



Cumulus Consultants Ltd

**High Nature Value farmland in
Rural Development policy**

Culm Grasslands Case Study

Report for

**European Forum on Nature Conservation
and Pastoralism**

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Report Prepared for

European Forum on Nature Conservation and Pastoralism

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Glossary

AES	Agri-Environment Scheme
AONB	Area of Outstanding Natural Beauty
BAP	Biodiversity Action Plan
CAP	Common Agricultural Policy
CSS	Countryside Stewardship Scheme
CWS	County Wildlife Site
DA	Disadvantaged Area
DWT	Devon Wildlife Trust
EIA	Environmental Impact Assessment
ELS	Entry Level Stewardship
EENRD	European Evaluation Network for Rural Development
EU	European Union
FBI	Farm Business Income
FBS	Farm Business Survey
FWAG	Farming and Wildlife Advisory Group
HAT	Holding Assessment Toolkit
HLS	Higher Level Stewardship
HNV	High Nature Value
HNVF	High Nature Value Farmland
LCA	Landscape Character Area
LFA	Less Favoured Area
NCA	National Character Area
NE	Natural England
NNR	National Nature Reserve
OELS	Organic Entry Level Stewardship
RDPE	Rural Development Programme for England
RLR	Rural Land Register
SAC	Special Area of Conservation
SDA	Severely Disadvantaged Area
SNA	Strategic Nature Area
SPS	Single Payment Scheme
SSSI	Site of Special Scientific Interest
WES	Wildlife Enhancement Scheme

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Introduction

This case study is part of Phase 2 of the Devon High Nature Value (HNV) farming project. It is one of four case studies¹ that build on the work carried out in Phase 1 (see main report).

In Phase 1 the project aimed to clarify what is HNV farmland, where it is, and how much there is, in the case study areas. The project explored what data and methods can be used to identify this farmland, and its approximate location and extent, in the case study areas.

This was not intended to be a precise scientific exercise. Rather it was a process of trial and error, to see what can be done to identify broad areas of HNV farmland initially using nationally available data sources. Local data were to be used only where necessary. However, a strong input of local knowledge is needed for ground-truthing the assumptions used and the data available at national level.

The Phase 1 work considered different approaches to identifying HNV farmland, based on experience at national and EU levels and on the guidance produced by the European Evaluation Network for Rural Development Help Desk. These can be summarised as:

- The land-cover approach (identifying types and patterns of land cover that can be expected to support HNV).
- The habitats and species approach (mapping the location of concentrations of habitats and/or species of conservation concern).
- The farming systems approach (identifying and mapping farm types than have characteristics normally associated with HNV, such as low livestock densities).

The project partners concluded that these approaches, using existing databases, do not allow a sufficiently robust identification of HNV farmland in the Devon case study areas, for various reasons:

- Landcover UK 2000 is not produced at sufficiently high resolution; the 2007 version is much higher resolution but is not yet available.
- Habitat inventories include only Biodiversity Action Plan (BAP) priority habitats (there is a consensus among the project partners that such inventories do not represent the total extent of semi-natural farmland in its wider sense), and the data are often quite old.
- Species data are not sufficiently consistent either geographically or across taxa, and the spatial resolution is also too crude in most cases.
- Data on farming characteristics are not readily available at a sufficient spatial resolution and would need to be tested against an initial interpretation of which areas of farmland can be considered HNV on ecological grounds.

The project therefore turned to aerial photos to see if these would allow the identification of a wider spectrum of semi-natural farmland. The answer seems to be that they do, as the unimproved and semi-improved farmland has a distinct “rough” appearance on the

¹ Blackdown Hills, South Devon, Culm, Dartmoor

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photos. Local knowledge confirmed that the areas apparent from this visual interpretation of the photos correspond with farmland areas considered of most nature value. It was noted also that these semi-improved habitats linked many of the BAP priority habitat areas and/or were located in the same landscape units.

The project partners decided to produce indicative maps of HNV farmland for the case study areas on the basis of visual interpretation of aerial photos. These indicative maps aim to capture a contiguous area of HNV farmland for each case-study area. More details on the characteristics for the case study area are presented in this report.

Phase 1 was successful in establishing for the case study areas a “baseline” of HNV farmland, as intended under the EU indicator for monitoring rural development programmes.

Under the Phase 2 case studies, the project analysed the characteristics of farming on the HNV “baseline” area, the tendencies and needs of this farming from the perspective of maintaining nature values, and the effectiveness of current policies.

Thus the aim of Phase 2 was to address the following questions in each case study area:

- Can we characterise the different farming systems or farm types that currently support HNV farmland (e.g. in terms of production sector, production systems, management practices, farm size, ownership, etc.)?
- How are these farming systems or types likely to evolve in future e.g. intensification, abandonment, change of land use?
- What are the main factors influential in maintaining HNV farmland e.g. policy and socio-economic trends but also e.g. hobby farmers, tourism, personal motivation of certain farmers?
- What are the key issues that need to be addressed on the ground, in order for HNV farmland to be maintained? This includes social and economic questions, but also practical issues such as the availability of livestock to graze small, awkward fields, and how such activities can be organised and continued.
- To what extent does the current package of policy measures ensure the maintenance of HNV farmland e.g. Pillars 1 and 2 of CAP, BAP, NI197 etc.?
- Are current measures effective in maintaining the relevant farming types and practices and their associated nature values? Are the design, coverage, delivery and resources of measures sufficient?

In the final stage (Phase 3 – see main report) the project considered how current policies (especially RDPE) can be improved to ensure that nature values are maintained on farmland within the HNV baseline areas.

1 Farming and Environment in the Culm Grasslands

1.1 Description of the Culm Grasslands Landscape and Environment

The Culm is often referred to as 'the land between the moors'. The Culm National Character Area (NCA) covers 280,000 ha of North Devon, extending from the foot of Dartmoor to the Atlantic Coast, bordered by the Cornish Killas to the West and Exmoor to the East. The rolling ridges of the Culm are largely open and treeless, separated by the intricate valleys of the Taw, Torridge and Mole Rivers. The area has not been broken down into separate, specific Landscape Character Areas (LCAs) but is described as a whole in The Culm National Character Area (NCA 149).

"The Culm is a largely remote and sparsely populated landscape. The landscape character of much of the Culm is dominated by the wide views, the variety of field patterns and the visual accents given by the siting of settlements. There is a mosaic of field patterns: long, narrow, former common fields around the hamlets; irregular older fields on the valley sides; and rectilinear patterns on the high ridges and wet valley bottoms."

The Culm area contains a high concentration of significant wildlife habitat, relative to lowland farmed landscape of the South West peninsula as a whole. The distribution and character of this habitat is directly correlated with the limitations of the landscape for intensive farming, to a large degree influenced by the underlying geology, soils and climate.

The 'Culm Measures'² comprise Lower Carboniferous shales, slates, cherts, limestones and volcanic rocks, and Upper Carboniferous mudstones and sandstones. This geology gives rise to heavy, infertile clay soils on the hilltops and in the valley bottoms but, on some valley sides, there are better drained, more fertile brown earths. The Culm has a distinct, mild climate dominated by Atlantic influence, giving rise to a high rainfall of around 1270mm each year. The combined result is that much of the Culm is characterised by poor wet soils, best suited to cattle grazing.

Details of characteristic landscape features, together with key farming and environmental characteristics relevant to this study are given in Table 1-1.

²The Culm Measures were laid down 300 million years ago when the area was swamped by river deltas and shallow seas. This geology holds similarities to the Coal Measures elsewhere in the British Isles but contains only thin beds of coal (known locally as 'culm').

Landscape Character	Key Characteristics and Features
River Valleys	Main valleys of Taw and Torridge follow broad sweeping courses, meandering across the tree lined floodplains. Upstream the valleys narrow and split into and intricate and dramatic pattern of headwaters.
Field pattern	Mosaic of field patterns: long, narrow, former common fields around hamlets, irregular fields on valley sides and rectilinear patterns on high ridges.
Boundaries	The boundaries consist of hedgerows of hawthorn, blackthorn and hazel, which vary between low trimmed hedges and overgrown thick hedges.
Land cover	Pasture is the dominant land use. The enclosed land is interspersed with patches of wet heathland and semi natural 'Culm grassland' on commons, unenclosed ground and unimproved pasture.
Tree and Woodland cover	Woodland is largely confined to the valleys, where oak woodland predominates, and to large conifer plantations in the central part of the area. Occasional wind-swept trees and copses occur, but tree cover is generally sparse.

Table 1-1: Landscape Features and Key Characteristics

The Culm landscape has been influenced by the development of agriculture over the centuries. Around the 13th century, the land around hamlets was divided and enclosed for farming. Near to settlements there were long narrow strips of common fields, beyond which lay 'outfields', occasionally cultivated, or rough grazing. Furthest from the settled hamlets lay the open moor, with grazing rights usually belonging to the parish.

This varied landscape supports a diversity of environmental features, with a unique, internationally important wildlife assemblage. The most significant of these – including BAP habitats and species - are shown in Table 1-2.

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Habitat	Characteristic Species
Grassland and Heath	
Culm Grassland (Purple Moor Grass and Rush Pasture)	Culm pastures are dominated by purple moor-grass, often herb-rich with plants such as meadow thistle, devil's-bit scabious, tormentil and saw-wort, heath-spotted orchid, bog asphodel, creeping willow, meadowsweet, greater bird's-foot trefoil, water mint and a variety of sedges. Less common are plants like round-leaved sundew, pale butterwort and lesser butterfly orchid. Bog mosses are also frequent and open pools support marsh St John's-wort, bogbean, marsh pennywort, bog pondweed and other aquatic plants. Butterflies are especially prominent, with species such as marsh fritillary, small pearl-bordered fritillary often being frequent, despite their scarcity in the countryside as a whole.
Lowland Heathland	Heathers and dwarf gorses predominate. Lowland heathland is a dynamic habitat which undergoes significant changes in different successional stages, from bare ground (e.g. after burning or tree clearing) and grassy stages, to mature, dense heath. These different stages often co-occur on a site. The presence and numbers of characteristic birds, reptiles, invertebrates, vascular plants, bryophytes and lichens are important indicators of habitat quality.
Woodland	
Lowland mixed deciduous woodland including Oak woodland and lowland beech and yew woodland.	Common tree species include oak, hazel, holly, rowan, beech yew, whilst ground flora often includes primrose, wood anemone, wood sorrel, bluebell, bilberry, cow-wheat, hard fern, particularly in ancient woodlands.
Wet woodland	Usually with alder, birch and willows as the predominant tree species, but sometimes including ash, oak, pine and beech on the drier riparian areas. There are a large number of invertebrates associated with alder, birch and willows. Otter may use wet woodlands for breeding sites.
Corridors	
Hedgerows and hedgebanks	Includes trees and woody shrubs such as Ash, hazel, oak, field maple, hawthorn, blackthorn, willow, holly, beech, wood anemone, primrose, early-purple orchid, green hellebore, black bryony. Associated fauna includes the gatekeeper and brown hairstreak butterflies, common lizard, bullfinch, bats and dormouse.
Cereal Field Margins	Supported species depends of type of margin but can include nationally scarce or rare arable plant species such as fluellens, cornsalads and fumitories particularly in cultivated margins. Conservation headlands can support crop-nesting bird species e.g. corn bunting, reed bunting or lapwing. Grassy field margins provide habitat for grey partridge, tree sparrow, turtle dove.
Rivers and streams	The plant and animal assemblages of rivers and streams vary according to their geographical area, underlying geology and water quality. Species associated with rivers include chub, brown trout, bullhead, lamprey; kingfisher, dipper, grey wagtail; otter, water vole, Daubenton's bat.

Source: Natural England Nature on the Map.

UK Biodiversity Action Plan; Priority Habitat Descriptions.BRIG (ed. Ant Maddock) 2008.

Table 1-2: Key Habitats and Species in the Culm

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Key notable and BAP priority species in the Culm include the marsh fritillary, small pearl bordered fritillary, narrow-bordered bee hawk-moth, dingy mocha, cuckoo, curlew, reed bunting, grasshopper warbler, wavy St. John’s wort, three lobed water crowfoot, southern marsh orchids and lesser butterfly orchids.

