Brecon Beacons National Park Landscape Mapping Project

March 2021[1]

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Contents

Executive Summary

The diversity of landscapes across the Brecon Beacons National Park requires different land management options appropriate to the character of each landscape. In order to inform decision making, a map of Level 2 (1:50,000) landscape types was generated for the whole of the National Park, using the GIS based Living Landscapes approach. The pre-existing Level 1 (1:250,000) landscape framework, covering the whole of Wales, was also reviewed and updated to provide a template for guiding subdivision of the National Park into the more detailed set of Level 2 landscape types. The strength of character and condition of each of these landscapes was evaluated, based on a combination of field work, remote mapping from Google Earth imagery and assessment of the Phase 1 Habitat Survey. Unsurprisingly, the results showed that landscape types characterised by recent coniferous planting (Forested Moorland Slopes) or intensive agriculture (Village Farmlands) show lower overall condition scores compared with, for example, some of the upland landscape types (Moorland Hills & Slopes) where visual impact from human activity is low and the survival of semi-natural habitat is high. The results of this analysis were then reviewed within the context of medium-term projections of land cover change to 2030, to generate a strategy/vision for each landscape type with accompanying land management guidelines. It is anticipated that this mapping and analysis will assist the National Park Authority with the development and monitoring of their Nature Recovery Action Plan.

Background

This report describes the work that was undertaken in response to a proposal from the Brecon Beacons National Authority in May 2020 (Appendix A). The objective was to review and update the pre-existing broad scale Level 1 (1:250 000) Land Description Unit (LDU) framework for Wales and to generate a more detailed, larger-scale set of Level 2 (1:50 000 scale) LDUs for the Brecon Beacons National Park. The ecological and cultural condition of each Level 2 LDU was subsequently evaluated with reference to high resolution air-photography available from Google Earth (© Google Earth) to inform an overall Landscape Strategy and Management Guidelines for each Landscape Character Type (LCT). A novel addition has been the projection of future land cover change to 2030, specifically semi-natural Broadleaf woodland[2], Acid grassland & Mountain, Heath & Bog, based on the introduction of the new system of agricultural payments (Sustainable Farming Scheme) proposed for the replacement of the CAP (Common Agricultural Policy) subsidy [1].

This report and associated data, available in a GIS compatible format, is designed to assist with the development and implementation of a Nature Recovery Action Plan for the national park [2]. The principles of the Welsh approach are integrated within the specific Nature Recovery Action Plan for the Brecon Beacons National Park, principally to 'help reverse the decline in biodiversity by focusing on developing resilient ecological networks (in other words "nature recovery networks") which are more diverse, greater in extent, in better ecological condition and better joined up'. A key component of the Nature Recovery Action Plan is to protect, restore and expand habitats. It is anticipated that the Level 2 LDUs will provide the spatial framework within which to prioritise the type of management intervention required to achieve this, across the diverse range of landscapes within the national park.

Methodology: Landscape Character Assessment (LCA)

Landscape character can be defined as ''a distinct, recognisable and consistent pattern of elements that make one landscape different from another, rather than better or worse" [3]. The Living Landscapes approach [4] used in this report is a system of Landscape Character Assessment (LCA) based on the mapping of Land Description Units (LDUs). LDUs are distinct and relatively homogeneous units of land each defined by a series of attributes that reflect mapped differences in the natural (geology, soils, topography) and cultural attributes (settlement pattern, land use and tree cover) of the landscape. These are categorized as: *physiography* and *ground type*, which describe the underlying natural dimension of the landscape; *landcover*, reflecting surface vegetation/land use; and *settlement pattern*, describing the structure of the cultural landscape.

There are two existing sources of landscape character mapping available for the national park. The Natural Resources Wales (NRW) map of landscape character is regional scale, essentially delineating *character areas* rather than landscape types, with the Brecon Beacons National Park mapped as a single character area [5]. Secondly, more detailed mapping was completed by Fiona Fyfe Associates in 2012 [6], a map of broad landscape types similar to the Level 1 mapping described and presented in this report.

LDU mapping and characterisation enables broad patterns to be distinguished. The iterative nature of this process assists in the understanding of how a particular landscape has developed and is the key to assessing the character of that landscape. Once the inherent character of the land has been described other aspects of the landscape, such as scale, form and enclosure, become apparent. Although these are the qualities which are most apparent to viewers on the ground, the fact that they are almost invariably controlled by either relief, or the surface pattern of vegetation and land

[2] Priority habitats.

use, explains why the LDUs defined by the process of overlay mapping can be used to define Landscape Character Types (LCTs). Similarly, it is much easier to evaluate the condition of a particular landscape and its capacity to accept change, where this is supported by knowledge of how that landscape has evolved.

The first task in the development of a landscape framework is a desk-based exercise involving the analysis of simplified map overlays to define the natural and cultural dimensions of the landscape. The natural dimension (physiography and ground type) is mapped first, not only because it provides a context for understanding the historical evolution of the landscape, but also because the baseline attributes of relief, geology and soils have 'real' boundaries which can be extracted from existing published maps. Cultural attributes do not usually have such clearly defined boundaries, but because of the constraints that have historically been imposed on land use by slope, soil fertility and drainage it is often possible to map cultural patterns at the landscape scale using the emerging LDU framework.

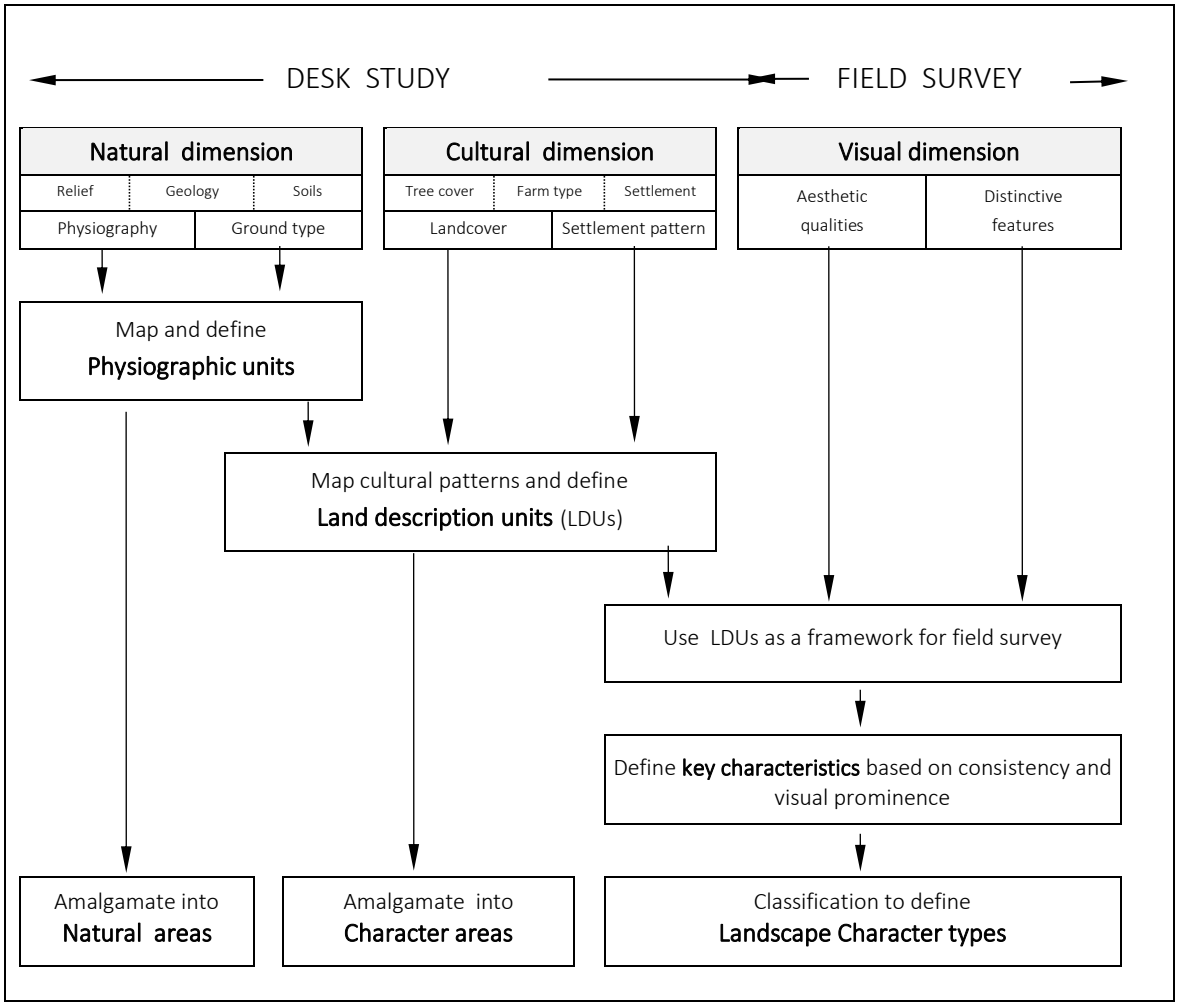


Figure 1. The Landscape Character Assessment process.

Each task in the process of LDU mapping involves a step-by-step procedure of data acquisition, processing and synthesis to produce a series of character-based overlays incorporating the key factors that contribute to landscape character (Figure 1). These factors are summarised by a series of codes/short descriptions in the GIS database. The LDU mapping process involves four main phases

of analysis to define the natural (physiography and ground type) and the cultural (land cover and cultural pattern) dimensions of the landscape:

Physiographic Analysis

Physiography is an expression of the shape and structure of the land surface as influenced both by the nature of the underlying geology and the effect of subsequent geomorphological processes. Two definitive attributes are used at Level 2, one defining the geological structure of the unit as derived from the British Geological Survey (BGS) geology map and the other to describe the form (and relative relief) of the land surface, as derived from the Ordnance Survey (OS) 10m contour map. The physiographic units emerge from a comparative visual analysis of the two attributes to identify boundaries that relate to the spatial correspondence between breaks in slope and differences in the underlying geology.

Ground Type Analysis

Ground type is an expression of the soil forming environment and its influence in determining the surface pattern of vegetation and land use. Two definitive attributes are used at Level 2, one describing the nature of the underlying bedrock/drift, as derived from BGS solid/drift geology maps and the other to reflect variations in the process of soil formation related to drainage and soil fertility, as derived from printed national soil maps. In most cases there is a close correspondence between rock type and soil but, in some situations, there are variations in soil type within a geological unit that require physiographic units to be sub-divided and mapped separately.

Landcover Analysis

Landcover is an expression of the type of vegetation (natural and man-made) covering the land surface. Two definitive attributes are used at Level 2, one describing the predominant land use/type of farming, the other reflecting the contribution that trees and woodlands make to the visual character of the landscape. Trees and woodlands are mapped separately using the National Inventory of Woodlands and Trees [7] and the NRW (Natural Resources Wales) Ancient Woodland Inventory [8], reflecting their specific contribution to the visual character of the landscape. The availability of land cover data is gradually improving with satellite derived classification of land cover generated by the Centre for Ecology and Hydrology [9][3] now widely available.

Cultural Pattern Analysis

Cultural pattern is an expression of the structural component of the cultural landscape as reflected in the historic pattern of land enclosure and rural settlement (presence of nuclei and degree of settlement dispersal). Two definitive attributes are used at Level 2, one describing the broad pattern of village formation and settlement dispersion, the other reflecting the structure (size/tenure) of agricultural land holdings. The analysis of settlement patterns and the contrast between a dispersed pattern of individual farms characteristic of both 'ancient' and more 'recent' planned landscapes and a nucleated pattern of villages associated with landscapes enclosed from a former feudal pattern of 'open fields', has long been observed and has been mapped by Roberts and Wrathmell [10]. However, this mapping does not include Wales and the Landmap historic layer was used as an alternative for the Brecon Beacons National Park [11].

Having defined the building blocks of the landscape the next step is to define Landscape Character Types (LCTs). In contrast to the mapping of LDUs, the derivation of LCTs recognises the human perception of prominent visual characteristics and/or locally distinctive features. For this reason, LCTs are defined by grouping together LDUs with the same prominent visual characteristics. Visual information is gathered from field survey for each LDU. The primary function of the field survey is

[3] Subject to a license agreement.

to identify the key characteristics that contribute to local distinctiveness and sense of place and to gather information about the condition of the landscape, in particular the impact of recent change. It is only when the field survey has been completed to include the visual dimension of the landscape and to identify the key characteristics that contribute to local distinctiveness, that it is possible to derive a typology of LCTs. For example, in unenclosed upland areas where landform is often a dominant visual element, LDUs with only subtly different patterns of Ground type and/or Land cover may be perceived as the same Landscape Character Type. Likewise, in wooded lowland landscapes where views are restricted by dense tree cover, similar LDUs may be perceived as part of the same LCT. Alternatively, where there is a strongly unified pattern of locally distinctive features, this may convey a strong sense of place contributing towards a distinctive type of landscape. For example, a planned and settled landscape of former land held in 'common' characterised by a strongly geometric pattern of straight roads, regular fields and scattered roadside dwellings, can have a very strong sense of place. In this way the process of deriving LCTs includes both the informed mapping of measurable patterns on the ground as well as how the landscape is perceived visually, thus merging the two aspects of 'landscape': objective mapping versus judgment and perception.

Level 1 Mapping

The existing Level 1 (1:250 000) LDU framework for Wales produced originally for the former Countryside Council for Wales (now NRW), was used to help with the generation of a larger scale (1:50 000) and more detailed Level 2 LDU map for the Brecon Beacons National Park. The revised Level 1 map (Fig. 2) is derived from four definitive attributes, reflecting the pairs of attributes (physiography, ground type, landcover & settlement pattern) used to map the Level 2 LDUs. These attributes were derived from published maps and interpreted visually on-screen using GIS software.