Case Study Area

This case study focuses on the two of the three areas targeted by the Devon Wildlife Trust as part of the Working Wetlands project – Torr ridge & Tamar headwaters, and Knowstone & Witheridge, see Figure 1-1. The case study area comprises approximately 40,628ha or 15% of the Culm NCA.

Working Wetlands, run by Devon Wildlife Trust, is a long term project working alongside landowners to recreate a Living Landscape in the Culm area of Devon. The project works across three target areas – Torr ridge & Tamar headwaters, Knowstone & Witheridge, and Hollow Moor. Through the project, the Trust is helping landowners carry out targeted habitat management, creation and restoration projects. The result will be better linked areas of Culm grasslands in the wider countryside.

Working Wetlands aims to support land owners through:

- Whole farm, farming and wildlife advice
- Small grants
- Free training events
- Free advice on and submission of applications for Entry Level and Higher Level Stewardship
- Access to machinery such as mobile stocking facilities
- Help with finding graziers or land to rent for grazing with our Grazing Links initiative

More details about the project are available at <http://www.devonwildlifetrust.org/working-wetlands/>.




Figure 1-1: Working Wetlands Project

The Culm Case Study Area includes the following designations and sites:

- 20 Sites of Special Scientific Interest (SSSI)
- 580ha of the Culm Grasslands Special Area of Conservation (SAC)
- One National Nature Reserve (NNR) at Dunsdon.
- Two Local Nature Reserves at Meddon Green and Roadford Lake.

1.2 High Nature Value Farmland in the Culm Grasslands

HNV farmland (HNVF) in the case study area includes Culm grassland, together with surrounding and buffering semi-improved pasture³, and woodland, scrub and wood pasture.

The ingredients of a mild maritime climate, high rainfall, and poorly draining geology provide the ideal potential conditions for Culm grassland. This potential is realised by the cultural influence of extensive, locally adaptable farming practices that have given rise to arguably the region's most important habitat.

The term Culm grassland is used to describe the unimproved wet pasture scattered across the Culm measures. Locally it is known as white grass moor due to the pale straw colour which purple moor-grass *Molinia caerulea* displays during the senescent winter months.

Culm grassland encompasses a broad range of habitats from damp neutral meadow, fen meadow, tall-herb fen, wet flush, swamp, species-rich rush pasture and wet heath. It is in fact mosaics of these that are characteristic and unique. It also provides a varied structure which is good for a range of wildlife including invertebrates, amphibians, mammals, birds as well as plants. Culm is also present in many differing landscapes from networks of densely hedged small field systems exemplified at Dunsdon Farm National Nature Reserve to large unenclosed moors such as Knowstone, Bursdon and Witheridge.

The jewel in the crown of Culm habitats is the fen meadow. Although dominated by purple moor-grass this habitat is distinct from other related vegetation communities. The sward is herb-rich, often supporting swathes of meadow thistle *Cirsium dissectum*, Devil's-bit scabious *Succisa pratensis*, tormentil *Potentilla erecta*, and saw-wort *Serratula tinctoria*.

Culm grasslands are strongly associated with other HNVF habitats which together help to create important ecological networks. Culm grasslands are often found amongst large expanses of semi-improved farmland characterised by rough grasses and rushes. In the Pancrasweek Parish, for example, 6.7% of land area is recorded as semi-natural and 13.5% semi-improved. The latter have high ecological value in their own right but also in buffering the semi-natural habitats beyond.

In freely draining land semi-natural neutral meadows are often supported but are an under-recognised feature.

Some wet, rushy grassland is the result of reversion from improved or semi-improved rye-grass pasture. This tends to be species-poor but nonetheless has a value as a buffer to priority habitats.

Dense networks of hedges, often extensively managed provide significant habitat value and also linkage in the landscape. Orchards and wetlands are all well represented. Together these features of HNVF form the characteristic landscape of this part of Devon.

The Culm supports dense mosaics of woodlands, scrub and wood pasture.

³Semi-natural pasture consists of vegetation that has not been reseeded or artificially fertilised, or sufficient time has passed since this was done to allow reversion to a "natural" community. Semi-improved pasture is in altered state due to past reseeded and/or fertilisation, but not to the extreme of grassland that is under intensive management.

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HNVF in the Culm supports significant invertebrate interest with nationally important populations of butterflies including the marsh fritillary, small pearl-bordered fritillary, wood white and brown hairstreak. Moths are also well represented including the elusive narrow-bordered bee hawk-moth and more frequent double-line. Recently dingy mocha populations have been confirmed, a species previously only known from south east Dorset and west Hampshire.



Figure 1-2: Marsh Fritillary

The Culm remains an area of lowland England where Cuckoo are a frequent, although diminishing, herald of spring. Widespread farmland bird species are present in high densities and include bullfinch, yellowhammer, skylark, meadow pipit and garden warbler. Willow tit, tree pipit, grasshopper warbler, and reed bunting are familiar sounds of the unimproved pastures. Of regional significance is the remaining breeding curlew population. Breeding pairs are now thought to number fewer than 10 countywide. Broods have been regularly fledged in the Culm in recent years, whilst breeding birds in Dartmoor and West Exmoor continue to struggle.

Culm grassland supports the UK stronghold for the rare wavy St. John's wort which is otherwise only found locally in west Wales and Cornwall. There are regionally significant populations of whorled caraway and also one of only a handful of records of three-lobed water-crowfoot in Devon. Heath-spotted and southern marsh orchids can proliferate with the occasional lesser butterfly orchid.

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HNV farmland and woodland, as defined and identified in this study, is estimated to cover **8,578 ha** or **21.1%** of the Culm study area, see **Note 1** for the methodology used to identify this land. This total comprises **6,319 ha of HNV farmland** (15.5% of the study area) and **2,259 ha HNV woodland** (5.5% of the study area), see Figure 1-3.

Of this HNV farmland and woodland, 770 ha (9% of HNVF) is designated as SSSI (this is mainly farmland) and 1,619 ha (19% of HNVF) is designated as CWS. The combined total designated area is 2,389 ha (28% of HNVF), see Figure 1-4.

A breakdown of HNVF data for the Culm study area is shown in Table 1-3.

Culm	Total	SAC	SSSI	CWS
HNV farmland	6,319 ha	534 ha	702 ha	1090 ha
HNV woodland	2,259 ha	46 ha	68 ha	529 ha
HNV total	8,578 ha	580 ha	770 ha	1,619 ha

Source: Natural England 2011

Table 1-3: HNVF in the Culm Study Area

Strategic Nature Areas (SNA) have been identified across the SW of England. These represent biodiversity 'hotspots' and are priority areas for the management and restoration of wildlife habitats. The study area has a number of SNAs. A large proportion of HNV farmland and woodland in the study areas falls within these SNAs (see Figure 1-4).

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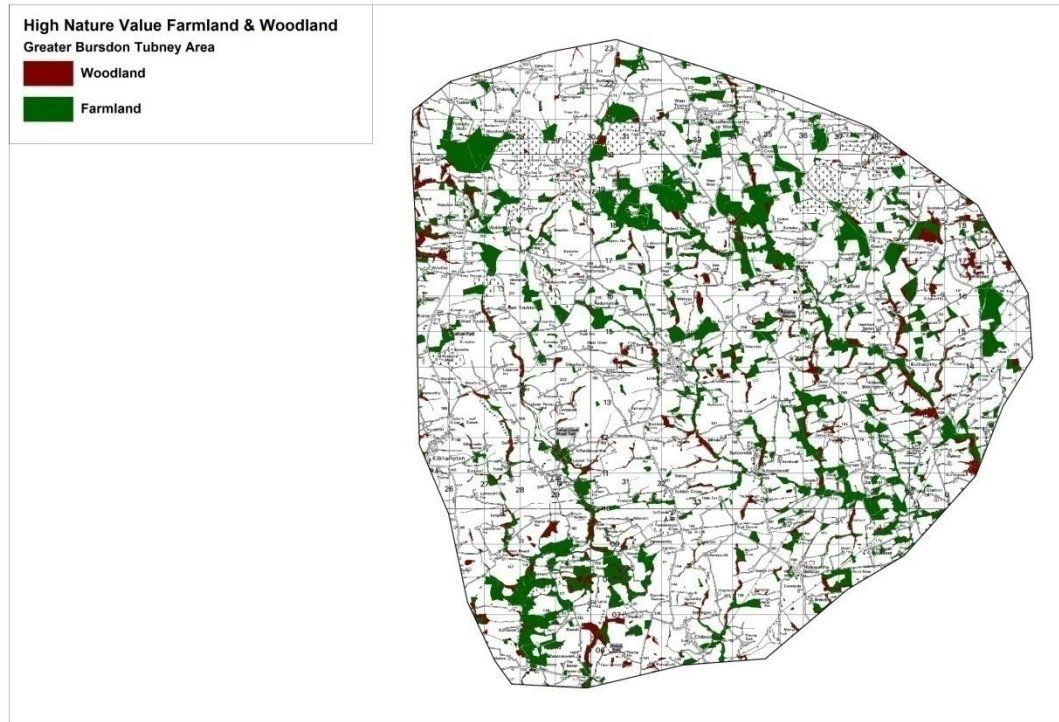


Figure 1-3: HNV Farmland and Woodland in the Culm Study Area

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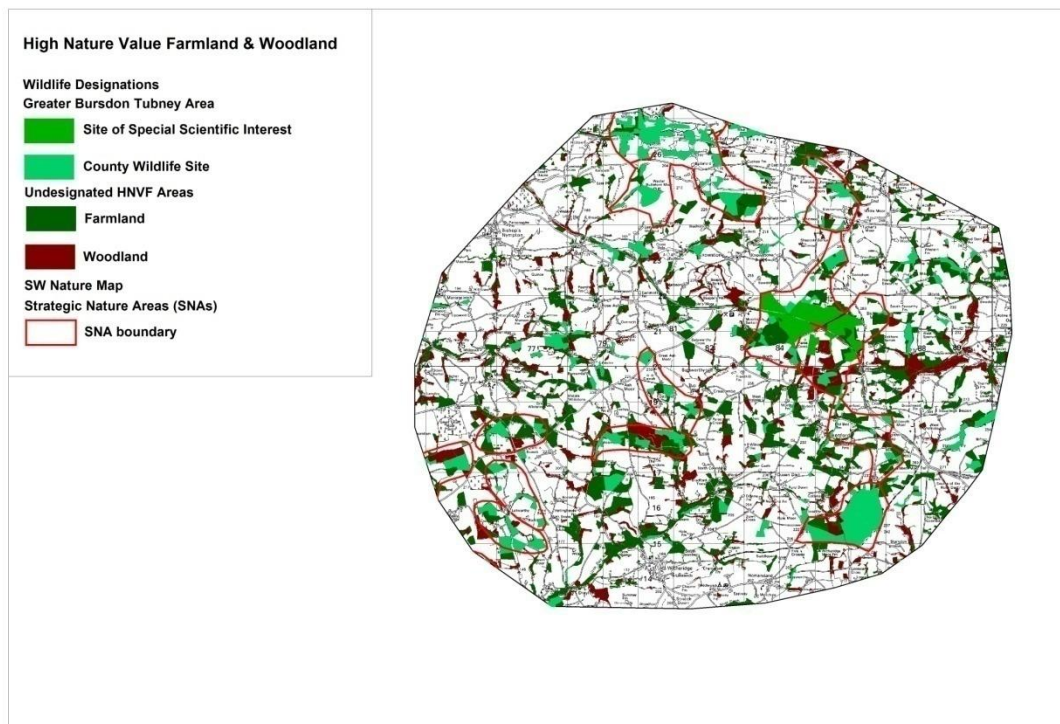
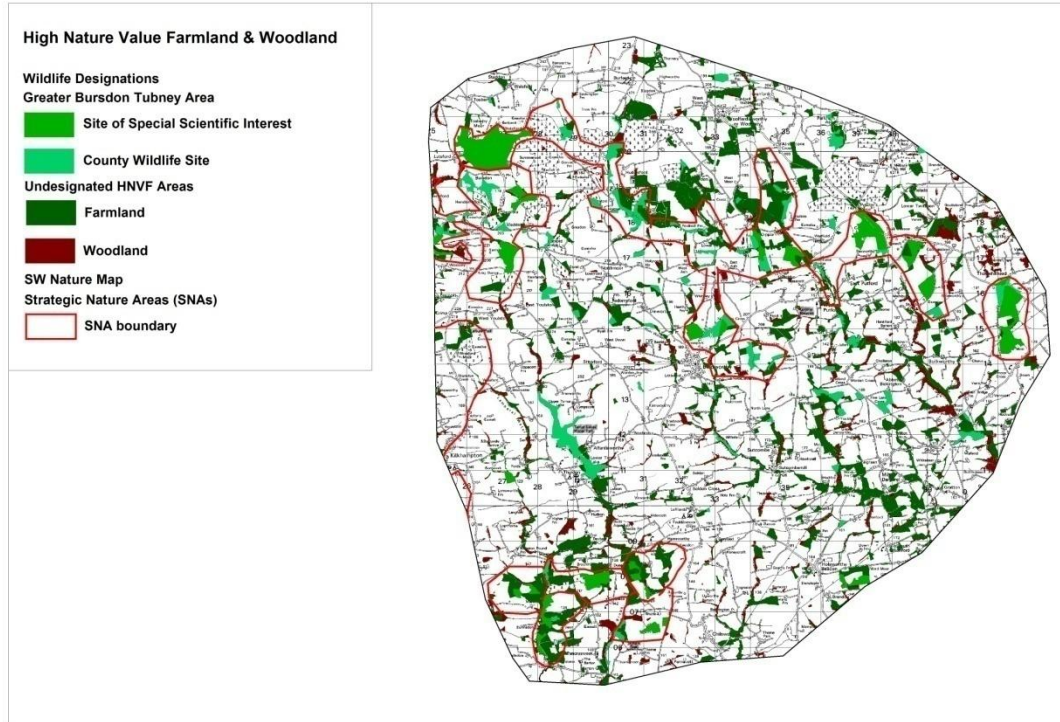