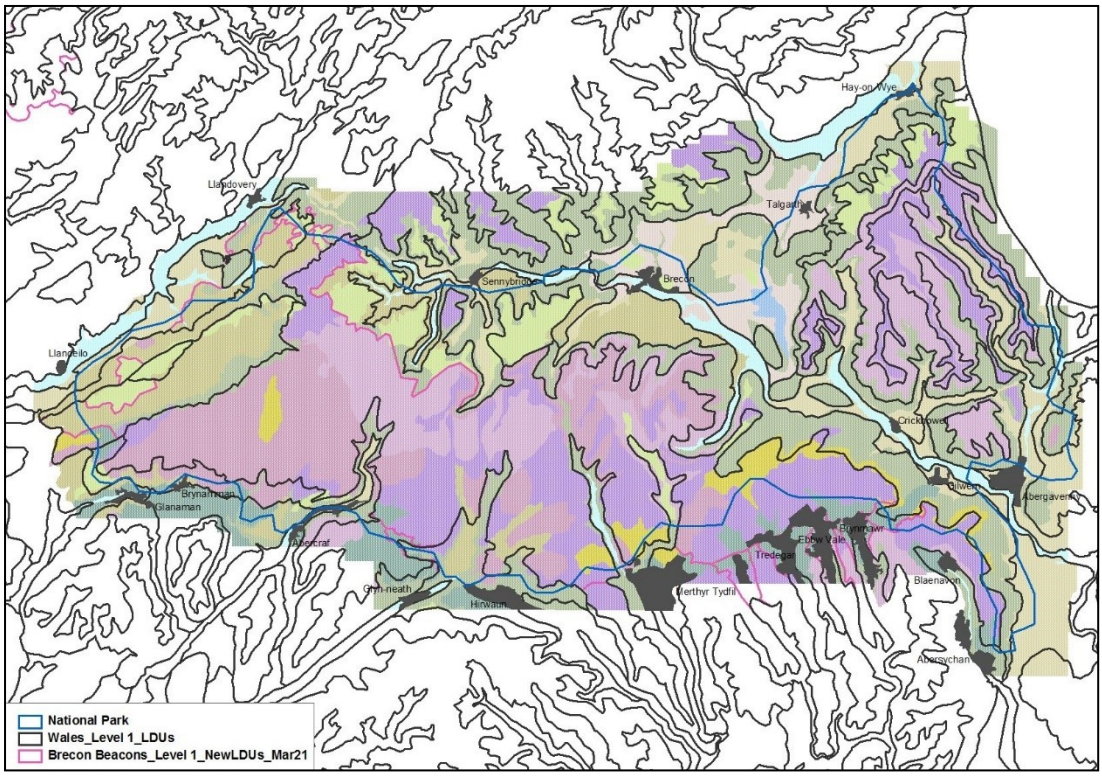


Figure 2. Map of Land Description Units (LDUs) derived from the national Level 1 (1:250,000) dataset for Wales (shown as thick grey lines), with amendments (shown as red lines) to reflect the underlying Level 2 Landscape Character Types (LCTs) mapped for this study.

Level 2 Mapping

By contrast, Level 2 mapping uses eight definitive attributes, providing more detail and therefore capable of mapping at larger scale than for the Level 1 framework. Completion of the Level 2 mapping provides a more refined framework on which to undertake the following three steps of analysis:

1. Classification of the Level 2 LDUs into Landscape Character Types (LCTs).
2. Analysis of the condition of each LCT.
3. Development of a Landscape Strategy & Management Guidelines for each LCT.

Classification into Landscape Character Types

The Level 2 LDUs have been classified into 12 discrete Landscape Character Types, which can be grouped into 5 broad categories (Table 1):

Unsettled upland landscapes:
- Moorland Plateau
- Rocky Hills & Slopes
- Moorland Hills & Slopes
- Limestone Hills & Slopes

Settled marginal upland landscapes:
- Upland Pastoral Enclosures
- Settled Upland Pastures

Wooded upland landscapes:
- Wooded Slopes & Valleys

Ancient settled farming landscapes:
- Ancient Pastoral farmlands
- Ancient Settled farmlands

Other Lowland landscapes:
- Village farmlands
- River Meadowlands
- Lakeshore Wetlands

Landscape Type	Ha	Percent
Ancient Pastoral Farmlands	13181	9.76
Ancient Settled Farmlands	8813	6.53
Forested Moorland Plateau	7240	5.36
Forested Moorland Slopes	4240	3.14
Forested Pastoral Enclosures	3685	2.73
Lakeshore Wetlands	526	0.39
Limestone Hills & Slopes	3598	2.66
Moorland Hills & Slopes	16220	12.01
Moorland Plateau	13542	10.03
River Meadowlands	3556	2.63
Rocky Hills & Slopes	19953	14.78
Settled Upland Pastures	1744	1.29
Upland Pastoral Enclosures	4296	3.18

Urban	820	0.61
Village Farmlands	3263	2.42
Wooded Slopes & Valleys	30348	22.48
Totals	**135025**	**100.00**

Table 1. Area (ha & percent) of each mapped Landscape Character Type within the Brecon Beacons National Park.

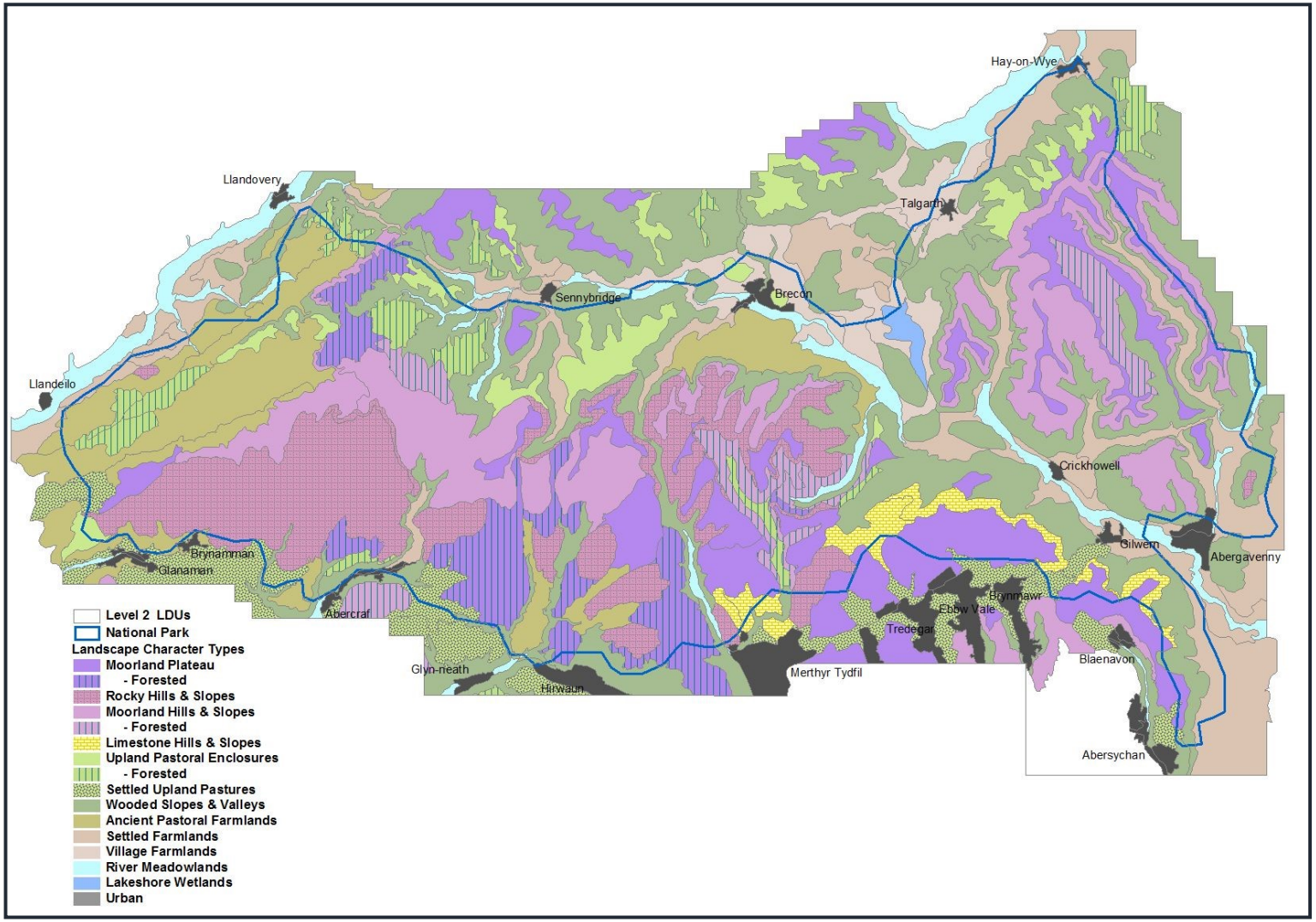


Figure 3. Map of Landscape Character Types (LCTs) for the Brecon Beacons National Park. Based on a ***Level 2*** (1:50,000) analysis of map overlays to define LDUs (shown as fine grey lines), reflecting the **shape of the land** (landform and *structural* geology), **ground type** (rock *type* and soils), **settlement pattern** (type of settlement and farm structure) and **land cover** (farm type and tree cover), which are then classified into LCTs describing the visual character of the landscape.

Analysis of Condition

A condition analysis was undertaken to determine the extent to which individual LDUs retain their visual, cultural, and ecological character. Condition (Fig. 4) includes two components: **visual impact** (extent & magnitude) and **functional integrity** (the survival/appropriate management of cultural patterns and habitats). Normally, these two components are assessed and evaluated from fieldwork. In this case, however, only a preliminary analysis was carried out using high resolution Google Earth imagery and the Phase 1 Habitat Survey for Wales [12]. Additional fieldwork would be needed both to add essential detail and to validate the results.

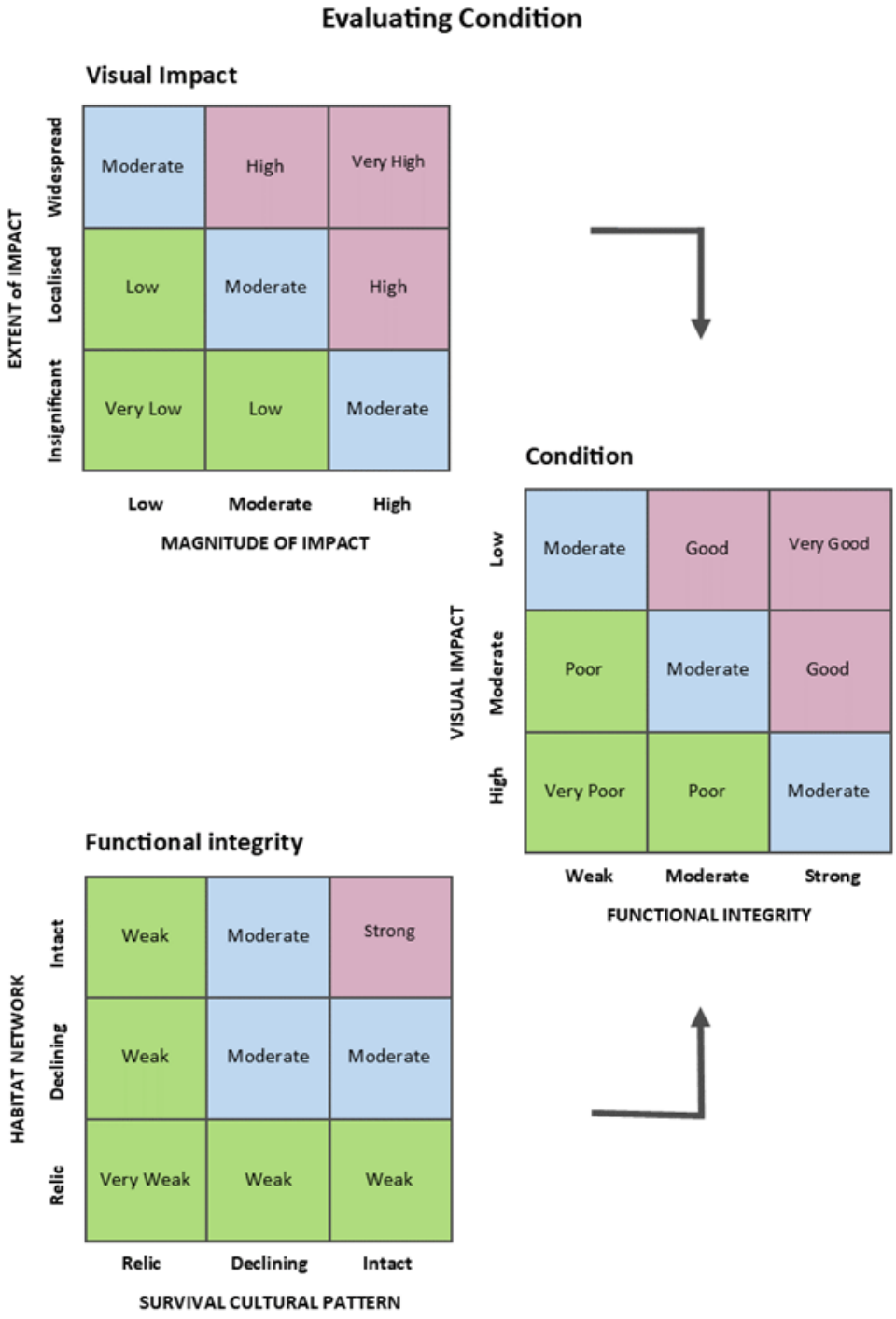


Figure 4. Matrix for analysis of condition

Visual impact

This involves assessment of both the extent and magnitude of any visual impacts within an LDU that detract from the intrinsic character of the landscape. Examples include quarrying/mining, extensive coniferous plantations, agricultural change, new housing/roads and reservoirs. The matrix in Figure 4 shows how visual impact is a measure of both the magnitude of recent change (low, moderate or high), depending upon whether it was appropriate or not within a given landscape and the spatial extent (insignificant, localised or widespread) of that change. Where change reflects the underlying character of a landscape it may be deemed to have a low impact, whereas if it does not 'fit' the impact may be high.