Figure 1-4: HNV Farmland and Woodland together with SSSI and CWS designations in the Culm Study Area

The following aerial photos illustrate typical patterns of HNMF occurrence in the Culm study area, taken from the example farms considered in more detail later in this study.

Figure 1-5 HNMF: Small fields, thick hedge lines and small woodlands

In this example, which shows part of the farm described in Section 2 as **Farm 8**, there are larger, more intensively managed grass and arable fields to the North and South. In the centre (to the right and far left), there are small fields and thick hedge lines, an area of Culm grassland, together with small woodlands. Conifer has been planted on some of this lower lying land. A stream and old canal run N-S and NW-SE respectively.



Figure 1-6: HNMF: Semi-improved grassland and blocks of woodland, scrub and Culm grassland.

This example shows the area around **Farms 3 and 5** described in Section 2. There is semi-improved grassland around the farm in the centre, with areas of woodland, scrub and Culm grassland to the North and East (which is more heavily wooded). The brown area at the top comprises a Culm grassland SSSI.



Figure 1-7: HNMF: Commercially farmed plateau with separate, distinct area of Culm grassland

This shows the landscape of **Farm 2**, with a large central block of more intensively managed arable and grassland with a limited network of hedges, on the plateau. To the South, is an area of Culm grassland and conifer plantations. Some of the conifers are now being felled in order to extend the area of Culm grassland.



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A typical view across an area of the Culm in the Knowstone & Witheridge Working Wetland area is shown in Figure 1-8. In the foreground is a large field with more open, semi-improved grassland (1) and blocks of rushy pasture (2). There is a network of thick hedges (3) and a row of hedgerow trees (4) in the far distance. To the left is an area of oak woodland (5). This whole area can be said to constitute HNMF. An improved grassland field (6) lies to the right.



Figure 1-8: View across Culm landscape near Romansleigh, South Molton

A close-up of a Culm grassland field in the Torridge and Tamar working wetland area is shown in Figure 1-9. This shows purple moor grass (1), rushy pasture (2), thick hedges (3), hedgerow trees (4) and broadleaved woodland (5).



Figure 1-9: Culm grassland near East Putford, Holsworthy

Conservation need and objectives

In contrast to other lowland semi-natural grasslands, the history of Culm grassland loss is a recent one. More than 50% of the semi-natural grasslands present in 1980 had been lost by the early 1990s, principally to agricultural improvement driven by poorly targeted subsidy, most notably for flax and linseed. Anecdotal accounts from the landowning community suggest that the loss of target species populations, such as the marsh fritillary, has mirrored that of the habitat. However the full latent effects of ecological isolation are yet to be realised.

Currently 5,129ha of Culm grassland has been recorded nationally (3,826ha occurring in Devon), distributed over nearly 700 sites, with two thirds being under 5 hectares in size. The major concentrations are found in the upper reaches of the Torridge, Taw, Tamar and tributaries of the Exe. The remaining Culm grassland sites are widely scattered and ecologically isolated, vulnerable to change and a challenge to support.

In light of the above, Devon Wildlife Trust has identified the following objectives for HNMF in the Culm:

- To prevent further loss of high nature value habitats in the Culm Natural Area to abandonment;
- To prevent further loss of high nature value habitats in the Culm Natural Area to agricultural intensification projects and development;
- To restore and recreate high nature value habitats to achieve robust Culm ecosystems (75% of HNMF in favourable condition / achieve South West Nature Map targets);
- To positively influence the socio-economic factors that underpin the farming systems that support HNMF;
- To ensure RDPE support is efficiently focussed in landscapes that support high proportions of high nature value farmland and the associated ecosystem services provided.

1.3 Farming characteristics and trends in the Culm Grasslands

This section is based on the best available farming data for the Culm study area at the time of writing: see **Note 2** for a description of sources used. The current state and trends relating to farming in the Culm are outlined and the impacts on farms with HNPF explored.

Soils and climate combine on the Culm to produce ideal conditions for growing grass. The heavy wet soils have long been the focus of improvement effort and lend themselves well to livestock production, the Devon (affectionately known as the Devon Red or Ruby Red) being the beef cattle breed native to the area. The better land is usually occupied by the dairy sector, whilst the beef and sheep sectors tend to be found on less productive land. The majority of the Culm NCA is classified Grade 3 and 4, and a significant proportion (c. 35%) is designated a Disadvantaged Area.

Today, agriculture remains fundamental to the area’s economy and culture, with three times more people employed in farming than the European average. There are more than 4,900 registered farm holdings across the Culm, with over 40% being under 20 hectares. Only 18% of the land is tenanted, showing the established pattern of small family farms and a few larger estates which has characterised the area for centuries (Countryside Agency, 2004)

Current farm survey data (primarily based on the Defra June 2008 survey) and trend data for the period 2000-2008 (based on Defra June Survey for 2000-2008) indicate the state of farming in the Culm Case Study Area, see Table 1-4 and Table 1-5.

<p>Summary: The survey data indicates that commercial holdings in the Culm Case Study Area are on average small to medium sized, and likely to be owned rather than rented. Commercial holdings are more likely to be categorised as grazing livestock or dairy (together these farm types comprise 67% of land area) but just under half of the holdings are categorised as ‘Other’ (holdings which either do not fit well with mainstream agriculture, such as specialist horses, or which are of limited economic importance, such as specialist set-aside, specialist grass and forage (no livestock) and non classifiable holdings). The predominant land use is permanent grass followed by temporary grass, then crops and fallow. Cattle are the dominant livestock in terms of grazing livestock units, although there is a significant number of sheep.</p>	
<p>Agricultural land</p>	<p><i>Farm Survey June 2008:</i> Agricultural land in the case study area comprises 40,628 ha (15% of the Culm NCA).</p> <p><i>Trends 2000-2008:</i> 6% increase in the total area, which increased from 38,249ha to 40,628ha. This increase is primarily due to the registration of new holdings when SPS was introduced in 2005.</p>
<p>Farm holding number and size</p>	<p><i>Farm Survey June 2008:</i> There are 1,181 farm holdings in the case study area with an average holding size of 34.4ha. Note, the average size of commercial holdings in the case study area is 53.9ha, smaller than the Culm NCA as a whole is 59.7ha (2009).</p> <p><i>Trends 2000-2008:</i> 25% increase in the number of farm holdings from 943 holdings to 1,181 holdings. Average holding size reduced from 40.6ha to 34.4ha.</p> <p><i>Note:</i> Commercial holdings are those which exceed the threshold for the census. This includes holdings with one or more of the following: >5ha; >10 bovines; >20 sheep.</p>

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Farm tenure	<i>Farm Survey June 2008:</i> The tenure of farmland in the case study area is 86% owned and 14% rented (based on 2008 data). This compares with 75% owned in Devon and 68% owned in the South West region.
Farm categorisation	<p><i>Farm Survey June 2008:</i> 44% of holdings are categorised as 'Other' in the case study area, followed by 20% grazing livestock (lowland) and 11% for both grazing livestock (LFA) and dairy. Average farm sizes are 10ha, 36ha, 41ha and 104ha respectively.</p> <p><i>Trends 2000-2008:</i> There has been a 30% decrease in the number of dairy farms and a 16% decrease in the number of lowland grazing livestock farms. The number of LFA grazing livestock farms increased by 44% (for reasons which are unclear) and there was a 95% increase in the number of 'Other' farms. Most of these changes are in line with regional and national trends.</p> <p><i>Note:</i> Farms are categorised according to whether a particular enterprise accounts for two thirds or more of Standard Gross Margin (SGM). For example, cereal farms are those where cereals accounts for more than two thirds of the total SGM. 'Other' holdings are those which either do not fit well with mainstream agriculture, such as specialist horses, or which are of limited economic importance, such as specialist set-aside, specialist grass and forage (no livestock) and non classifiable holdings. The holdings categorised as 'other' and under 5ha in size are likely to be closely associated with one another. At least a proportion of these will fall in the category of 'non-farming' landowners, lifestyle farmers or similar.</p>
Farm size distribution	<p><i>Farm Survey June 2008:</i> Holdings over 50ha account for 23% by number and 75% by area in the case study area. At the other end of the scale, holdings under 20ha account for 60% by number and 8% by area.</p> <p><i>Trends 2000-2008:</i> The numbers of farms increased both in the lower size categories, under 5ha up 52%, and 5<20ha up 21% but also in the largest category >100ha, up 56%. There was a 3% increase in the number of holdings of 20<50ha and a 3% decrease in the number of 50<100ha holdings.</p>
Land uses	<p><i>Farm Survey June 2008:</i> The main land uses in the case study area are permanent grass (67%), temporary grass (12%) and crops and bare fallow (11%). Woodland and rough grazing each account for 4% of land use.</p> <p><i>Trends 2000-2008:</i> The area of permanent grass increased by 14% but temporary grass and rough grazing decreased by 7% and 23% respectively (the reasons for these changes are uncertain but may include reversion of some temporary grass to permanent grass with a change from dairy to beef, and loss of some rough grazing to woodland and possibly some reclassification of some rough grazing land to permanent grass). The area of crops and bare fallow increased by a marginal 2%. The area of woodland on farms increased by 26%.</p> <p><i>Note:</i> 'Permanent grassland' is defined as grassland more than 5 years old, 'temporary grassland' is grassland sown within the last 5 years; 'rough grazing' includes heathland, moors, mountain or hills where a farmer owns or has sole grazing rights (this measure excludes common grazing).</p>
Livestock numbers	<p><i>Farm Survey June 2008:</i> There are around 51,531 cattle, 101,416 sheep, 2,970 pigs, 1 million poultry and 1,330 horses in the case study area. The percentage of holdings with different types of stock is as follows: cattle (33%); sheep (31%); Poultry (18%); Horses (20%) and Pigs (4%).</p> <p><i>Trends 2000-2008:</i> Cattle numbers are down by 9%, and the total number of holdings with cattle is down 23% (this is likely to reflect some switch in cattle from dairy to beef breeds and enterprises). Sheep numbers are down 20% however the total number of holdings with sheep is down by just 1%. The number of poultry and</p>

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	pigs has reduced by 21% and 61% respectively. The number of horses has increased by 72% and the number of holdings with horses has increased by 20%.
Farm labour	<p><i>Farm Survey June 2008:</i> The agricultural workforce in the case study area totals 1,783. Of these, 799 of these are full time employees, including farmers, farm managers and regular workers.</p> <p><i>Trends 2000-2008:</i> The total number of full-time workers (farmers, managers, male and female workers) is down 8%. By contrast, the total number of part-time and casual workers has increased by 7%. The total number employed in agriculture in the case study area has decreased very slightly, from 1,790 to 1,783.</p>