Functional Integrity

Functional integrity refers to the survival of both the cultural pattern and the habitat network within a particular landscape, reflecting both the structure of surviving patterns and the intensity of land use. Thus, a moorland landscape may still retain its open, unenclosed cultural character, while its ecological function may be in decline, perhaps through the replacement of heathland vegetation with acid grassland as the result of long-term, intensive sheep grazing. Figure 5 shows an example of the analysis of condition in a Level 2 Forested Pastoral Landscape lying to the south-east of the Usk reservoir. This illustrates how the condition of each LDU is evaluated according to the two components of visual impact and functional integrity:

Visual Impact:

Impact: ***High*** - new woodland planting has changed the visual character of the landscape.

Extent: ***Widespread*** - extensive coniferous plantations.

Functional integrity:

Habitat network: ***Relic*** - minimal survival of former semi-natural habitats.

Cultural survival: ***Relic*** - enclosed farmland replaced by new forestry plantations.

The overall condition is thus **poor** (high and widespread visual/functional impact) reflecting extensive conifer planting and loss of the former enclosed agricultural landscape in more than half of the LDU.

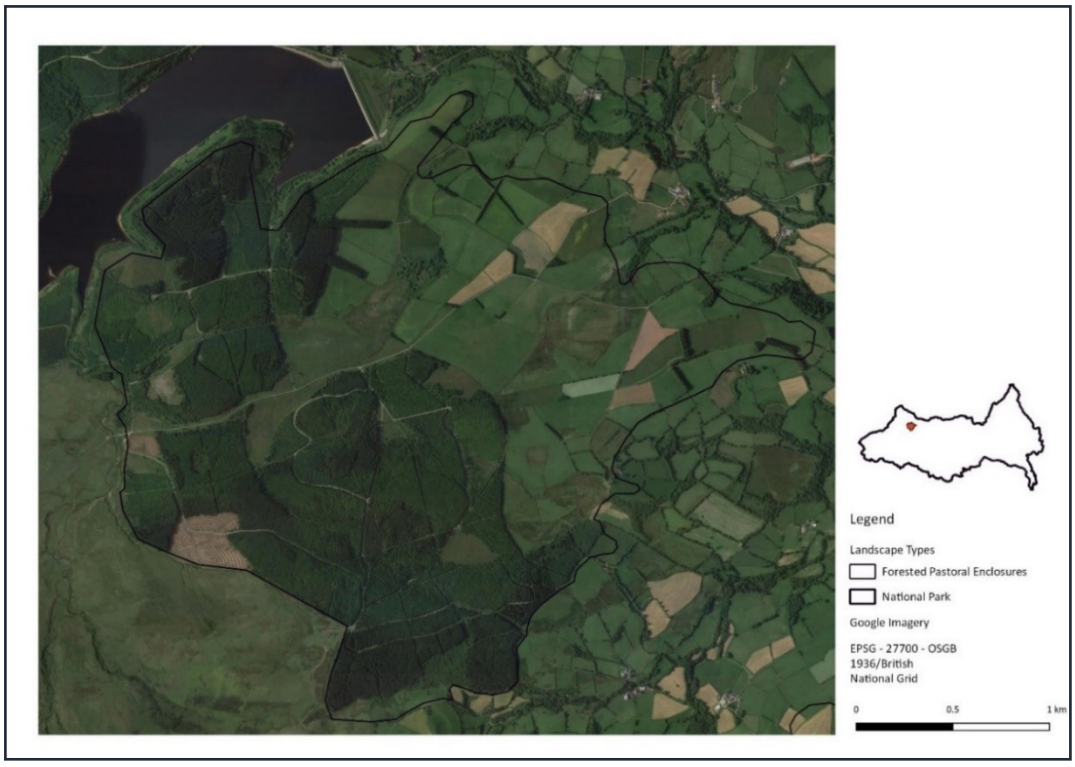


Figure 5. Example Google Earth (©Google Earth) image of a Level 2 LDU - Forested Pastoral Enclosures.

Table 2 summaries the condition 'score' for each landscape type. Each landscape types comprises a number of LDU2 landscape units, each of which was scored separately. The table, therefore, only provides a general estimate of the combined condition score for all of the LDUs within each LCT. Unsurprisingly, landscape types that are characterised by recent coniferous planting (Forested Moorland Slopes) or intensive agriculture (Village Farmlands) show lower overall condition scores, compared with, for example, some of the upland landscape types (Moorland Hills & Slopes) where visual impact is low and the survival of semi-natural habitat is greater.

Landscape Type	Condition score			
Ancient Farmed Lowlands			Very poor	
Ancient Pastoral Farmlands			Poor	
Forested Moorland Plateau			Moderate	
Forested Moorland Slopes			Good	
Forested Pastoral Enclosures				
Lakeshore Wetlands				
Limestone Hills & Slopes				
Moorland Hills & Slopes				
Moorland Plateau				
River Meadowlands				
Rocky Hills & Slopes				
Settled Farmlands				
Settled Upland Pastures				
Upland Pastoral Enclosures				
Village Farmlands				
Wooded Slopes & Valleys				

Table 2: General condition scores for landscape types.

Projections of Future Land cover

The departure of the UK from the Common Agricultural Policy (CAP) will result in significant changes in policy affecting land cover and land use. Projections of future land cover change to 2030 were modeled for a set of broad land cover categories based on an analysis of past land cover change derived from the Centre for Ecology and Hydrology (CEH) Land Cover Maps for 2007 & 2015 [9]. Critically, the analysis of past land cover transitions is 'explained' by a set of statistically significant variables (Appendix B) that are used to project future change. Once the significant variables have been identified, the matrix of land cover transitions can be modified to reflect a specific scenario, i.e., 'Business-as-Usual', or 'Green Futures'. This is essentially an assumption about how the scenario would affect the land area of a specific land cover type into the future, in this case the medium-term to 2030. Whilst a range of scenarios and land cover types was modeled [13], only two scenarios and three land cover types (Broadleaf woodland, Acid grassland & Mountain, Heath & Bog[4]) were considered. The benefit of the approach is that the impact of policy is modeled *spatially*, providing a projection of the type of land cover that could occur under contrasting scenarios. In combination with the analysis of condition this provides additional detail for the development of a landscape strategy for each LCT (see Landscape Strategy section, below). The two scenarios were:

Business-as-Usual (B-a-U)

This assumes that Wales continues to apply a non-reformed version of the Common Agricultural Policy (CAP). Business as usual therefore, represents a simple linear extrapolation of current land cover trends observed over the recent past (2007-2015) (Appendix C).

[4] Refers to the land cover typology of Broad Habitats used by the CEH Land Cover Map [7]

Green Futures

Under this scenario Wales pursues its own policy geared towards environmental responsibility and landscape sustainability, based on indicative proposals of the Welsh government [1]. The most significant change is a move away from direct subsidies and towards paying for environmental benefits. A number of land cover trends remain the same as for Business as usual, but by 2030 we foresee a 100% increase in the 2015 area of Broadleaf woodland (Fig. 6) and a 50% increase of Conifer plantations. There will be no further reduction of Mountain, Heath & Bog but an increase in Acid grassland (Appendix C)[5].

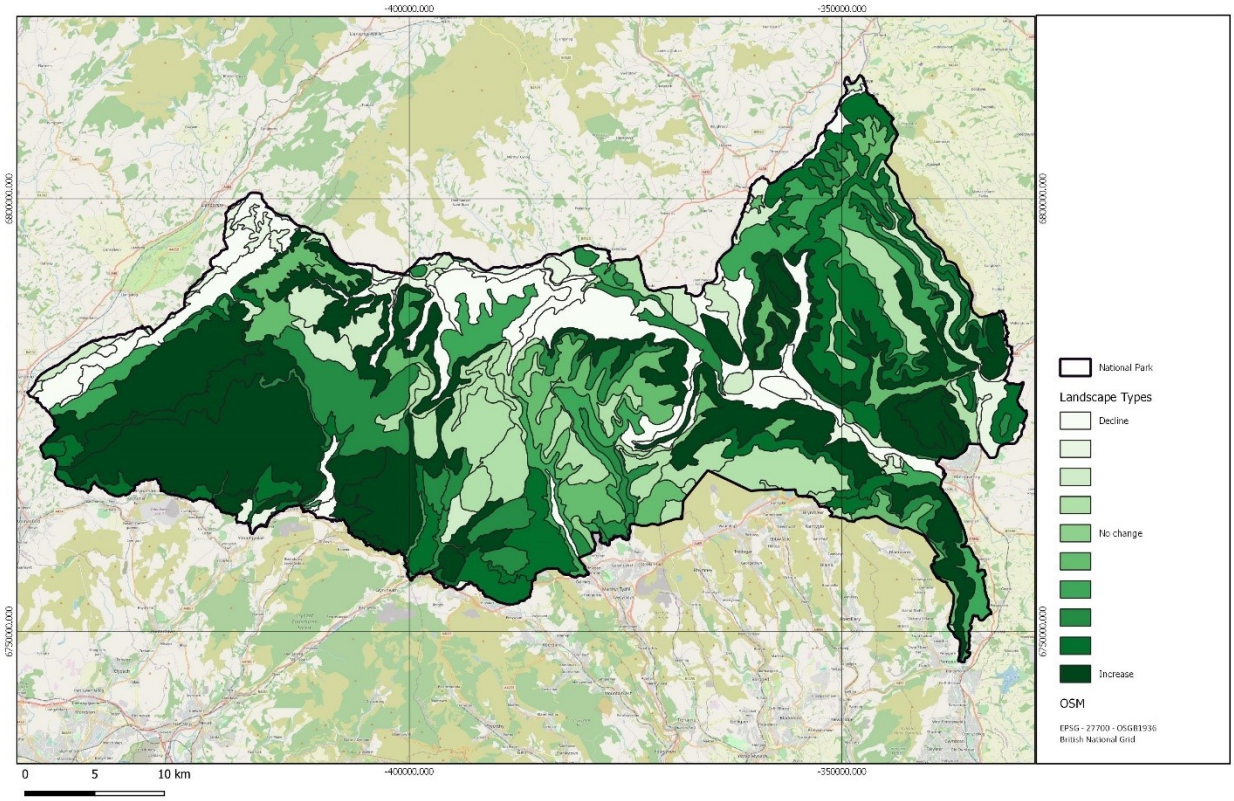


Figure 6. Change in the extent of Broadleaf woodland by LCT under the Green Futures scenario [source: CEH LCM data].

[5] It is relatively straightforward to run new scenarios based on different sets of assumptions of the impact of future policy.

Development of a Landscape Strategy

Analysis of condition in combination with an evaluation of strength of character can be used to develop a landscape strategy for each landscape type (Fig. 7). A LCT with a strong character and in good condition would result in a recommendation to 'Conserve'. By contrast, where character is weak and condition poor, there will be opportunities for the 'Creation' of new landscapes.

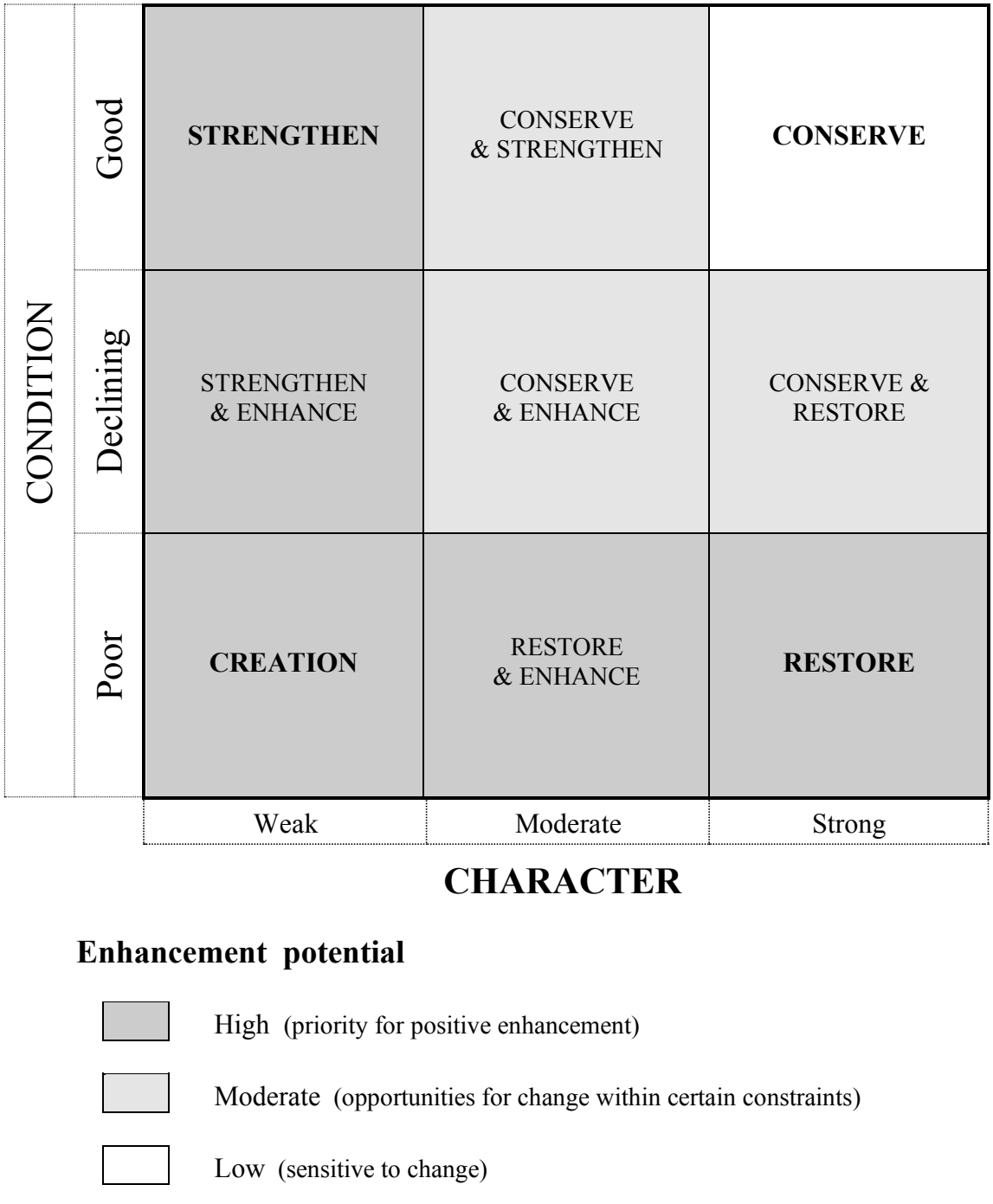


Figure 7. The development of a landscape strategy based upon the combined evaluation of strength of character and condition.

Local Landscape character type descriptions

MOORLAND PLATEAU

Overall character

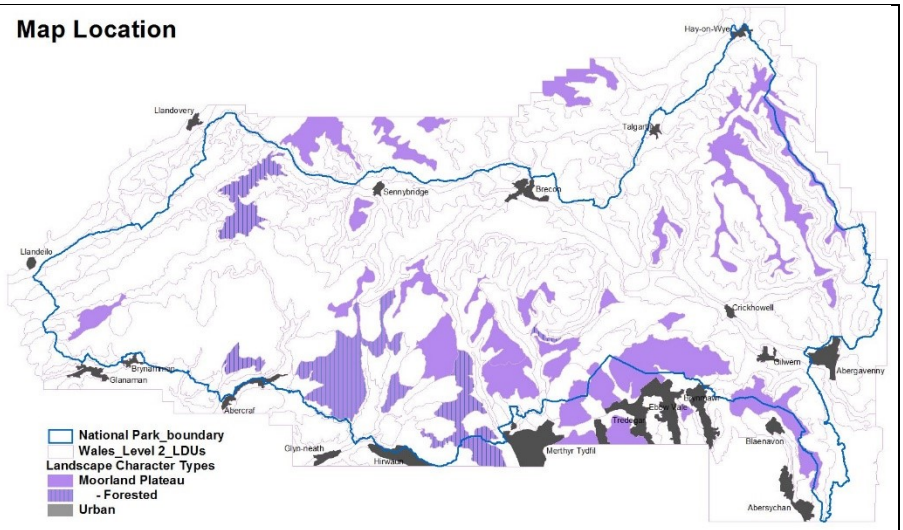
An upstanding, open, rolling moorland landscape bounded on one or more sides by steeply sloping ground. The mineral soils are generally peaty and covered by heather moorland with patches of blanket bog on the higher parts of the plateau. This is an unsettled landscape with wide views to distant surrounding hills and valleys giving a strong sense of remoteness and space.

SN 981132

Key characteristics

- Rolling sandstone summits.
- Thin impoverished soils with deposits of peat.
- Unenclosed heather and grass moor.
- Unsettled/unenclosed with wide views.

Map Location



Location

This landscape is widely distributed and occurs on higher ground throughout the national park and comprises two landscape sub-types: Moorland Plateau & Forested Moorland Plateau. There is also a third sub-type including the highest/most open and exposed land which could possibly be another LCT called 'High Moors'.

Strength of Character

The upland rolling topography and peaty soils, together with the extensive areas of unenclosed moorland and panoramic views, are dominant elements in this landscape, creating a ***strong strength of character***. This is a wild landscape with a strong semi-natural character that is reinforced by a lack of human structures and feeling of remoteness. In its natural state the Moorland Plateau has probably always been more open in character, with a covering of dwarf shrub vegetation and localised boggy ('peaty')[6] hollows, in contrast to the more wooded mineral soils on the adjoining steeply sloping ground. This pattern has been sustained by the traditional management of open grazing on the unenclosed commons and is dependent on an appropriate management regime to maintain more diverse and ecologically rich dwarf shrub (ericaceous) habitats.

Condition - Moorland plateau

The majority of the Moorland Plateau LCT is classified as being in ***good condition*** although overgrazing, resulting in a decline of woody vegetation such as dwarf shrub heath, may be a problem in some locations. Visual impacts are generally low, confined to some fringing coniferous plantations, for example at Coed y Rhaiadr in the southern part of the national park. Habitat survival derived from the Phase 1 Habitat Survey is generally high, with areas of unimproved Acid grassland[7] and Flush on localised deposits of deeper peat. Whilst it is not possible to see evidence of overgrazing in upland LCTs from the Google Earth air-photography, there is considerable botanical evidence indicating that extensive areas of the National Park are overgrazed. This is considered to be an issue affecting the landscape strategy in all of the unsettled upland LCTs throughout the Park. Both Acid grassland and Mountain, heath & bog are projected to decline under the B-a-U scenario but to increase under the Green Futures scenario.

Condition - Forested Moorland plateau

By contrast, the condition of the Forested Moorland Plateau sub-type is generally ***poor***, reflecting the visual and ecological impact of relatively recent coniferous planting. Woodland, in particular modern forestry, is not a feature of the wider Moorland Plateau and there is also little potential for a significant increase in Broadleaf woodland within this landscape.

Landscape Strategy

The strong character of the Moorland Plateau Landscape, created by the consistent and historic pattern of unenclosed moorland with wide views, combined with the widespread survival of semi-natural habitats, some of which may currently be overgrazed, would suggest that ***Conserve and Restore*** (Fig. 7) is the optimal strategy for this landscape type. In areas where overgrazing has resulted in the replacement of heathland communities with acid grassland, there is an opportunity to 'restore' the quality and extent of the heathland.

[6] The small-scale and generalised soil mapping means that some localised differences in soil type are not shown.
[7] Names of CEH broad habitat types are capitalised otherwise, when used generically, written in lower case.

By contrast, the poor condition of the Forested Moorland Plateau sub-landscape, as a result of land use change and subsequent visual impact/loss of semi-natural habitat, leads to a strategy of ***Restore and Enhance***. This would involve a gradual removal of the coniferous plantations and the restoration of former semi-natural habitats, possibly associated with the regeneration of some semi-natural woodland on patches of sloping/more freely draining land within, or around the edge of this landscape.

Management Guidelines

- *Conserve/Restore* the open, unenclosed moorland character.
- Develop a strategy for the gradual removal of coniferous planting as it matures and replace with moorland vegetation.
- Maintain and expand areas of ecologically important semi-natural habitats, specifically patches of wet flush, bog and heathland.
- Identify opportunities for the creation of small patches of semi-natural broadleaf woodland on suitable sites.

ROCKY HILLS & SLOPES

Overall character

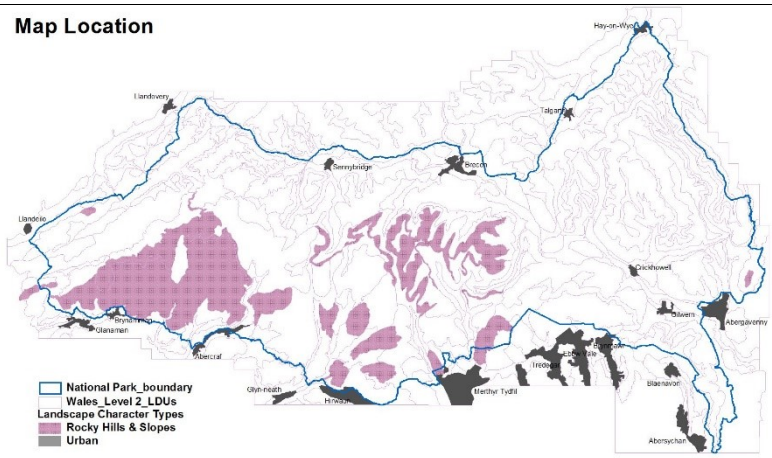
A steeply sloping and often visually dramatic upland landscape characterised in places by rocky sandstone scarps, rising to open moorland summits. This is a wild unsettled landscape of rough grassland, bracken and heathland, with exposed and distant views over adjoining lower lying ground.

SO 021245

Key characteristics

- Steeply sloping land, often topped by precipitous cliffs.
- Prominent sandstone edges, scree slopes and scattered rock outcrops.
- Thin soils over sandstone bedrock with relict quarries.
- Rough acid grassland, bracken and heather moorland grazed by sheep.
- Panoramic views over adjoining lower ground.

Map Location



Location

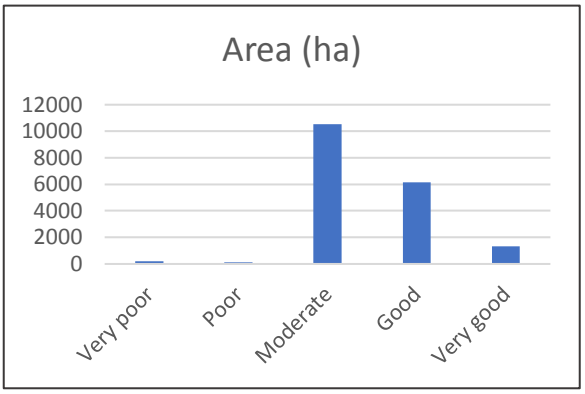
This landscape is widely distributed and occurs on higher rising ground, primarily in the central and south western parts of the national park.

Strength of Character

The steeply sloping topography, extensive areas of unenclosed land, the presence of prominent rocky outcrops, comprising a range of different rock types, and the panoramic views are key elements in this landscape, creating a ***strong*** and pronounced ***strength of character***. This is a wild landscape with a dominant semi-natural character that is reinforced by a lack of human structures and feeling of remoteness. In its natural state the Rocky Hills & Slopes would have been more wooded, with a covering of dwarf shrub vegetation and patches of semi-natural woodland, particularly on the steeper/more rocky slopes. This pattern, in contrast to its current overgrazed state, would have been sustained historically by the traditional management of open grazing on the unenclosed commons to maintain diverse and ecologically rich dwarf shrub (ericaceous) and semi-natural woodland habitats, with considerable benefits for biodiversity.

Condition[8]

A LCT that is generally in ***moderate*** to ***good*** condition, reflecting the marginal nature of the landscape which is unsuited to agricultural improvement. This landscape still retains extensive areas of unimproved Acid grassland and Wet/Dry heath, with smaller patches of Calcareous grassland, as well as Wet flushes. The good condition also reflects the absence of visual impacts, but it is primarily the survival of extensive areas of semi-natural vegetation that is a key feature of this landscape.



Landscape Strategy

The very strong natural character, created by the sloping topography, rocky outcrops, unenclosed moorland and the widespread survival of semi-natural habitats, some of which may currently be overgrazed, would suggest that ***Conserve and Restore*** (Fig. 7) is the optimal strategy for this landscape type. Dry/Wet heathland dominates many parts of this landscape, for example large areas of Mynydd Du and it is important that this is maintained and where necessary, restored. The Green Futures scenarios also indicates the potential for a substantial increase in woodland cover from a very low baseline. This would be best achieved through semi-natural regeneration and re-planting under a regime of reduced grazing and/or within temporarily fenced enclosures to allow patches of woodland to become established. This would change the visual appearance of the existing landscape, perhaps reflecting the past appearance of this landscape, but with considerable benefits for biodiversity. Such a strategy would involve modifying the existing management regime on the commons, which would require support for farmers and other landowners.

Management Guidelines

- *Conserve and restore* areas of Dry/Wet heathland.
- Seek opportunities to create semi-natural Broadleaf woodland on suitable sites.

[8] Graphs are only shown where there is a wide range of values to facilitate comparisons.

MOORLAND HILLS & SLOPES

Overall character

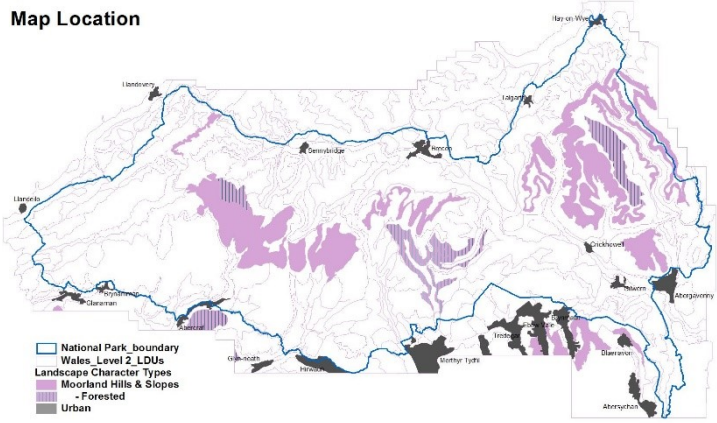
A steeply sloping and open, upland landscape characterised by deep valleys and high ridges, often capped by localised, but prominent outcrops of red sandstone. Acid grassland, patches of heather and more extensive areas of bracken, with pockets of scrub and secondary woodland, reflect the free draining and impoverished nature of the underlying soils. Much of this wild, unsettled landscape is extensively grazed by sheep and there are panoramic views to surrounding hills and over the lower lying land to the north of the national park.