Source: Defra/Natural England 15.9.10, 2.12.10, 5.1.11, 18.1.11

Table 1-4: Farm Survey Data for the Culm Study Area

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ROBUST FARM TYPES	Number of holdings	%	Area (ha)	%
Cereals	44	4%	3,783	9%
General Cropping	#	#	#	#
Horticulture	32	3%	267	1%
Specialist Pigs	#	#	#	#
Specialist Poultry	33	3%	1,253	3%
Dairy	125	11%	13,010	32%
Grazing Livestock (LFA)	134	11%	5,539	14%
Grazing Livestock (lowland)	240	20%	8,582	21%
Mixed	49	4%	3,121	8%
Other	514	44%	4,948	12%

FARM SIZE				
<5ha	437	37%	561	1%
5<20ha	267	23%	2,902	7%
20<50ha	203	17%	6,586	16%
50<100ha	157	13%	11,077	27%
>=100ha	117	10%	19,501	48%

TOTAL HOLDINGS	1,181	100%	40,628	100%
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LAND USE				
Crops and bare fallow (A99)	193	16%	4,489	11%
Vegetables and salad for human consumption (B99)	19	2%	8	0%
Fruit (C99)	33	3%	25	0%
Temporary grass (G1)	281	24%	5,031	12%
Permanent grass (G2)	863	73%	27,093	67%
Rough grazing - sole rights (G5)	193	16%	1,606	4%
Woodland (G14)	333	28%	1,758	4%
All other land (G17)	273	23%	601	1%

LIVESTOCK	Number of holdings	%	Number of livestock	%
Cattle (K299)	394	33%	51,531	na
Pigs (L98)	48	4%	2,970	na
Sheep (M98)	362	31%	101,416	na
Poultry (N98)	214	18%	1,073,684	na
Horses (P90)	240	20%	1,330	na

Source: Defra / Natural England 15.9.10

Table 1-5: Farm Survey Data for the Culm Study Area - June 2008

The potential impacts of these farm characteristics and trends on HNVF and HNVF management in the Culm Case Study Area are outlined below:

- There is an increasing number of both smaller holdings (up to 20ha) and larger holdings (>100ha) suggesting polarisation of holdings. HNVF is likely to be present on both types of holding (see Figure 1-11); it will therefore be important to work with both larger, commercial family farms and smaller holdings owned by non-farming landowners (likely to be associated with the 'other' category).
- Grazing livestock and dairy farms predominate in terms of land area. Farming systems associated with these farm types will continue to have a major influence on the way in which HNVF is managed. Remaining dairy farms are likely to

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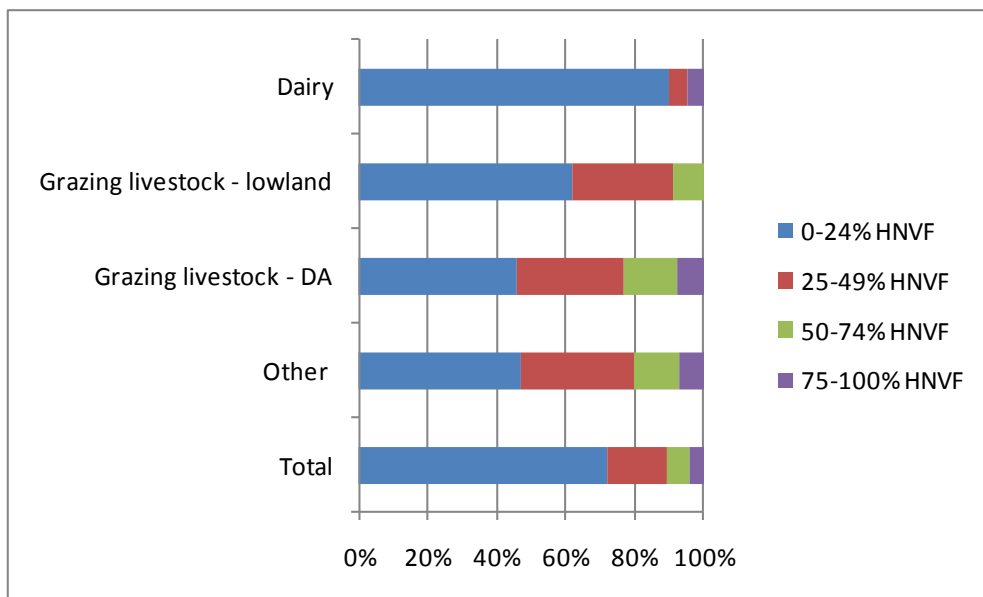
continue to expand in size (average dairy farm size has increased from 80ha to 104ha from 2000-2008), many serving processing plants at Bude and Davidstow; grazing livestock farms have remained fairly stable as a whole in terms of number and land area (although this masks an increase in the number and area of LFA grazing livestock farms and a decrease for lowland farms, the reasons for which need to be explored).

- Permanent grassland is increasing as a proportion of total land use, with less temporary grassland and less rough grazing. Note, rough grazing remains a relatively small proportion of total land use (4%) suggesting that many farmers may categorise their Culm grassland as permanent grassland. Existing HNMF is likely to benefit from a greater area of permanent grassland around existing priority habitats by way of buffer.
- Cattle numbers and sheep numbers have decreased in recent years, although cattle still predominate. It is likely that beef breeds now comprise a greater proportion of the total cattle herd than in 2000, given the 9% decline in the area of land occupied by farms with dairy cattle. This will be generally beneficial for HNMF due to the more extensive systems associated with beef enterprises (and the grazing characteristics of certain traditional beef breeds).
- Less farm labour is present now and hence less is likely to be available for HNMF management now compared to previously. This trend is likely to continue.

Natural England data for holdings with HNMF in four sample parishes in the Working Wetland study areas (see Section 2 and see **Note 5** for more details) provides additional detail of the characteristics of holdings with HNMF:

HNMF as a proportion of total holding size varies according to farm type, see Figure 1-10:

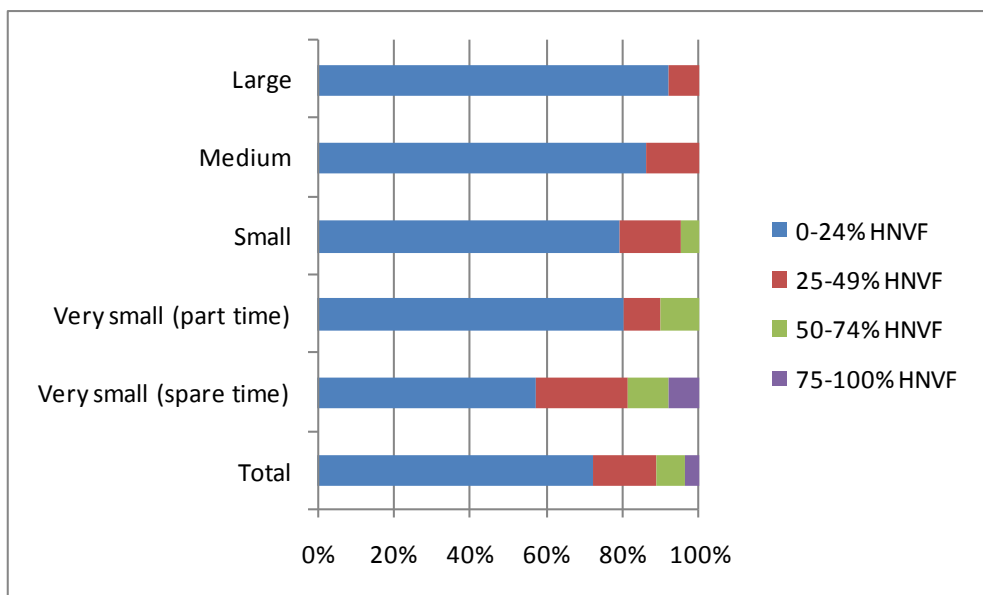
- Dairy farms predominantly have a limited amount of HNMF (under 25%) as a proportion of total holding size.
- Grazing livestock farms have a greater variation of HNMF as a proportion of holding size, particularly in the Disadvantaged Area (DA) where 23% of farms have HNMF on more than half their holding.
- 'Other' holdings are also fairly balanced in terms of HNMF as a proportion of holding.
- Overall, 72% of holdings have 0-24% HNMF as a proportion of total holding size; a further 17% have 25-49% HNMF.



Source: Natural England 17.2.11

Figure 1-10: HNVF as % of Holding Size for Different Types of Farm with HNVF in the Culm Study Area Sample Parishes

HNVF as a proportion of total holding size also varies according to farm size, see Figure 1-11. There appears to be a weak negative correlation between farm size and % HNVF, with more small or very small holdings having a higher % HNVF than larger holdings. Very small spare time holdings are more balanced in terms of HNVF as a proportion of holding.



Source: Natural England 17.2.11

Figure 1-11: HNVF as % of Holding Size for Different Sizes of Farm with HNVF in the Culm Study Area Sample Parishes

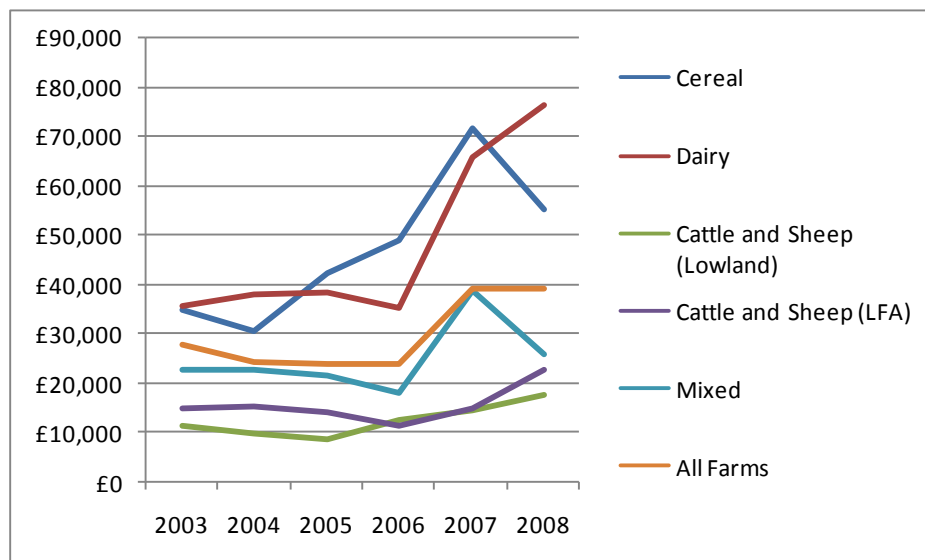
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89% of HNMF is registered on the Rural Land Register (RLR) – a pre-requisite for the receipt of support in the form of SPS and agri-environment scheme (AES) payments. The remaining 11% of HNMF would not be supported by such payments. This land is likely to include unregistered farmland (for example, on small amenity holdings) and unregistered woodland (there was initially no obligation on farmers to register woodland on the RLR although this is now required under SPS and AES rules).

1.4 Farm Business Income

There are no specific farm business income figures available for the Culm Case Study Area. However data can be drawn however from the Farm Business Survey (FBS) and relevant reports. Farm Business Income (FBI) is the key measure used. See **Note 3** for background on FBI and data sources.

Figure 1-12 indicates the Farm Business Income (FBI) for different farm types in SW England and shows how FBI has changed since 2003/4. Dairy farms have the highest FBI, followed by cereal farms, mixed farms and lastly LFA and lowland cattle and sheep farms - the predominant farm types in the Culm. The FBI for LFA cattle and sheep farms was £22,601 in 2008/9, and for lowland cattle and sheep farms the figure was £17,668. There has been an increase in FBI for all farm types. Dairy farms have experienced the greatest increase (115%). Lowland and LFA cattle and sheep farms have experienced lower increases (59% and 51% respectively) followed by mixed farms (15%). The decrease in cereal and mixed farm FBI from 2007/8 to 2008/9 is noticeable. This reflects the high commodity prices in 2007 and subsequent fall back.



Source: Farm Business Survey 2008. Adapted from Lobley et al (2009)

Figure 1-12: Farm Business Income – SW England – Trends

Table 1-6 shows the breakdown of FBI for different farm types in SW England. This shows for all farms that Single Payment Scheme (SPS) income accounts for a significant 53% of FBI, followed by agricultural output (21%), diversification (14%) and agri-environment payments (13%).