SO 266182

Key characteristics

- High hills and slopes dissected by narrow steep sided valleys.
- Prominent rock outcrops often along the upper edge of this landscape.
- Thin impoverished soils over sandstone bedrock.
- Rough grassland and dry heath extensively grazed by sheep.
- Occasional historic stone quarries.
- Panoramic views over adjoining lower ground.

Map Location



Location

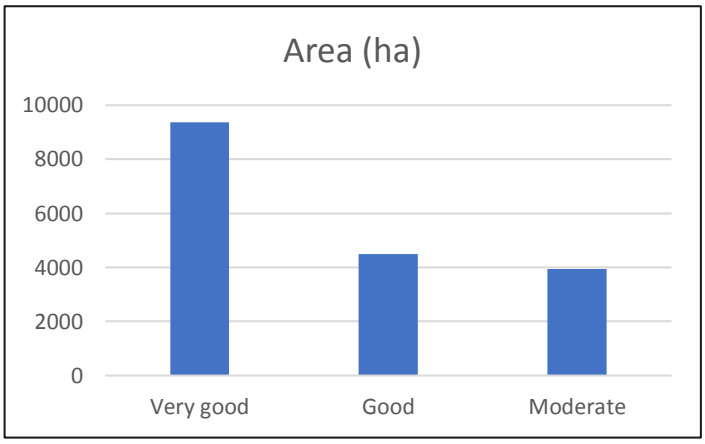
This landscape is widely distributed and occurs on higher rising ground throughout the national park.

Strength of Character

The steeply sloping topography, extensive areas of unenclosed land and the panoramic views are key elements in this landscape, creating a ***strong strength of character***. This is a wild landscape with a dominant semi-natural character that is reinforced by the lack of human structures and feeling of remoteness. In its natural state the Moorland Hills & Slopes would have been more wooded, with a covering of dwarf shrub vegetation and patches of semi-natural woodland, particularly on the steepest slopes. This pattern, in contrast to its current overgrazed state, would have been sustained historically by the traditional management of open grazing on the unenclosed commons to maintain diverse and ecologically rich dwarf shrub (ericaceous) and semi-natural woodland habitats, with considerable benefits for biodiversity.

Condition – Moorland Hills & Slopes

An LCT that is generally in ***very good***, or ***good condition***, reflecting the marginal nature of the land in this LCT which, being unsuited to agricultural improvement, still retains extensive areas of Wet/Dry heathland and unimproved Acid grassland. Whilst the good condition reflects the absence of visual impacts it is primarily the survival of extensive areas of semi-natural vegetation, principally the large areas of Dry heathland on the Black Mountains, that is a key feature of this landscape.



Condition - Forested Moorland Slopes

By contrast, the condition of the Forested Moorland Hills & Slopes sub-type is generally ***poor***, reflecting the visual and ecological impact of relatively recent coniferous planting, especially in the Grwyne Fawr, Caerfanell and Taf Fechan valleys in the eastern and central areas of the park. Woodland, in particular modern forestry, is currently not a feature of the wider Moorland Hills & Slopes, but there is considerable scope for an increase in Broadleaf woodland within this landscape.

Landscape Strategy

The very strong natural character, created by the sloping topography, unenclosed moorland and the widespread survival of semi-natural habitats, some of which may currently be overgrazed, would suggest that ***Conserve and Restore*** (Fig. 7) is the optimal strategy for this landscape type. Dry heath communities dominate many parts of the landscape particularly in the Black Mountains, and it is important that this is maintained and where necessary restored. The extent of Broadleaf woodland is low in this high and open landscape, but the Green Futures scenarios indicates the potential for a modest increase in woodland cover from this very low baseline, particularly in areas dominated by an almost continuous cover of Bracken. This would be best achieved through semi-natural regeneration and re-planting under a regime of reduced grazing and/or within temporarily fenced enclosures to allow patches of woodland to become established. This would change the visual appearance of the existing landscape, perhaps back to the past appearance of this landscape, but with considerable benefits for biodiversity. Such a strategy would involve modifying

the existing management regime on the commons, which would require support for farmers and other landowners.

By contrast, the poor condition of the Forested Moorland Slopes sub-landscape, as a result of land use change and subsequent visual impact/loss of semi-natural habitat, leads to a strategy of ***Restore and Enhance***. This would involve a gradual programme of re-designing the shape of the coniferous plantations, leading both to the planting/regeneration of Broadleaf woodland and the restoration of former semi-natural habitats.

Management Guidelines

- *Conserve and Restore* Dry heath vegetation communities.
- Develop a strategy for the gradual replacement of uniform coniferous plantations with more irregularly shaped Broadleaf woodland.
- Seek opportunities to re-create semi-natural Broadleaf woodland on other suitable sites.

LIMESTONE HILLS & SLOPES

Overall character

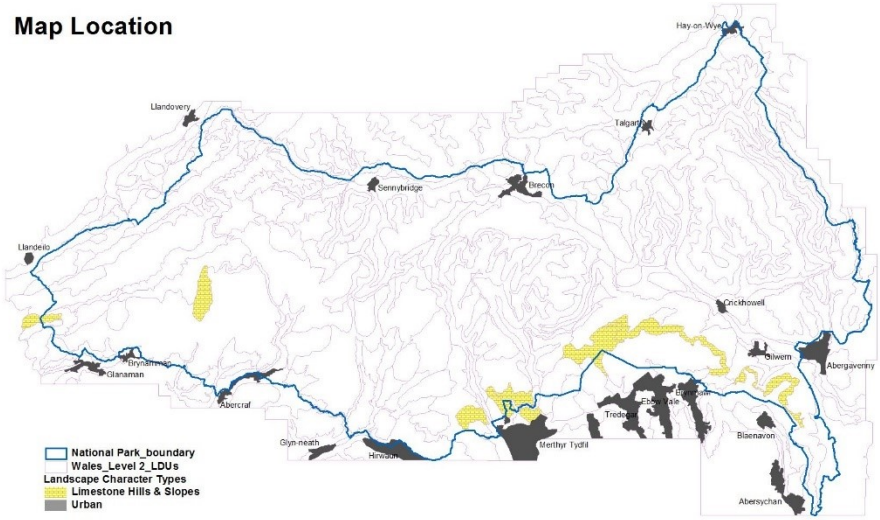
A largely unsettled upland landscape with a varied undulating and in places rocky/steeply sloping topography. This is a sparsely populated landscape with extensive patches of rough ground, including limestone grassland/heath and patches of scrub/ woodland, interspersed by pockets of small to medium sized pastoral fields enclosed by stone walls. There are many open views northwards over the Usk valley to the adjoining Black Mountains.

SO186167

Key characteristics

- Varied, undulating, in places steeply sloping topography.
- Frequent rock outcrops.
- Large patches of Calcareous grassland / Dry heath.
- Patches of secondary woodland and scrub.
- Pockets of small to medium sized walled fields.
- Open views to distant skylines.

Map Location



Location

This landscape mainly occurs in a narrow band around the along the south eastern edge of the national park, with 2 outliers in the western end of the park.

Strength of Character

The prominent and distinctive rocky topography, extensive areas of unenclosed semi-natural grassland with more localised patches of heath and the surrounding panoramic views are the distinguishing features of the Limestone Hills & Slopes LCT, creating a ***strong*** and pronounced ***strength of character***. Although there remaining patches of semi-natural woodland and scrub, particularly on the steeper/more rocky slopes, in its natural state this landscape would have been much more wooded, with considerable benefits for biodiversity.

Condition

An LCT that is generally in moderate condition, reflecting its location along the southern edge of the national park with its long history of mining and quarrying. Lack of grazing has resulted in some areas reverting to scrub and woodland, whilst quarrying has a significant, if localised, visual impact.

Landscape Strategy

The varied topography and diverse range of semi-natural habitats that give this landscape a strong character, combined with its generally poor-moderate condition, indicates a ***Conserve and Restore*** strategy (Fig. 7). There is a need to identify those areas where appropriate grazing and scrub control should be a priority to maintain the mosaic of diverse habitats, especially areas of Calcareous grassland. Other areas should also be identified, where the retention of scrub and encouragement of woodland regeneration would be more appropriate.

This is not a well-wooded landscape with the exception of some ecologically interesting woodland at, for example, Craig y Cilau. The Business-as-Usual scenario indicates a significant increase in Broadleaf woodland compared with Green Futures, possibly an indication of the likelihood of upland abandonment in this agriculturally marginal LCT. The strategy, therefore, should seek to encourage Broadleaf woodland, but not at the expense of other semi-natural habitats, especially Calcareous grassland.

Management Guidelines

- *Conserve/Enhance* semi-natural habitats associated with the limestone geology, specifically Calcareous grassland.
- Encourage Broadleaf woodland in restricted areas, but not at the expense of other ecologically important semi-natural habitats.

UPLAND PASTORAL ENCLOSURES

Overall character

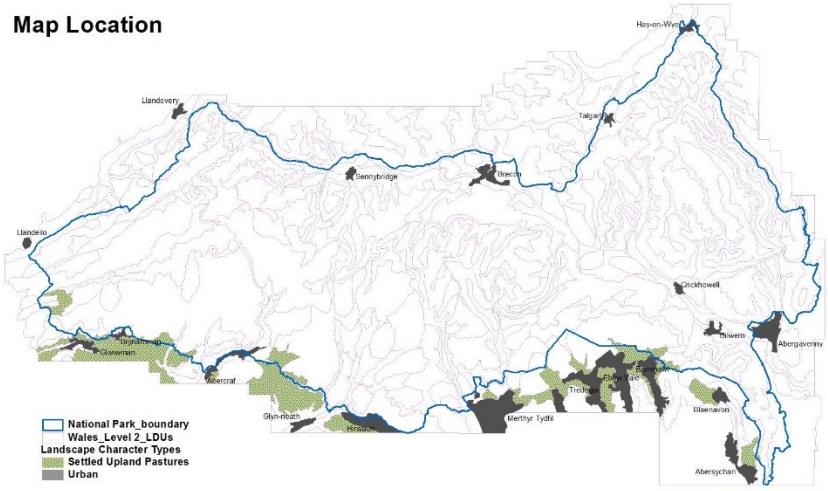
An enclosed upland pastoral landscape associated with impoverished, in places peaty soils on gently rolling plateau summits. This is a 19th century planned landscape created by Parliamentary enclosure of heath/moor and characterised by isolated stone farmsteads, straight roads and regular fields of variable size. Views are framed in places by forestry plantations, but otherwise this is an open landscape with little tree cover to obscure long distance views.

SN882266

Key characteristics

- Rolling upland landform.
- Poor soils with a relic moorland character.
- Pastoral farmland with extensive areas of grazing land.
- Medium sized regular fields, enclosed by hedgebanks/drystone walls.
- Planned pattern of straight roads.
- Isolated farmsteads.
- Open, long distance views framed in places by forestry.

Map Location



Location

This landscape occurs in scattered areas primarily on the northern fringe of the national park, on lower summits running down from the higher moorlands.

Strength of Character

The Upland Pastoral Enclosures is a geometric planned landscape created by parliamentary enclosure over a short period of time giving it a strongly unified character. The subdued rolling landform and the localised presence of conifer plantations, however, tend to restrict views, making it more difficult to get a clear impression of the overall character. In combination with the fact that it is a relatively recent landscape with limited 'time depth' and only isolated remnant patches of semi-natural habitat, the Upland Pastoral Enclosures LCT displays only a ***moderate strength of character***.

Condition

The condition of Upland Pastoral Enclosures is ***moderate to poor***, reflecting the on-going improvement of grassland for sheep grazing. Within the Forested Pastoral Enclosures, however, conifer plantations create a much stronger sense of enclosure (e.g. Taf Fechnan). The extent of Broadleaf woodland is low in both sub-types, but particularly in the Upland Pastoral Enclosures. Localised patches of semi-natural habitat still survive across both landscape sub-types, but much of this is covered by extensive areas of invading Bracken.

Landscape Strategy

This is not an LCT with a particularly strong character and when combined with its relatively poor condition, indicates a strategy of ***Restore and Enhance***. Although the land cover projections do not indicate the opportunity for significant new Broadleaf woodland in either sub-type, the results of our character assessment would suggest that there is scope to create a new landscape within the Upland Pastoral Enclosures that has a more functional wooded character. Although there is only minimal survival of areas of semi-natural habitat, these remaining patches could be expanded and linked together to form a more unified structure of existing and new woodlands, separated by pockets of more open farmland. Not only would this allow the creation of productive and biodiverse woodlands within a landscape that is able to accept such a change, but it would also balance the proposal to remove adjoining upland forestry plantations.

Management Guidelines

- *Conserve* and restore all surviving patches of semi-natural habitat, principally isolated patches of Dry heathland/Acid grassland mosaic.
- Seek opportunities to link the surviving patches of semi-natural habitat to create a core of open land that connects with the adjoining moorland.
- *Enhance* tree cover through the creation of a well-designed and more unified structure of existing and new woodlands.
- Retain pockets of open farmland as a balance to the new wooded character of this landscape.

SETTLED UPLAND PASTURES

Overall character

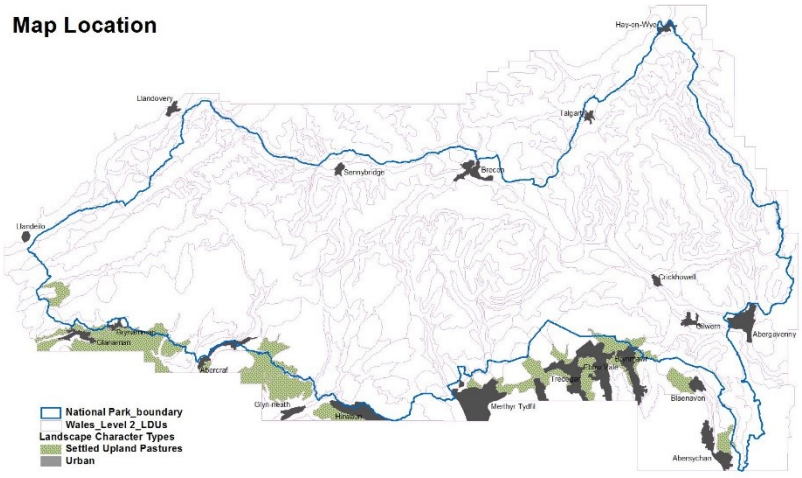
An upland pastoral landscape with a significant number of small farmsteads and dispersed settlement, many of which were originally associated with surrounding mining/quarrying activities. Overall, this is a landscape of unimproved permanent pasture and patches of scrub/secondary woodland, enclosed by drystone walls and areas of disturbed ground reverting to moorland. Relic industrial activity characterised by coal mining, quarrying and other types of mineral extraction are a key feature of this landscape. These activities are associated with the growth of larger industrial settlements along the southern fringe of the national park.

SO 228126

Key characteristics

- Undulating upland topography.
- Thin soils over sandstone bedrock.
- Patches of acid grassland and heather moorland.
- Small pastoral fields enclosed by drystone walls.
- Patches of secondary wood/scrub.
- Relic earthworks associated with former mining activities.
- Dispersed settlement with clusters of brick terrace housing along lanes.

Map Location



Location

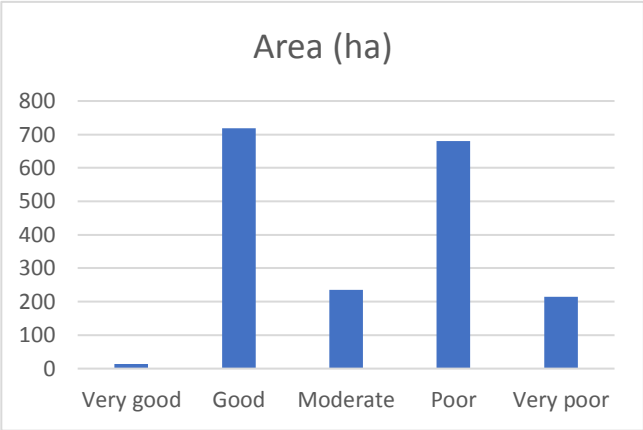
This landscape occurs around the southern fringe of the national park where it is closely associated with the quarrying and the former mining of minerals in this area. Although there are 10 LDUs wholly or partly within the National Park these represent only 1.4 percent of the total land area.

Strength of Character

The Settled Upland Pastures is a marginal agricultural landscape that has been affected in a variety of ways over a long period of time by mining, quarrying and other types of mineral extraction, including more recent industrial development. This is reflected in the broad zone of urban activity that has grown up around the southern fringe of the national park. Although the boundary of the park has been drawn to largely exclude this LCT, it still includes a number of LDUs that contain patches of semi-natural habitat and relics of some early mining activity. Many of these areas have a relatively ***strong historic/industrial strength of character***, but this often sits within a degraded wider landscape.

Condition

Condition is highly variable across this landscape reflecting its varied character, including wildland, pockets of 'ancient' and more recent marginal farmland as well as mining/quarrying activities. Urban influences associated with the South Wales Valleys also occur along the southern edge of the national park, notably at Brynmawr. Associated visual impacts, such as new housing at Cefn-bryn-brain and coniferous planting at Nant Gwys, result in many areas having a ***poor, or very poor condition***.



Landscape Strategy

The Settled Upland Pastures is a relatively well wooded landscape with evidence in some areas of agricultural abandonment and woodland regeneration, for example at Capel Dewi close to the western perimeter of the national park. Whilst the natural and in places cultural character of this landscape is relatively strong reflecting the steep upland topography and patches of secondary woodland/other semi-natural vegetation, the poor condition of many LDUs indicates the need for a ***Restore and Enhance*** strategy. This could be achieved in this relatively small scale landscape by focusing on historic land use/industrial features and surviving semi-natural habitats, in particular the areas of Wet heath/Acid grassland mosaic. Under the Business-as-Usual scenario, there is the opportunity for a significant increase in Broadleaf woodland, for example, along the new road (A465) through the Clydach Gorge, but this would need to be well-sited to avoid an impact on historic features.

Management Guidelines

- *Conserve* historic sites.
- *Restore/Enhance* surviving patches of semi-natural habitat.
- Look for opportunities to expand Broadleaf woodland.

WOODED SLOPES & VALLEYS

Overall character

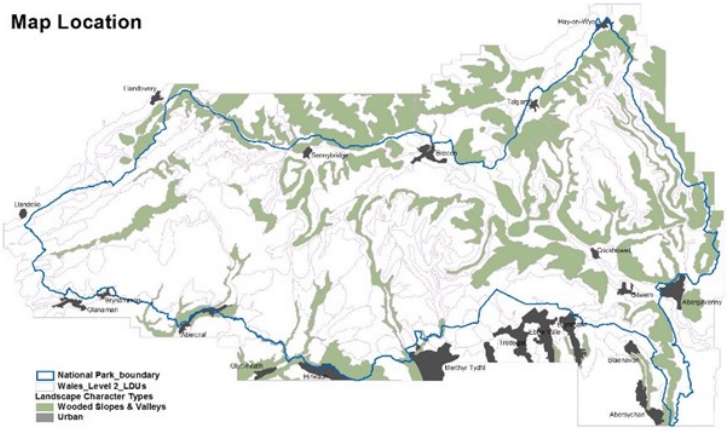
An enclosed, often heavily wooded, pastoral landscape with a varied, steeply undulating topography on sloping ground around the fringes of adjoining open moorland landscapes. The Wooded Slopes & Valleys is characterised by large blocks of broadleaf woodland, including both ancient and secondary woods, often located along incised watercourses in steep-sided river valleys. Patches of unimproved grassland and bracken are a feature of steeper slopes on higher ground. Whilst the character is dominated by woodland cover, this is also an ancient settled landscape with a dispersed pattern of farmsteads and hamlets, connected by a network of winding lanes, in places set within a mosaic of irregular fields.

SO 025248

Key characteristics:

- A steeply incised landform with many incised valleys
- Irregular blocks of secondary and ancient woodland
- Extensive areas of semi-improved and acid grassland with patches of bracken and gorse
- Permanent pasture enclosed by wide, overgrown hedges
- Narrow winding often sunken lanes
- Scattered farms and loosely clustered dwellings

Map Location



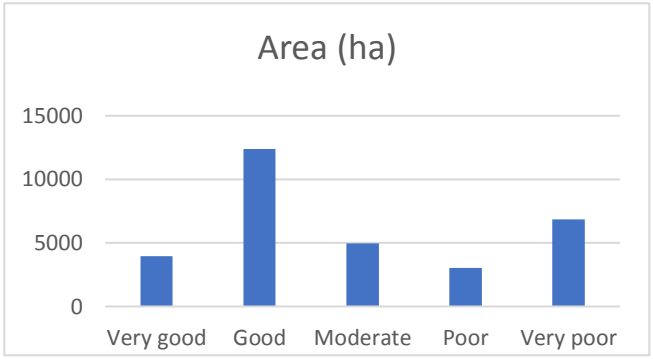
Location

This landscape is widely distributed on the lower slopes of the higher hills in the northern and eastern parts of the national park. It also occurs as a series of narrow strips along some of the steep-sided valleys along the southern edge of the Park.

Strength of Character

The Wooded Slopes & Valleys is an ancient wooded pastoral landscape, where the pronounced relief and interconnecting woodland cover create a very ***strong and visually unified strength of character***. This is an ecologically rich landscape that retains a significant cover of ancient semi-natural / secondary woodland and other habitats. Many areas originally cleared for agriculture also have an ancient, irregular 'assarted' field pattern with thick hedgerow boundaries which, together with the dispersed settlement pattern and network of narrow winding lanes, contribute to a strong feeling of 'time depth' throughout this landscape.

Condition



The Wooded Slopes & Valleys comprises almost 50 discrete LDUs characterised by a range of conditions that reflect the extensive and diverse nature of this landscape. The majority of LDUs are in a ***very good, or good condition***, reflecting the extensive survival of Broadleaf woodland and the consistent pattern of small, irregular fields bounded by tall/thick hedgerows, typical of this 'fridd' landscape. The wooded character is particularly strongly along the northern slopes of Mynydd Llangatwg (Afon Crawnon & Usk Valley). By contrast, in Cwm Crai for example, intensification of grassland for grazing and a relatively smaller area of Broadleaf woodland, results in a ***poor*** condition. The land cover projections indicate a considerable loss of Broadleaf woodland under the Business-as-Usual scenario, but this is made good under the Green Futures scenario.

Landscape Strategy

This is a landscape where the ***Conservation of existing features*** should be a priority, while looking for opportunities to create new Broadleaf woodland in areas where the condition of the landscape is in decline. The Green Futures scenario indicates the potential for a significant increase in the area of Broadleaf woodland. Any new planting should avoid surviving areas of irregular medieval fields and care should be taken to fit it into the existing pattern of woodland connected by ancient mixed species hedgerows which are typical of this landscape type. The survival of other semi-natural habitats is relatively poor, with only limited scope for the restoration of neutral and unimproved grassland.

Management guidelines

- *Conserve* the irregular pattern of small hedged fields.
- Promote better management of ancient species rich hedgerows.
- Expand areas of Broadleaf woodland, taking care to fit with the existing character of the landscape.

ANCIENT PASTORAL FARMLANDS

Overall character

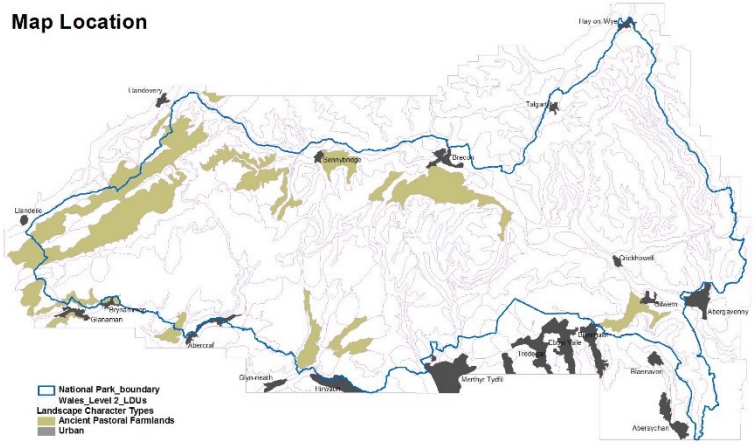
A settled, pastoral landscape with a distinctive ancient character, reflected in the historic irregular enclosure pattern and the network of narrow, often sunken lanes, which link a dispersed pattern of farmsteads, wayside dwellings and occasional, small rural villages. This is a strongly undulating, in places steeply sloping landscape, with localised deep stream valleys. Prominent recurring features that contribute strongly to the character of the landscape include the ancient field pattern with its irregular mixed species hedges and hedgerow trees, along with the ribbons of broadleaved woodland running up valley sides.

SN 728213

Key characteristics

- Varied, strongly undulating landform.
- Pastoral farmland with localised patches of species rich grassland.
- Irregular pattern of medium sized, hedged fields.
- Dense scattering of hedgerow trees.
- Broadleaf valley woodlands.
- Network of narrow, often sunken, lanes.
- Dispersed pattern of sandstone farmsteads and roadside dwellings.

Map Location



Location

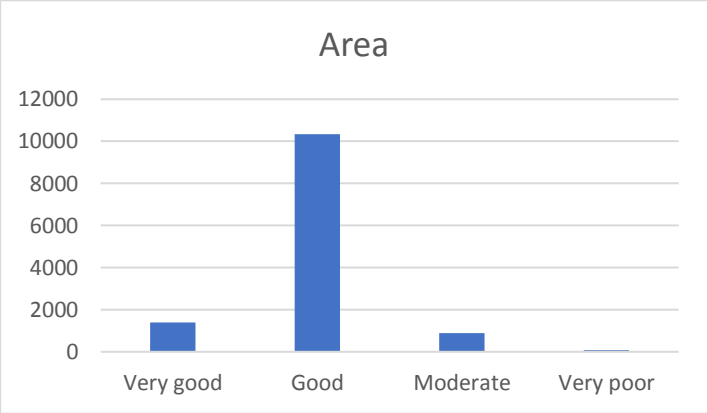
This landscape occurs mainly in the western part of the national park, with a significant outlier to the south of Brecon and a number of smaller patches within valleys along the southern edge of the Park.

Strength of Character

The Ancient Pastoral Farmlands is an historic settled pastoral landscape, where the undulating landform and strongly unified ancient cultural pattern, characterised by irregular hedged fields, narrow sunken lanes and the dispersed pattern of stone farmsteads/wayside dwellings, contribute to a ***distinctive and very strong feeling of 'time-depth'*** throughout this landscape. This is also an ecologically rich landscape that retains semi-improved grassland with irregular mixed species hedgerows, as well as ribbons of ancient semi-natural and secondary woodland along river valleys.