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These totals mask big variations between farm types. Dairy farms obtain 68% of their FBI from milk and other agricultural products, 28% from SPS and only 3% agri-environment payments and 1% from diversification. Mixed farms on the other hand obtain a very significant 86% from SPS, 19% from agri-environment payments, 8% from diversification and -12% from agriculture. Lowland cattle and sheep farms are similar with 73% of FBI from SPS, 20% from diversification, 18% from agri-environment payments and -10% from agriculture. LFA cattle and sheep farms also obtain 73% of FBI from SPS, but in addition they obtain a significant 33% from agri-environment payments, and only 5% from diversification and -11% from agriculture. Cereal farms are also dependent, albeit to a slightly lesser degree on SPS income (63%).

	Sources of Income									
	Agriculture	%	Agri-environment payments	%	Diversification	%	Single Payment Scheme	%	Farm Business Income	%
Cereal	-£430	-1%	£7,596	14%	£13,256	24%	£34,871	63%	£55,294	100%
Dairy	£52,005	68%	£2,630	3%	£400	1%	£21,382	28%	£76,417	100%
Cattle and Sheep (Lowland)	-£1,832	-10%	£3,174	18%	£3,502	20%	£12,823	73%	£17,668	100%
Cattle and Sheep (LFA)	-£2,387	-11%	£7,377	33%	£1,063	5%	£16,548	73%	£22,601	100%
Mixed	-£3,186	-12%	£4,806	19%	£2,129	8%	£22,201	86%	£25,950	100%
All Farms	£8,146	21%	£4,953	13%	£5,364	14%	£20,696	53%	£39,082	100%

Source: Farm Business Survey 2008. Adapted from Lobley et al (2009)

Table 1-6: Farm Business Income – SW England - Sources of Income

It is important to note that the nature of farming in the Culm, with its less productive land and smaller farm size (compared to the Culm NCA and county/region) is likely to mean that the area's lowland grazing livestock and dairy farms may yield lower FBI on average than the figures indicated above. However, relatively good participation in agri-environment schemes is likely to offset this to some extent. The dependency of Culm grazing livestock and dairy farms on SPS income is likely to be similar to the region.

To illustrate this, the physical and financial figures for the average lowland grazing livestock farm (which typically may have HNMF) used in the FBS in 2008 have been adapted to reflect the farming characteristics of an average lowland grazing livestock farm in the case study area, see Table 1-7. This shows a reduced 'average' FBI or net profit of £11,988. SPS accounts for 77% of this net profit.

	South West		The Culm		Notes
	£/ha	£/Farm	£/ha	£/Farm	
Physical data					
Farm size	74.7 ha		54 ha est.		
UAA	69.2 ha		50 ha est.		
Perm. grass + rough grazing (% of UAA)	77%		>77%		
Stocking	75.3 LU				
Stocking density	1.09 LU/ha		<1.09 LU/ha		
Financial data					
Agriculture		-£24 -£1,832		-£30 -£1,620	Less productive land (75%)
Agri-environment payments		£42 £3,174		£42 £2,268	Similar agri-environment scheme income (100%)
Diversification		£39 £3,502		£39 £2,106	Similar diversification income (100%)
Single Payment Scheme		£171 £12,823		£171 £9,234	Similar SPS income (100% regional area payment by 2012)
Farm Business Income		£228 £17,668		£222 £11,988	

Source: base data from Farm Business Survey 2008.

Table 1-7: Farm Business Income – Lowland Grazing Livestock Farm – Culm

1.5 Agri-environment scheme participation

A total of 27,444 ha of land in the Culm study area is in some form of agri-environment scheme, equivalent to 67.5% of the total area. Environmental Stewardship accounts for 81.5% of total agri-environment agreement area.

3,887 ha (61%) of HNV farmland in the study area is under some form of agri-environment scheme agreement. Environmental Stewardship accounts 72% of HNV farmland under agri-environment scheme agreement, including 43% in ELS or OELS and 29% in some form of HLS agreement. Classic schemes (CSS) accounts for the remaining 28% of HNV farmland under agri-environment scheme agreement. It is worth noting that 18% (1,117 ha) of HNV farmland in the Culm study area is under some form of HLS agreement.

A breakdown of agri-environment scheme participation is shown in Table 1-8 and the maps shown in Figure 1-13.

Culm (total HNVF farmland 6,319 ha)	Area of land under agreement in study area (ha)	HNVF under agreement (ha)	HNVF under agreement (%)	% of total HNVF
HLS only	416	374	10%	6%
ELS+HLS	3,175	660	17%	11%
OELS+OHLS	258	83	2%	1%
ELS only	16,375	1,479	38%	23%
OELS only	2,158	214	5%	3%
Env. Stewardship sub-total	22,382	2,810	72%	44%
ESA	n/a	n/a	n/a	n/a
CSS	5,062	1,077	28%	17%
Classic schemes sub-total	5,062	1,077	28%	17%
Total	27,444	3,887	100%	61%

Source: Natural England 17.2.11

Table 1-8: Agri-environment Scheme Participation in the Culm Study Area

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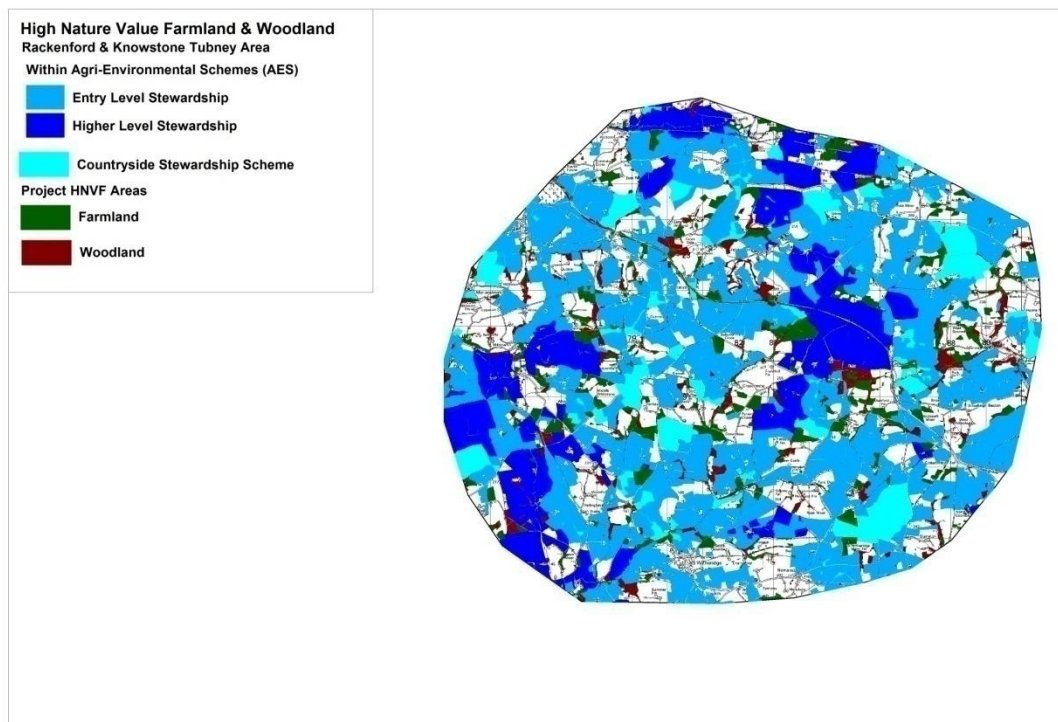
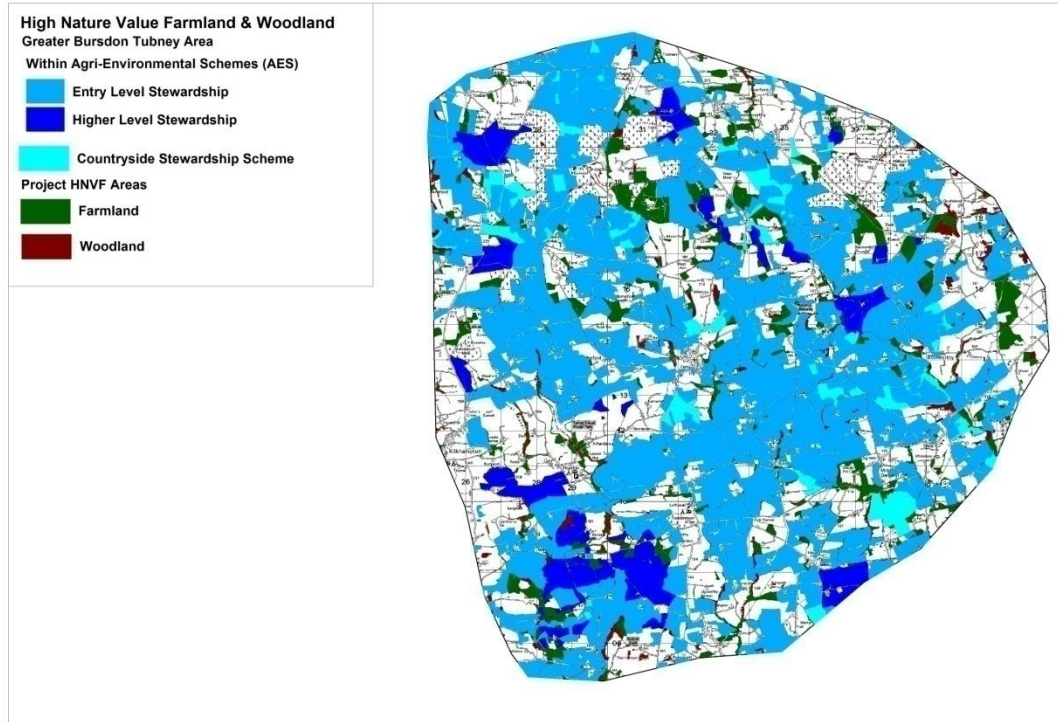


Figure 1-13: HNVF in Agri-environment Schemes in the Culm Study Area

Data on the effect of agri-environment schemes on HNVF is not available at the time of writing, but anecdotal and individual case experience suggests the following:

- ELS is likely to have had limited impact in terms of different or more management. It has sustained existing management but is unlikely to have brought HNVF back into active management. In addition, ELS does not specify stocking provisions for grasslands that are key to maintaining certain important plant communities.
- HLS is the main driver for the conservation of HNVF. Where HLS has been applied to substantial areas of, or whole, farms, it is helping to maintain a complex mosaic of HNVF features. In other cases the HLS boundary may be quite limited, and while maintaining the immediate semi-natural vegetation it may not be helping to maintain the connections between this habitat and the wider landscape.
- HLS has helped restore HNVF, as is the case with the removal of coniferous plantations and restoration of Culm grassland.
- The Culm falls outside a HLS target area, but is covered by the SW HLS Theme Statement⁴, on the basis of which applications can be made for land outside target areas. It is important to note, however, that Culm grassland on its own is often not enough to secure an agreement, additional features are required. The minimum 2ha of Culm grassland required for entry into HLS has recently been increased to 4-6ha reducing the likelihood of small areas being accepted into the scheme.
- While some larger farms have been entered into HLS, there are many that have not, for budgetary and other reasons. Some other parcels are not good enough or big enough to warrant an agreement. This includes small bits of Culm grassland on larger farms (e.g. dairy farms), as well as parts of smaller holdings. There is a view that HLS, which has targeted large clustered areas of semi-natural habitats, is unable to tackle the scale of the challenge posed by the highly fragmented nature of the Culm grasslands (Burgess, 2010).
- Some landowners coming out of CSS agreements have been unable to enter HLS, and have breached EIA regulations and risked SPS payments in order to improve land for agricultural purposes; resulting in habitat loss and poor payback for previous public investment (Kenderdine, 2009).
- HLS £/ha payments are generally very good, much better than previous scheme payments.
- Hedgerows may not be targeted now as much as they were previously. There is concern that less hedgerow restoration is taking place under HLS compared to CSS⁵. This may be due to a wider range of targets, but it is also possible that as a lot of restoration was undertaken under the earlier scheme, there is less need/interest for a similar level of restoration/focus under HLS.
- Agri-environment scheme uptake has been good in the Culm (68% of the case study area). More farmers are involved in agri-environment schemes in the Culm than ever before
- Farmers are aware in the Culm, this stems from a long history of conservation activity and in particular the recent, very successful Working Wetlands Project.