Condition

The majority of the area of this LCT is mapped as in ***good condition*** reflecting the management of field boundaries and the survival of strips of Broadleaf woodland along the many incised river valleys that are such a characteristic feature of this landscape. There are isolated examples of where Broadleaf woodland may have been replanted with conifers, as at Pont-ar-llechau on the western edge of the national park (A4069 south of Llangadog). Only remnants of unimproved and /or neutral grassland survive.



Landscape Strategy

The strong and consistent historic pattern, combined with the fact that the Ancient Pastoral Farmlands is in an overall good condition, indicates that this is a landscape where the ***Conservation*** should be a priority. Although this is a reasonably well wooded landscape, there is an indication that this could be lost under a Business-as-Usual scenario. By contrast, the Green Futures scenario indicates the opportunity for a significant increase in Broadleaf woodland, principally through the creation of small farm woodlands connected by ancient hedgerows. Former areas of semi-improved neutral grassland could also be restored and expanded in localised areas across the LCT.

Management Guidelines

- *Conserve* the irregular pattern of small hedged fields.
- Promote better management of ancient species rich hedgerows.
- Protect and expand areas of Broadleaf woodland.
- *Restore and expand* areas of semi-improved neutral grassland.

ANCIENT SETTLED FARMLANDS

Overall character

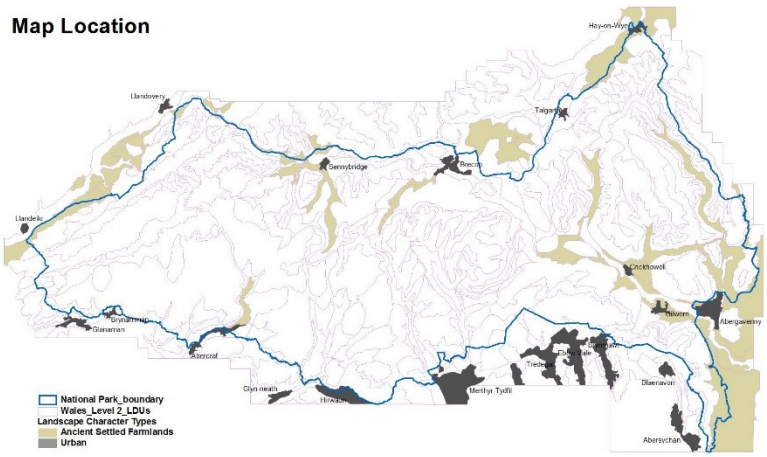
A rolling, mixed farming landscape, associated with the lowlands of the River Usk and the River Wye, characterised by a clustered settlement pattern of scattered farmsteads and groups of roadside dwellings set within a network of winding lanes and trackways. This is a well-defined rural landscape with a varied pattern of small to medium sized hedged fields, many of which are of medieval origin. The underling Devonian sandstones have produced fertile Brown soils where dairying/mixed farming is the dominant land use, associated with a scatter of small woods.

SO186389

Key characteristics

- Rolling, in places undulating landform.
- Many small streams in shallow valleys
- Arable and pastoral farming.
- A well-defined sub-regular pattern of hedged fields.
- Frequent small woods and streamside trees.
- Network of narrow lanes, often with hedge banks.
- Clustered pattern of scattered farmsteads and groups of roadside dwellings.

Map Location



Location

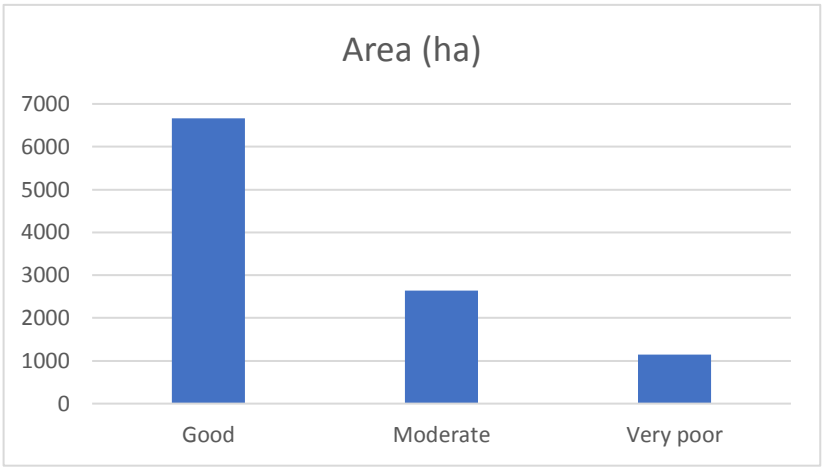
This landscape more or less defines the eastern, northern and western boundaries of the national park, where it is closely associated with the river valleys of the Wye / Usk and the lower lying parts of their tributary streams.

Strength of Character

The small to medium scale, rural settled character is the key feature of this agricultural landscape, which is defined by a rolling landform, fertile Brown soils and an historic enclosure pattern set within a network of winding lanes and trackways. Given the intensive management of the land, however, the natural dimension of the landscape is rather weak as there are only small patches of habitat survival, mainly along watercourses. The historic character, however, is prominent and often unified, where it contributes to an overall ***moderate strength of character***.

Condition

This is an intensively managed mixed farming landscape where grassland improvement and arable cropping are common. Although declining in places, however, the condition of the landscape, is generally ***good***, retaining strips of secondary Broadleaf woodland, particularly in upper river valleys, for example the Afon Senni and the Afon Tarrell. There are only remnant patches of other semi-natural habitats, notably semi-improved neutral grassland in Glyn Tarrel.



Landscape Strategy

The relatively consistent historic pattern in this agricultural landscape, combined with a generally good, although often intensively managed, overall condition, indicates the need to ***Conserve and Strengthen*** the historic character. The Business-as-Usual scenario indicates the possibility of future losses to Broadleaf woodland in this landscape type presumably because of further agricultural improvement. By contrast, the Green Futures scenario indicates the potential for an increase in new farm woodland. A good example is the Vale of Ewyas, indicating the potential for new areas of farm woodland scatted along the valley floor and lower slopes.

Management Guidelines

- *Conserve* the historic pattern of small to medium size hedged fields.
- *Enhance* hedgerow and streamside tree cover.
- *Restore and expand* areas of semi-improved neutral grassland.
- *Identify opportunities for small scale woodland planting.*

VILLAGE FARMLANDS

Overall character

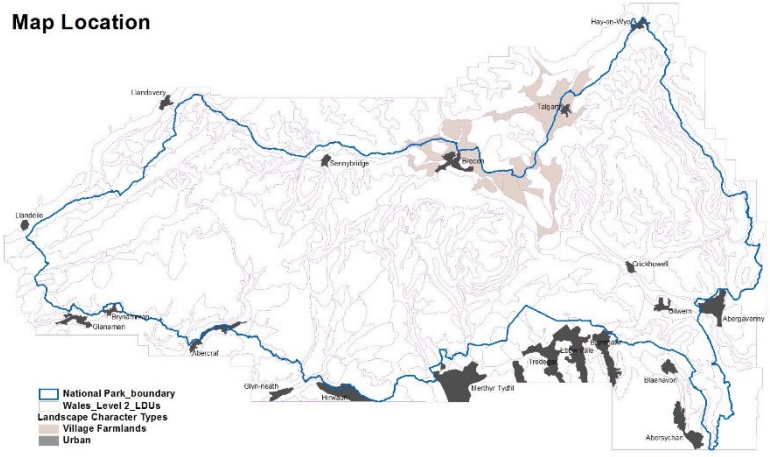
An open, gently rolling, mixed farming landscape associated with the River Wye and characterised by discrete rural villages set within an ordered, sub-regular pattern of medium to large size hedged fields. This is a landscape of fertile, well drained Brown soils, typically associated with lowland river valleys in this part of Wales. Although hedgerow ash trees are not uncommon, tree cover today is largely restricted to occasional small plantations, groups of trees around houses and lines of streamside trees.

SO 103278

Key characteristics

- Gently rolling lowland topography.
- Fertile, free draining Brown soils.
- An open, intensively managed mixed farming landscape.
- Semi-regular pattern of medium- large sized hedged fields.
- Lines of streamside trees.
- Small plantations and groups of trees.
- Rural lanes with uniform grass verges.
- A strongly nucleated pattern of small rural villages.

Map Location



Location

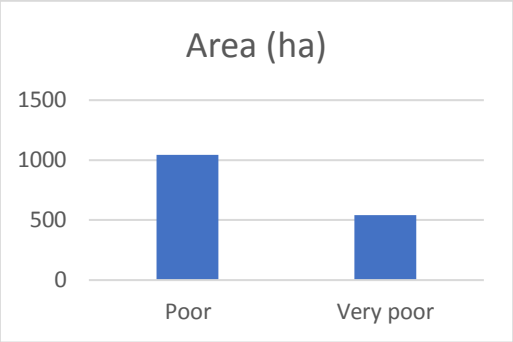
This is a landscape that has a restricted distribution in the Brecon Beacons and includes only 3 LDUs in the area around Talgarth and in the Llangors / Llanfihangel basin.

Strength of Character

One of the special features of the Village Farmlands is its rural agricultural character associated with the fertile, free draining Brown soils that occur in the broad river valleys that run along the northern edge of the National Park. This is emphasised by the nucleated settlement pattern of discrete rural villages and relatively few roads. Field hedges and scattered hedgerow trees are an important component of this relatively open farmed landscape, where there are often wide views to the surrounding hills. Given the intensive management of the land, however, the natural dimension of the landscape is rather weak, as there are only small patches of surviving semi-natural habitat, mainly along watercourses. The historic character, however, is predominant and often unified, contributing to an overall ***moderate strength of character***.

Condition

The overall condition of this landscape is generally ***poor/very poor***, reflecting the impact of intensive, mixed farming with very little survival of semi-natural habitat, apart from restricted areas of Broadleaf woodland.



Landscape Strategy

The relatively consistent historic pattern of this productive agricultural landscape, which has a moderately strong strength of character, combined with its generally poor overall condition, indicates the need to ***Restore and Enhance*** the historic character of the landscape.

Management Guidelines

- *Restore the* visual and ecological continuity of neglected primary hedgerows.
- *Enhance* hedgerow tree cover.
- Seek opportunities for habitat restoration along watercourses.

RIVER MEADOWLANDS

Overall character

A linear riverine landscape associated with a flat, alluvial floodplain that is subject to periodic flooding. For the most part this is an unsettled, pastoral landscape. There is often much marginal vegetation and fringing alders/willow scrub along the river channel itself, especially where this has a varied bank profile, creating a strong sense of place and feeling of naturalness.

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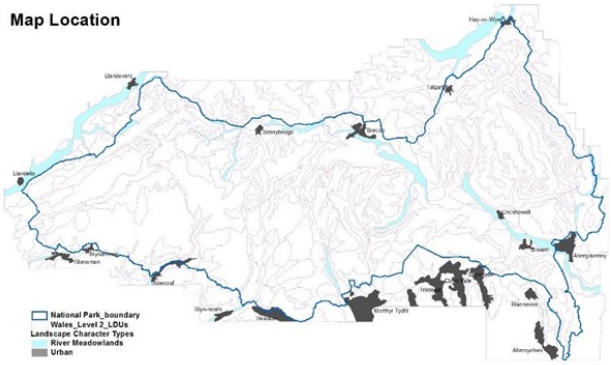
Key characteristics:

- Flat, low-lying corridors in shallow valleys.
- Seasonally flooded alluvial floodplain.
- Meandering river channel.
- Grazing meadows and small fields of permanent pasture.
- Unsettled with few roads.
- Historic stone-built river bridges.
- Strong riparian character with riverside willows and tree-lined ditches.

Map Location



Location

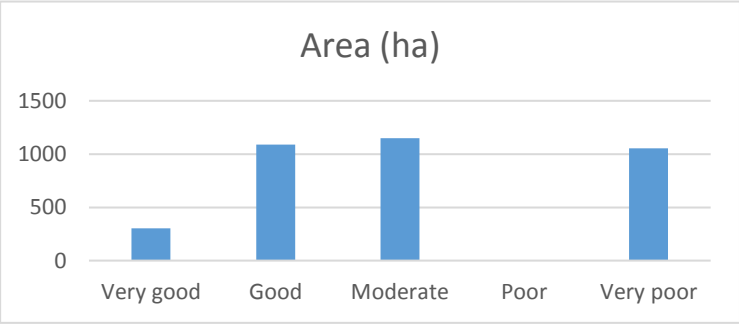
This is a widespread landscape occupying the lowest lying land within a region that is drained by three separate river systems associated with Wye, the Usk and the series of rivers that drain southwards from the Brecon Beacons through the Welsh Valleys.

Strength of Character

Narrow meandering river corridors with flood meadows and riverside trees are the features that define this landscape, combining to create a peaceful, undisturbed character. Along with the continuity of the river channel itself, and the associated strip of permanent pasture along the floodplain, often with patches of wet grassland and marsh, these features evoke a sense of naturalness and a ***strong strength of character***.

Condition

The condition of the River Meadowlands varies considerably, from ***good to poor***, especially on the broader floodplains at lower elevation, where the fertile alluvial soils have been subject to improvement with a loss/neglect of hedgerows and patches of semi-natural habitat.



Landscape Strategy

The strong natural character and relatively consistent historic pattern, combined with a moderate overall condition, indicates the need to ***Conserve and Restore*** the continuity / species diversity of this wetland landscape and seek opportunities for maintaining/enhancing river and streamside tree cover.

Management Guidelines

- *Conserve tranquil* undisturbed pastoral scenes associated with the riverside landscape.
- *Restore* the visual and ecological continuity of permanent pasture along the alluvial floodplain.
- Seek opportunities for habitat restoration along watercourses.
- *Enhance* river and streamside tree cover.

LAKESHORE WETLANDS

Overall character

A flat, low lying, unsettled landscape within a poorly drained river basin fringed by higher land. A large, irregularly shaped water body - Llangors lake - lies in the centre of this basin, surrounded by a pastoral landscape with numerous ditches and areas of unimproved neutral and marshy grassland. The surviving patches of semi-improved pasture within this area retain a secluded pastoral character, within a regular pattern of grazing units bounded by ditches and supporting species-rich aquatic and marginal vegetation. Many of these ditches and the lakeshore itself are fringed by lines of willow / alder and given the flatness of the landform this often provides a strong sense of visual enclosure.

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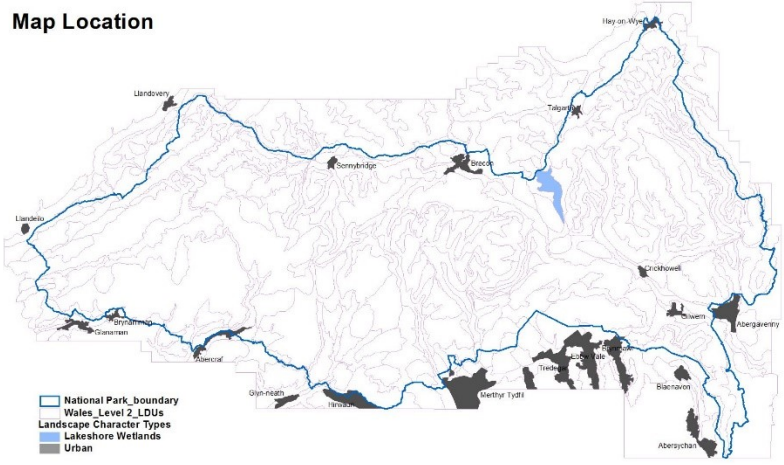
Key characteristics

- Flat low-lying topography.
- Poorly draining /peaty soils.
- Permanent pasture with patches of wetland vegetation.
- Lines of alder/willow along ditches and streamlines.
- Reeds and other marginal/aquatic vegetation.
- Unsettled with few roads.
- Views contained by tree cover and surrounding higher land.

Map Location



Location

This landscape occurs in just one location within the central part of the national park between the Brecon Beacons and the Black Mountains.

Strength of Character

The Lakeshore wetlands are a landscape that has been buffered from change due to the difficulty in cultivating soils with such poor drainage. A key feature is the widespread pastoral land use and associated traditional methods of management. Consequently this is a landscape that still survives in an 'unimproved' state, thus retaining certain wilderness qualities with a ***strong strength of character***.

Condition

Generally this landscape is in ***good condition***, reflecting the poor drainage that is a characteristic feature of this type of landscape.

Landscape Strategy

The very strong natural character, combined with a generally good overall condition, indicates the need to ***Conserve*** the species diversity of this wetland landscape, especially the semi-natural habitats on the lakeside fringe.

Management Guidelines

- *Conserve the tranquil* undisturbed pastoral scenes associated with this wetland landscape.
- *Look for opportunities to expand* the wet grassland and Swamp communities surrounding Llyn Llangors.

Summary

The landscape types described in this report were mapped according to a standard methodology developed as part of the Living Landscapes Project that integrates map layers to derive Land Description Units (LDUs) that are subsequently classified into Landscape Character Types (LCTs). The development of a landscape strategy and management guidelines were based on an analysis of the strength of character and condition of each LCT. The condition of each LDU across the national park was evaluated from the interpretation of Google Earth air photography in combination with the Phase 1 Habitat Survey [12]. The landscape strategy was also informed by a more experimental approach to project future land cover change for two scenarios, Business-as-Usual and Green Futures.

The Level 1 and Level 2 LDU maps are available in a GIS format (ESRI shapefile) and can be obtained from the National Park Authority or the authors (correspondence details, below).

Limitations of existing work

Condition analysis

(i) Character assessment was based on limited fieldwork in late September/early October 2020, but time was not available for a more detailed field survey to inform the evaluation of condition. It was not possible therefore, to review in detail the condition of the structure of the landscape (i.e. the survival/management of field boundaries/other historic features), nor to document evidence of overgrazing, or survival of semi-natural habitats. This would be helped considerably by the updating of the Phase 1 Habitat Survey.

(ii) The condition analysis was also only qualitative, and more work is required to measure not just the area of each semi-natural habitat type, but also to apply indices of fragmentation to quantify degrees of isolation and connectivity. This would link with work being undertaken by the National Park Authority to measure and map ecological connectivity.

(iii) Finally, the condition analysis is presented as an overall summary for each LCT. With more resources it would be possible to break down each LCT into its component LDUs and analyse/ present the condition of each LDU individually. Beyond this current landscape assessment (carried out at a 1:50 000 scale), each LDU could be subdivided into its component Land Cover Parcels (LCPs) to review change *at a farm level*. This would give a better idea of the range of variation and highlight where there are specific problems such as agricultural intensification resulting, for example, in the loss of field boundaries or semi-natural habitats. This scale of reporting would be of particular importance at the farm level with the introduction of the newly designed Sustainable Farming Scheme post-Brexit to inform the development of farm plans.

Data sources

Selected map layers from the NRW Lle Landmap geoportal (https://lle.gov.wales/home), namely the Historical and Cultural, were used for the analysis and mapping of the Level 2 LDUs. Although Landmap does not provide the level of historical detail available as part of the county-based Historic Landscape Character (HLC) [14] now available for England, many of the features of significance for LCA are mapped. The Welsh Register of Historic Landscape Types [15] shows that a significant area of the national park is listed. Additional work would be needed to integrate this information into the Level 2 LDU framework, something that could be achieved if revisions to the mapping are required in the future.

Poor weather conditions during the limited period of fieldwork meant that the range and quality of photographs used in the report is limited. Further fieldwork is required to ensure that better quality photographs that capture the range of landscapes across the national park are taken and included.

Projections of change

The change projections only considered three broad priority habitat types (Broadleaf woodland, Acid grassland & Mountain, Heath and Bog) and more work would-be required to include other habitat types, for example heathland. The data presented for the national park are derived from an all-Wales analysis which overall leads to greater confidence in the results at the national level, it is less robust regionally (at the scale of the national park) where the influence of local factors may result in over, or underestimates of the probability of the transition of a land cover type. The Business-as-Usual scenario is a simple extrapolation of past trends into the future. By contrast, the Green Futures scenario is a 'scenario' in the proper sense in that it makes an informed judgement about future policy changes and attempts to demonstrate the spatial impact on the distribution of modelled land cover. Additional scenarios could be developed and compared as Welsh policy evolves post-Brexit and enacts the policies of the Well-being and Future Generations (Wales) Act 2015 [16].

Further development of a landscape strategy and management guidelines

The limited scope of the project without the opportunity to undertake fieldwork, meant that number of landscape scale features in the landscape were not included. For example, it is known that the park authority have initiated considerable work on Invasive Non-native Species (INNS) (https://www.breconbeaconsparksociety.org/invasive-non-native-species/) specifically in the Usk and Tawe catchments. The landscape mapping at the level of individual LDUs, provides a potential framework for developing management guidelines that account for this problem. Many of the factors that determine the magnitude and distribution of INNS operate at landscape scales. Also beyond the scope of the present report was an in-depth analysis of large infrastructure features in the landscape, both historic (for example the Brecon & Montgomery canal), former mining/quarrying, new roads (e.g. the Heads of the Valleys A465). These prominent features in the landscape could be included in future work where there is the opportunity for more fieldwork.

Web-enabled mapping

The advantages of the maps and associated data being web-enabled is clear, giving the opportunity for landowners, land managers and the National Park Authority, as a major landowner in its own right, to interact with and use the mapping to support land management decisions. It would also be possible to bring a typical photo of an LCT into view by clicking on the map.

Acknowledgements

Acknowledgments to Syed Amir Manzoor (School of Agriculture, University of Reading) for his dedicated hard work to develop and run the scenarios of future change for Wales published in the journal, *Land* [13]. Martin Lukac at the School of Agriculture Policy & Development, University of Reading also supplied a lot of the hard thinking that went into the development of the scenarios. Finally, grateful thanks to Kath Lucas for proof-reading and improving the visual appearance of this report.

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Appendix A: the proposal to map Level 1 and Level 2 Land description Units for the Brecon Beacons National Park Authority(May 2020)

Updating the Level 1 Land Description Units

The Level 1 LDUs correspond closely with the Brecon Beacons LCA (https://www.beacons-npa.gov.uk/planning/draft-strategy-and-policy/landscape-character-assessment/). However, the Level 1 LDUs provide sufficient detail to enable the mapping of Landscape Types (see for example, the subdivision of the Black Mountains to reflect the deep river valleys (Capel-y-Ffin) that dissect this region, as opposed to the broader Character Areas on the existing LCA (Figure 2).

Producing a Level 2 map of Land Description Units

Level 2 LDUs provide a much finer level of spatial detail and information, which often involves a sub-division of the existing Level 1 LDUs. As such, the Level 2 LDUs reflect more subtle differences in the underlying character of landscape, thus facilitating the assessment of condition within each landscape unit. The proposal would be to intersect the Level 2 LDUs with the projections of land cover change to 2050 to assist the Park with developing a Nature Recovery Action Plan that reflects the likely dynamism of land cover over the medium term.

Output: a digital map (GIS format) with associated symbology and attributes for each Level 2 LDU. A provisional classification would also be carried out to group the LDUs into Landscape Character Types (LCTs).

Management Guidelines & Future land cover

Management guidelines provide a description of the management options for each Landscape type, reflecting both the character and condition of individual LDUs. The process involves:

1. Describing and evaluating the character of each LDU - what is the strength of character of a landscape unit and what are the key features that define this character? This would require limited fieldwork to define and describe the character profile of each Level 2 LDU. Ideally this would also include a member of staff from the Brecon Beacons National Authorityworking alongside one of the consultants.

2. Evaluating the condition of each LDU, with reference to existing habitat survey data (Phase 1/IHS, aerial photography and/or fine resolution [1 – 3m] satellite imagery [Google earth/Planet.com]). These data would be used to determine the type and survival of typical habitat types within each LDU.

3. Defining a Landscape Strategy with a supporting set of Management Guidelines for each Landscape type. For example, to what extent does the condition of a Level 2 LDU (reflected in the survival/management of habitats and of cultural patterns) determine the action that is needed to protect, enhance, or re-create key patterns/features.

Output: a short report with maps and field photographs, summarising the character and condition of each Landscape Character Type as well as recommendations for management.

APPENDIX B: Explanatory variables for future land cover projections

Column (I) shows the categorization of variables, column (II) lists all considered explanatory variables in each class, and finally column (III) shows the Cramer's V value of each variable. Variables with Cramer's V < 0.15 were deselected in the first step, the remaining variables were then tested for correlation and the least correlated variables retained (highlighted in red bold). (source: [])

Category (I)	Variables (II)	Selection Thresholds (III) Cramer's V (> 0.15) & Correlation (< 0.75)
Topography & Soil	**Altitude**	**0.3239**
	Aspect	**0.165**
	Slope	**0.1504**
	Hillshade	0.02
	Soil Carbon Content	0.06
Proximity	**Distance from Broadleaf Forest**	**0.191**
	Distance from Conifer Forest	0.167
	Distance from Arable & Horticulture	**0.154**
	Distance from Improved Grassland	**0.154**
	Distance from Semi-natural Grassland	0.165
	Distance from Mountain, Heath, Bog	**0.21**
	Distance from Urban Areas	**0.2**
	Distance from Water Bodies	**0.182**
	Distance from Access Points	0
	Distance from Green Spaces	0
	Distance from Motorways	0
	Distance from Road Links	**0.151**
	Distance from Hydro-nodes	0
	Distance from national parks	0.03
Socioeconomic	**Population Density**	**0.1763**
	Night Lights	0.04
Evidence Likelihood	Arable to Built	0.1
	Arable to Improved	0.151
	Conifer to Broad	0.2647
	Mountain, Heath, Bog to Semi-natural grassland	**0.1849**
	Semi-natural grassland to Arable	0.1647
	Semi-natural grassland to Broad	0.17
	Semi-natural grassland to Built areas	0.17
	Semi-natural grassland to Improved grassland	0.17

APPENDIX C: Percentage change in LULC under the Business-as-Usual and Green Futures scenarios, for the whole of Wales.

			2030	
	2007	2015	B-a-U	GF
Broadleaf forest	124.5	165	200.2 [+21]	330 [+110]
Coniferous Forest	143	161	190.3 [+18]	241.6 [+50]
Arable & Horticulture	176.6	99.5	92.9 [-7]	109.4 [+10]
Improved Grassland	841.3	983.4	1045.7 [+6]	792.7 [-19]
Semi-natural Grassland	510.9	428.9	314.4 [-27]	317.4 [-26]
Mountain, Heath, Bog	163.9	98.1	45.8 [-53]	98.1 [0]
Water Bodies	12.9	12.1	12.1 [0]	12.1 [0]
Coastal Areas	16.1	25.1	25.1 [0]	25.1 [0]
Built Areas	88.5	105	151.8 [+44]	151.8 [+44]

Area of each LULC category, historical observations in 2007 and 2015 (in '000s ha). Business-as-usual (B-a-U), Green Futures (GF) translate effects of hypothesised policy changes to LULC transitions. Numbers show predicted area (in '000s ha), square brackets indicate percentage changes of each LULC between 2015 and 2030.