⁴ Under Theme 1: Improving the resilience of Nationally Important (UK Biodiversity Action Plan) habitats to climate change: Natural England will consider applications offering to maintain and/or restore/link/buffer 'significant' areas (>2ha) of habitats including Culm grassland in North Devon.

⁵ Expenditure on hedgerow rejuvenation and new planting (in England) has fallen from a peak of £21.5m under CSS and ESAs in 2004 to £1.7m pa in recent years under HLS. This is a 90% fall (Wolton, 2010).

2 Farming with High Nature Value Farmland in the Culm – Findings from Interviews and Literature Review

2.1 Introduction

This section sets out the findings from interviews with farmers and other stakeholders, complemented by a review of relevant literature, with the aim of better understanding how HN VF is farmed in the Culm and key issues now and in the future.

Farm interviews

The main element was a series of interviews with a selection of farmers owning or managing farms with HN VF in the Culm study area.

The purpose of the farm interviews was to gather information on the range of farming systems and practices which support HN VF, the farm socio-economic context and trends, use of HN VF, motivation, obstacles to managing HN VF and future trends and consequences. The farms were selected following identification of a representative sample of parishes in the Culm study area and the development of a HN VF farm typology for the area, see **Note 5** for more details. For the location of the sample parishes and the farms surveyed, see Figures 2-1 and 2-2.

Given the relatively short time available for arranging and carrying out interviews, a pragmatic approach was taken which involved comparing the set of farm types derived in the farm typology with the map of estimated locations of HN VF, and looking for farms which fitted each of the types. The farmer/farm contacts were provided by Devon Wildlife Trust, and stemmed from existing relationships established through the Working Wetlands Project. This latter factor allowed for interviews to be more relaxed and open, and hence more extensive, than interviews based on cold-calling farmers with whom there was no existing relationship. The negative impact of this method was that the majority of farms were proactive towards HN VF management and mainly in HLS. To add dimension to the results it might have been preferable to include some other farms in ELS only, or outside of any agri-environment scheme, to ascertain their attitude to and management of HN VF.

Please note the tables referred to in this section - Tables A1 to A5 - are located in Appendix 1 due to their size and format.

Stakeholder interviews and additional evidence

Feedback from interviews with a range of stakeholders and additional evidence from relevant reports and studies is included under the relevant headings below. A bibliography showing reports and studies referred to is shown in Appendix 3.

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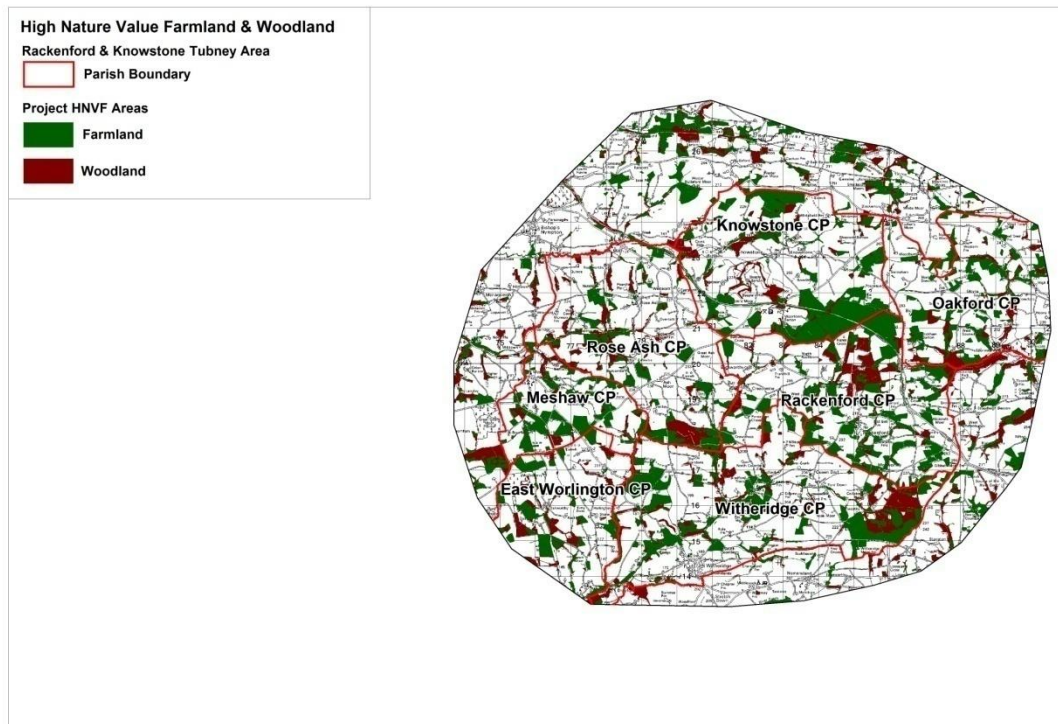
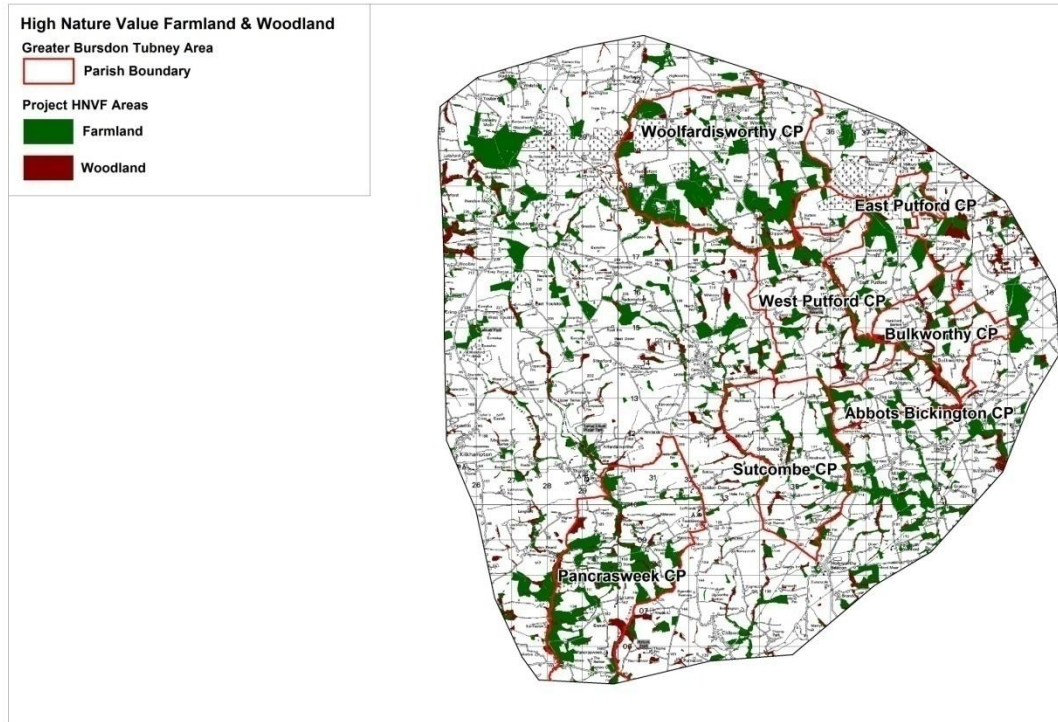


Figure 2-1: Sample Parishes in the Culm Study Area

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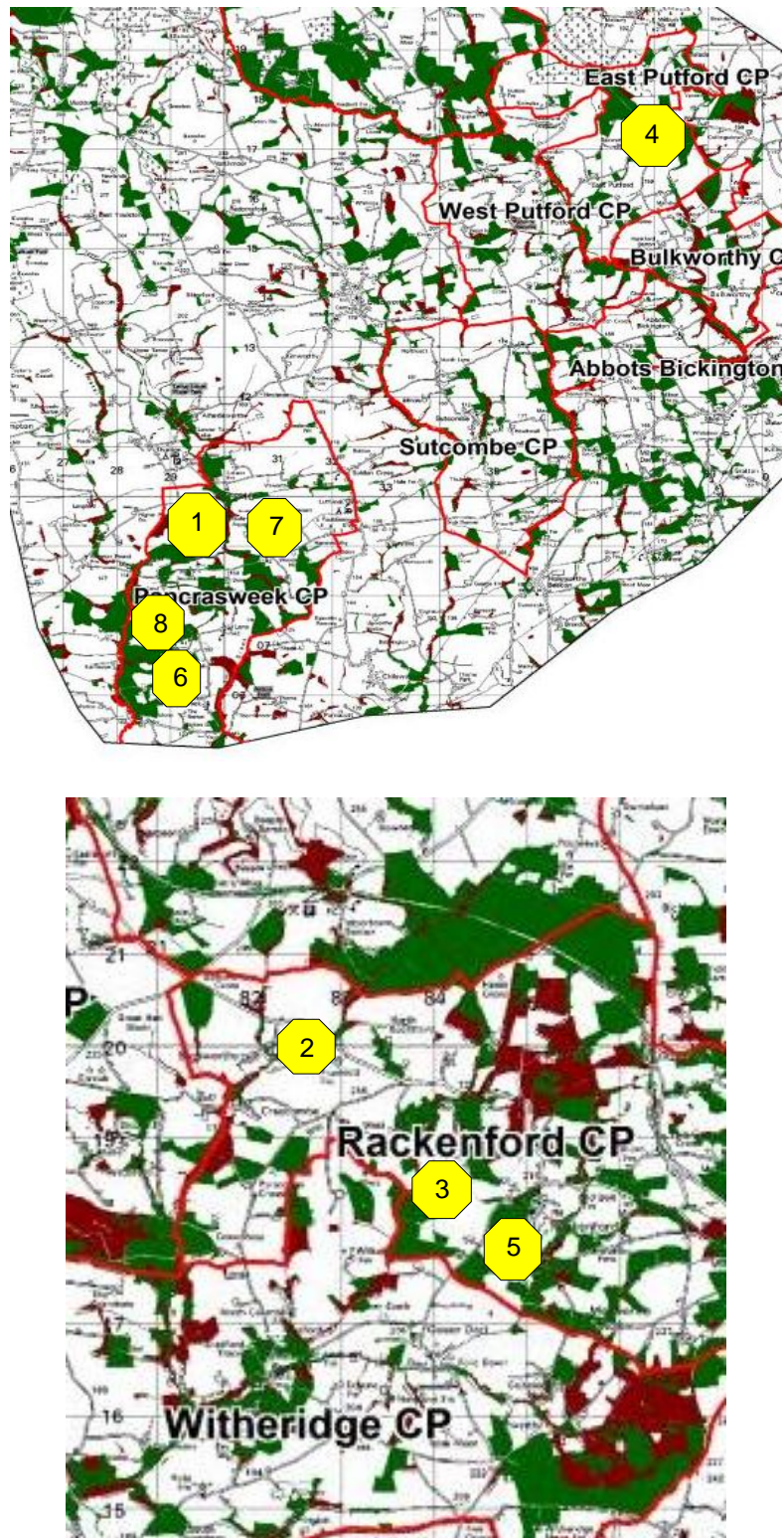


Figure 2-2: Location of Farms Surveyed

2.2 Farm descriptions

The eight farms are described in Table A1 in Appendix 1. The farms cover a reasonably typical range of livestock, dairy and mixed farms with HNV farmland in the Culm study area. They include commercial/family farms, smallholdings and units owned by non-farming owners. Farm size ranges from 22ha to 365ha. There is a mix of designations (including four SSSIs and four CWS) and agri-environment scheme participation (seven ELS/HLS and one with no agreement).

A brief summary of each farm and its HNVF is set out in Table 2-1 by way of introduction:

<p>Farm 1 - A small (28ha) low input, beef farm, the majority of which is HNVF.</p>	<p>The farm is now relatively small following sale of more productive land to a neighbour. It is virtually all HNVF, which includes a traditional orchard and Culm grassland, and, separated by neighbour's land, an acid grassland / fen SSSI located by a river. The HNVF is managed by light summer grazing using third party beef cattle. Conservation management supported by SPS/HLS is now the farm's main/only enterprise. The farmers are very keen on wildlife and committed to keep the HNVF as it is, in good condition. However farm income and profitability are low and they feel traditional livestock farmers such as themselves are an endangered species.</p>
<p>Farm 2 -A large (365ha) commercial dairy, beef and sheep, family farm</p>	<p>The farm includes commercial grazing and forage land, primarily devoted to a 125 cow dairy enterprise, and a sizeable area of HNVF located mainly to the South of the holding. This HNVF includes Culm grassland, some of which is being restored and some created from felled conifer plantation. The owner is very interested in wildlife and conservation, and is developing a traditional breed suckler cow enterprise to graze the HNVF, made possible by HLS. The farmer is considering selling beef from this enterprise via his farm shop, alongside game and other meat. He has also purchased adjacent areas of HNVF as and when it has come onto the market.</p>
<p>Farm 3 - A large (270ha) commercial beef and sheep farm , part in SDA</p>	<p>The farm comprises a mosaic of Culm grassland, semi-improved grassland and broadleaved woodland. The farm is predominantly HNVF, much of it designated SSSI and/or CWS. One third of the farm is in the SDA. All the land is managed in hand via suckler cow and sheep enterprises. The owner is positive about the HNVF, it is integral to the business and HLS makes the farm profitable. The HLS agreement has increased returns and enabled the farm to be improved, for example via scrub management. The owner enjoys managing the HNVF, but does not know much about the wildlife interest of the land.</p>
<p>Farm 4 - A medium-sized (98ha) commercial beef, sheep and arable farm</p>	<p>The farm is medium-sized mixed farm including cropped land, semi-improved grassland and blocks of Culm grassland and unimproved grassland particularly on lower lying areas adjacent to watercourses. The farm is managed in hand and grazed via beef store and sheep enterprises. HNVF management is integrated with the rest of the farm business. The farm is in HLS and this provides useful supplementary income, however the farm is not overly dependent on it. The owner considers the HNVF an asset from a farming, personal, sporting and financial perspective however the farm objectives are broader than HNVF alone.</p>
<p>Farm 5 -Small (32ha) amenity farm run by non-farming landowners</p>	<p>This small holding comprises mainly broadleaved and coniferous woodland together with two species rich meadows / Culm grassland areas adjoining the house. The current owners purchased the holding following retirement from their business. They are committed to the stewardship of the land and have invested considerable resources in conservation including removing conifers, broadleaf tree planting, ditching, hedging, fencing etc as well as in annual management such as mowing and burning. The owners regard the HNVF as an asset and they</p>

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	very much enjoy it, although it is a burden in terms of financial outlay. The land is not in any scheme (due to the HLS grazing requirement which was incompatible with current management) although they have benefited from DWT advice and small grants for certain works.
Farm 6 - Medium-sized (100ha) family beef farm	This medium-sized farm includes semi-improved grassland, Culm grassland and lowland fen/mire/bog. The farm is part owned and part rented; it is managed in hand and grazed with Friesian beef stores. HNVF management is fully integrated with the rest of the farm business. The farm is in ELS/HLS which provides reasonable payments but the farmer would manage the land outside schemes if payments dropped too far. The owner considers the HNVF an asset from a wildlife and financial perspective, but it does limit farming flexibility.
Farm 7 - Small (22ha) grassland farm run by non-farming landowner	This small farm includes Culm grassland, some semi-improved grassland and a large, recently planted farm woodland, as such virtually the whole farm is HNV. It is situated adjacent a SSSI and NNR. The farm is owned by a non-farming landowner who has entered the land into ELS/HLS and is actively restoring Culm grassland, hedge banks and hedges. The owner is positive about the HNV land and regards it as an asset. He has received advice from DWT and very much values this. In the future, he is seeking to grow his embryonic cattle herd, link HNV land to his other enterprises and make the farm more sustainable.
Farm 8 – Large (200ha) commercial dairy and beef family farm	This large, traditional family farm includes a 100 cow dairy enterprise and a smaller suckler beef herd. The farm is down to temporary and permanent grassland, together with some Culm grassland. The farm has a SSSI (a remnant leftover after a period of agricultural improvements) and there is a good network of thick hedges etc. on the farm. The HNVF is managed as integral part of the farm business. The farm was in CSS and has now entered ELS/HLS. A significant HLS project is the restoration of conifer woodland to Culm grassland to support the marsh fritillary butterfly. The farmer welcomes the HLS income (and is positive about wildlife) but not the conditions attached to the scheme.

Table 2-1: Description of Farms Surveyed

2.3 HNV farmland and features

For each farm, the nature, extent, density and context of HNVF habitats and landscape features is set out in Table A2 in Appendix 1.

The predominant open-ground HNVF habitats are purple moor-grass and rush pasture, grading into neutral and acid lowland meadow. There are also areas of fen meadow and lowland fen/mire/bog. Mixed deciduous and/or wet woodland and scrub is also extensive within these habitats often as a result of abandonment or under grazing of wet pasture. In addition, three farms have traditional orchards and one farm has part of a large area of wet heath. In most instances the higher quality Culm grassland habitats are buffered by adjacent semi-improved grassland, and progressively more improved land. In one or two cases, semi-improved grassland forms part of a more intimate mosaic of habitats with Culm grassland and other habitats.

There is no simple rule for judging when semi-improved land can be classed as HNVF, and an element of subjective judgement is necessary. Generally, where semi-improved land occurs as part of a continuum between fully improved land and semi-natural land, the semi-improved is logically regarded as being part of the HNVF whole. In these situations semi-improved land will be used and influenced by some of the wildlife present on adjacent semi-natural land, and helps to buffer that higher quality land. By

contrast, where semi-improved land occurs as isolated tracts surrounded by improved land (for example as a small area of steeper land in an otherwise gently sloping field, or a small corner of a larger field) it is more logical not to regard it as HNMF. Using this distinction, the proportions of HNMF on the eight farms ranges from 30% to 95%.

The predominant HNMF landscape features are thick ancient hedges on the lower lying Culm grassland, together with rivers, streams, small copses and larger woodlands. Other features include hedge banks, hedgerow trees, in-field trees and ponds. On more productive, drier land on the plateaux, there are post-Enclosure hedges. Seven of the farms have a high density of HNMF landscape features, at least in part, with one farm having medium density.

Natural England Holding Assessment Toolkit (HAT) data is available for seven out of the eight farms (excluding Farm 1). See **Note 4** for more detail on HAT criteria and scoring. Four farms are scored A (highest), and three farms (Farms 2, 4 and 5) are scored D (the lowest score possible is E). Six out of the seven farms score highly in terms of biodiversity, with the exception of Farm 2 despite this holding having a CWS and HLS agreement. Three farms are scored highly in terms of resource protection and 2 farms are scored highly in terms of historic environment (undesigned interest).

2.4 Management of HNMF farmland and features and link to farming system

For each of the eight farms, the farm circumstances and approach to HNMF management are set out in Table A3 in Appendix 1.

On all the farms visited, HNMF is managed positively. In the majority of cases, this is as a result of a combination of personal interest/objectives and pragmatism as a result of the quality of the land and the availability of agri-environment scheme support, with the balance between these drivers varying from one farm to another. On Farm 5, the non-farming landowners value and manage the HNMF but do not farm it as such.

The farmers' attitude to HNMF landscape features, their management, the effect of agri-environment schemes on this management, and the relevance/integration of HNMF to the farm business is set out in Table A3. Farmer attitudes range from very positive and enthusiastic, to positive mainly due to agri-environment scheme involvement, to tolerant/mildly interested.

HNMF habitats are generally light-moderately summer grazed with beef or dairy cattle and sheep. On Farm 7 (small grassland farm), HNMF is also grazed by horses. HNMF is managed by burning and cutting on Farm 5 (small amenity holding).

For the seven farms entered into ELS/HLS, the scheme has enabled conservation management to continue (from that supported by earlier CSS or WES agreements) or be enhanced. On two farms, conifer plantations have been removed and are being restored to HNMF under HLS, see Figure 2-3. On four other farms, existing habitats and/or boundary features are being restored or improved, see Figure 2-4. On Farm 2 (the large dairy/beef/sheep farm) the additional resources via HLS have supported the purchase of traditional breed beef cattle and given confidence for the farmer to purchase more HNMF land. On Farm 1 (small, low input beef farm) where the land is already in favourable condition, the beneficial management appears to have continued largely unchanged.

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Figure 2-3: Restoration of Culm grassland from conifer plantation



Figure 2-4: Restoration of hedge banks and small fields

In terms of the relevance to or integration of the HNMF into the main farm business, four farms fully integrate the (grazing) management of HNMF into their core livestock systems and enterprises (Farms 3, 4, 6 and 8). Another farm (Farm 2) has developed a new, separate traditional breed beef enterprise to manage the HNMF. On two farms (Farms 1 and 7), the whole farm is essentially HNMF and conservation management is the main enterprise; on one of these farms (Farm 1) the grazing management is let out to a third party. There is no farm business to speak of with Farm 5.

2.5 Benefits of farming systems and practices for nature values

A brief summary of HNMF management and condition is set out in Table A4 in Appendix 1.

In the majority of cases, the HNMF habitats are in good, or fair to good condition (and in some cases recovering) as a result of the light-moderate summer grazing with beef or dairy cattle. In the case of Farm 5, the HNMF is maintained in good condition by burning and cutting (in the woodland areas). Red deer provide additional grazing pressure in the case of Farms 3 and 5.

HNMF landscape features such as hedges, hedge banks and woodland are generally in fair-good or good condition. Hedges are generally managed by trimming each year or every other year, with hedges being laid on at least two farms.

Woodland management ranges from minimal to more active positive management. A new farm woodland comprising native broadleaf species has been established on Farm 7. As indicated previously, existing conifer plantations are being removed to restore Culm grassland on two other farms.

Additional evidence

“Light grazing (approximately one suckler cow per ha over a 20 week period or two 12-24 months old cattle per ha) seems to be favourable for the widest range of Culm grassland species although there has to be some flexibility in stocking densities due to the uncertainty of weather conditions or livestock availability. However, when livestock are unavailable, or it is impossible to graze a pasture due to a particularly wet summer, then winter burning could be used as a management tool to reduce quantities of leaf litter and to provide fresh Molinia growth for the following grazing season” (Gardiner, 2009).

2.6 Socio-economic context of farms and HNMF farmland management

The socio-economic context of each of the eight farms is set out in Table A5 in Appendix 1.

On all seven farms in ELS/HLS, the farmers said that the cost of HNMF management is being met through ELS/HLS payments. Two farmers mentioned that a small margin was being made on the annual payments, although in one case this was being reinvested into the purchase of stock (Farm 2). Two other farmers mentioned that if labour was fully factored in, they would be making a loss on the HNMF management under ELS/HLS. In terms of capital works, one farmer mentioned that the materials cost was

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covered by the grant, and another mentioned that, as he was undertaking these using a contractor, he was having to find the balance (around 25%) of costs.

On Farm 5, which is not entered into an agri-environment scheme due to the 'unsuitability' of the scheme for non-farming landowners (in this case, the land is not being farmed as such; management is via deer grazing and cutting, as opposed to livestock grazing as required under HLS). The owners mentioned that they had invested a significant sum of money to help restore their HNV farmland and woodland, and were spending around £10,000 p.a. to maintain it.

On all the farms surveyed, HNVF is regarded as an asset to the landowners on a personal level (i.e. an amenity asset). Seven farmers also regarded HNVF as an asset to the farm business mainly due to the HLS payments; this included those where the HNVF was integrated into the core farming enterprises as well as those where conservation management was the main enterprise. One of these farmers (Farm 3) indicated that while he had initially been negative about his SSSI, the Culm grassland now 'helps make the farm profitable' (although no labour is employed; all the work is done by the owners). Another farmer (Farm 8) considered the HNVF as neither an asset nor a burden, it was just part of the farm; in the past however, the farmer indicated that she would have agriculturally improved the SSSI land had it not been notified. A further farmer mentioned the enjoyment that he gets from rough shooting over the HNVF. The non-farming landowners (Farm 5) indicated that while they very much valued the HNVF it was a drain on their financial resources.

On two farms, the farmers recognise the potential of HNVF to complement existing or new enterprises. One farmer (Farm 2) is already engaged with selling local produce via a farm shop located in a nearby market town, and is keen to develop his traditional breed herd which grazes HNVF and sell the beef (promoting its local, high quality and environmental characteristics) via his shop. Another farmer (Farm 7), who is currently more of a non-farming landowner, is keen to develop the farm in terms of size and stock numbers. He is also keen to make the farm 'environmentally commercial' and sees opportunity to give his holiday cottages (currently being restored) and horse-riding enterprise a unique selling point by associating them with the HNVF on the farm; this would certainly provide marketing benefit, it may also deliver a small additional price premium.

Examples of HNVF cost-benefits

Examples of the cost-benefits of specific HNVF approaches/practices arising on the visited farms are set out below. The physical and financial figures shown are based on actual data from the farms visited except where indicated as estimates.

Table 2-2 shows the indicative economic position for Farm 1. The farmer is a traditional livestock farmer who has downsized over the years but is very keen on wildlife and has opted to retain the HNVF (including a SSSI). The farm's only income comes from SPS and ELS/HLS payments. The grazing is let to a beef farmer at minimal/low rent. The figures show a gross income of around £11,000 in total or £392/ha. Note, costs in the form of labour, overheads etc were not specified but are expected to be almost or equal to gross income, hence resulting in a minimal net profit, estimated to be no more than £1,000. HNVF is in good condition and well managed on the farm but is very dependent on SPS and agri-environment scheme income (>90%), and hence very vulnerable to policy/scheme change. SPS payments are expected to increase to 2012, after which they are expected to fall.

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28 ha small, low input beef farm – mainly HNMF			
	ha	£/ha	£/farm
Grassland/grazed habitat (100% HNMF)	27		
Other land (buildings, tracks, woodland etc)	1		
<i>Total area</i>	28		
Grass keep rent/ sales		£30 est	£800
Single Payment Scheme		£165 est	£3,000
ELS/HLS Payment		£260 est	£7,200
<i>Total income</i>		<i>£392 est</i>	<i>£11,000</i>
Less estimated costs (e.g. labour, machinery, insurance etc.)			£10,000
Net profit		£36	£1,000

Table 2-2: Cost-benefit: 28ha small, low input beef farm – mainly HNMF

The indicative economic position for Farm 4 is shown in Table 2-3. This is a medium-sized mixed family farm. Key enterprises include around 30ha of spring cereals (crimped for animal feed), 150 beef stores brought in at 3 months and sold at 24 months, 100 Friesian steers kept indoors, fed on cereals and finished at 12-14 months, and a breeding flock of 60 pedigree Charollais sheep. The HNMF which includes Culm grassland and semi-improved grassland is managed as an integral part of the farm, and grazed by the beef stores. The farm has a more balanced, diverse range of income compared to Farm 1. The figures show a gross farm income of around £115,000 in total or £1,173/ha. After costs, and after deducting off-farm income, net profit last year was around £26,000 (out of which comes the farmer's own remuneration); this is very close to the FBI for mixed farms in the SW region as a whole (see Section 1.4). It is important to note that the farm has a smaller percentage of the total farm as HNMF (around 40%) and also a much lower dependency on SPS and agri-environment scheme income (21%), although even this accounts for a high proportion of net profit/FBI. In other words, the farm is less vulnerable to policy/scheme change compared to Farm 1. It is worth noting that the dependency of the farms surveyed on SPS and agri-environment scheme payments ranged from 0 to 95% of farm income, with the commercial farms being in the range 20-50%.

98 ha medium-sized, mixed family farm – 40% HNMF			
	ha	£/ha	£/farm
Arable land	30		
Grassland/grazed habitat (c. 40% of farm is HNMF)	67		
Other land (buildings, tracks, woodland etc)	1		
<i>Total area</i>	98		
Crop sales			£10,000
Stock sales			£81,000
Single Payment Scheme		£165 est	£16,000
ELS/HLS Payment		£82 est	£8,000
<i>Total (farm) income</i>		<i>£1,173</i>	<i>£115,000</i>
Less costs			£89,000
Net profit		£265	£26,000

Table 2-3: Cost-benefit: 98ha mixed farm – 40% HNMF

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The costs and benefits associated with restoring HNMF from coniferous plantations under HLS is considered in Table 2-4. This was occurring on two of the farms visited, including Farm 2 upon which the example is based. The net cost of felling the conifer plantations and restoring the land (using stump grinders) is covered by Natural England under the HLS agreement. The cost of required infrastructure such as fencing and water is grant-aided, with the majority of the cost covered by HLS capital payments. The total HLS annual payment is in the order of £340/ha (including supplements for grazing with traditional breeds etc), added to which there is some limited grazing value. Against this, costs associated with reintroducing and maintaining grazing, mainly labour but also veterinary and medicine costs are estimated to be at least 50% of the HLS annual payment. Overall, the net annual income is estimated to be £175/ha restored or £4,200 in total. Note, the farmer could increase this by investing in SPS entitlements to secure an additional income stream.

365 ha dairy and beef farm – restoration of Culm grassland from conifer			
	ha	£/ha	£/farm
Conifer being restored to Culm grassland	24		
Other land	341		
<i>Total area</i>	<i>365</i>		
Capital			
Net income/cost from Sitka Spruce felled (NE covered 100%)		0	
Infrastructure costs - fencing, water (NE covered majority of costs)		0	
Revenue			
<i>Income</i>			
Grazing value		£25 est	
HLS Payment (HK8)		£280	
HLS Payment (HR2 and other supplements)		£60 est	
SPS Payment (n/a although entitlement could be purchased)		0	
<i>Total income</i>		<i>£365 est</i>	
Less costs (est. c.50% of net income to cover labour etc)		£190 est	
Net income		£175 est	£4,200 est

Table 2-4: Cost-benefit: 365ha dairy and beef farm – Restoration of HNMF

Additional evidence

The farm business income evidence presented in Section 1.4 indicates poor profitability for lowland and LFA livestock farms (4 of the farms surveyed) with FBI in the Culm likely to be lower than the SW average for 2008/9 of £17,668 and £22,601 respectively due to farm size, lower productivity etc. This income is highly dependent on SPS (73% of FBI for both types of farm) and to a lesser extent diversification (20% and 5% respectively) and agri-environment schemes (18% and 33% respectively), with agricultural output resulting in a loss (-10% and -11%). This underlines the economic importance for these farms of maximising subsidy receipts from SPS and agri-environment scheme payments. The barriers to entry into agri-environment schemes are explored further in Section 2.7 below.

Mixed farms tend to be similarly dependent on SPS (86%), agri-environment schemes (19%) and diversification (8%).

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Dairy farms (such as Farms 2 and 8) on the other hand are much less dependent on SPS (28%) and only obtain 3% of FBI from agri-environment payments and 1% of FBI from diversification.

Other anecdotal socio-economic evidence gained from stakeholder interviews in relation to the Culm includes the following:

- The main farming systems are dairy (serving processing plants in Bude or Davidstow) or mixed beef rearing/finishing.
- The stocking rate on the whole is relatively low to average, given the less productive nature of the land. In some cases it could be described as 'semi-subsistence' given its low productivity and profitability. This can be broadly supportive towards HNVF.
- There is an increasing number of incomers, some affluent and keen to do the right thing in terms of HNVF management; others have much more limited knowledge and awareness. Some are focused on horses rather than the natural environment.
- HLS is a key driver for HNVF management. Without some form of agri-environment scheme support it is very hard to maintain and manage HNVF.
- Woodland creation is a long term option which some farmers are involved with, via the South West Forest initiative.
- There is some, but limited diversification relating to HNVF. Mainstream farmers are often not that progressive in terms of developing and marketing niche products and services, such as those linked to HNVF. In addition, some parts of North Devon are quite remote.

2.7 Obstacles to managing HNV farmland

In order to maintain and manage HNVF, basic needs - from a farmer's perspective - include the availability of suitable livestock and suitably qualified labour and sufficient returns to cover costs and generate an element of profit.

A range of obstacles to managing HNVF were identified from the farms visited; to a degree, these reflect the extent to which basic needs are being met in the Culm but also highlight a number of other problematic issues:

Interest and awareness

- There is a lack of knowledge and awareness amongst some farmers of the special features and specific management associated with HNVF.

Practicalities

- There is a limited number of traditional livestock farmers left –we are “an endangered species” (Farm 1) – although livestock is available and native breeds of livestock are increasing in number.
- The BSE stigma is still attached to over 30 month (slower maturing, often traditional breed) cattle, adversely affecting the economics of extensive beef rearing and finishing.
- There are livestock health and welfare problems associated with wet grassland such as New Forest Eye, Fluke, Biting Flies etc. HLS limitations on topping rushy pasture do not help the New Forest Eye problem.
- There are other important livestock health and welfare issues impacting grazing animals and grazing management including TB and Bluetongue (Farm 1, 3 8). “FMD was not half as bad as TB”.

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Profitability

- There is serious concern about the possibility of future reductions in SPS and agri-environment scheme payments, even for farms with more viable, commercial enterprises (Farm 2).
- Most conservation jobs involve manpower rather than machines, hence they are labour intensive and expensive. This is an issue given reductions in farm labour over the years and low farm profitability.

Schemes

- HLS as a scheme is complex and daunting especially to landowners/farmers of small holdings (Farm 7). It is possible to slip-up inadvertently. There is a need for pragmatic advice and guidance (such as that provided by NGOs such as DWT and FWAG).
- HLS is primarily designed for farmers, and other conservation grants are limited. One cannot assume continued external financial support from non-farming landowners (Farm 5).
- HLS/SSSI conditions can be limiting and restrictive; in some cases resulting in sites deteriorating. *“Wish officials would listen to those who live on the land; know what can and can’t be done on the ground”*. Need flexibility in terms of HNVF management (Farms 1, 8).
- Limitations on over-wintering stock are considered unnecessary and expensive (e.g. investment in buildings, forage costs) (Farm 3).
- There are limited visits from Natural England staff under HLS – *“no visits in the two years under HLS but used to get two visits p.a. under WES”* (Farm 3)
- Mapping associated with HLS (and SPS) continues to cause problems.
- There are limited capital payments for fencing. *“Fencing is very expensive on wet land. More help would make a big difference”* (Farm 1). Scrub management payments are also considered to be too low given the conditions.

It is important to note however that the farmers surveyed have also made a number of positive comments:

- DWT was key. I had zero knowledge of land management ...they were very supportive. They helped with the educational side and contractors, specifications etc (Farm 7).
- HLS has been very good and pays much more (than WES). It has helped improve the farm (Farm 3).
- The (habitat) management course was great fun (Farm 5).

Additional evidence

The findings of a recent State of Resource report for Culm grassland (Kenderdine, 2009) set out the main reasons for lack of management:

“Almost 800ha of Culm assessed, (43%), has fallen out of management and is gradually being encroached upon by scrub and woodland. The reasons for these widespread lapses in management are well known and underline the habitats intimate connection with the agricultural community. Lack of stock, lack of skills, lack of funding, inaccessibility, economic non-viability, change in landownership and available expertise....these are not new issues but their accumulative impact is becoming more apparent. Although the speed of encroachment may be slow, it is steady, with the amount of open retrievable grassland declining year on year.....In many ways it is these

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sites that perhaps represent areas of greatest potential, either in terms of the land's restorability, or the capacity of these areas to act as new wildlife reservoirs within the Culm mosaic."

These sentiments are echoed in a recent report on County Wildlife Sites by FWAG (Stonex, 2011) which was focused on North Devon. It also highlights the small size and fragmented nature of CWS which increases costs, the lack of maintenance/decline of infrastructure associated with traditional grazing management (e.g. fencing, water supply), a decline in the 'network' of traditional graziers, problems created by sites in multiple ownership, and lack of time (especially with dairy farmers).

Other issues mentioned by stakeholders included the following:

- In the future, farmers may get disenchanted with Government, given (lack of) handling of TB issue and if SPS and agri-environment scheme expenditure reduces.
- DWT advice and services through the Working Wetlands project have been very important in securing HNVF management in the Culm. It has helped get the mindset right and get farmers interested and involved.
- Increased farmer knowledge and awareness should help to secure the longer term sustainability of HNVF management.
- The Working Wetlands project has addressed other barriers such as insufficient land-use data, shortage of suitable grazing livestock, lack of appropriate machinery, and the provision of funding for small capital works.

The nature and form of advice provision for farmers in the Culm, together with recommendations, are explored in detail in a report for DCC (Lobley & Butler, 2007). The report identifies the need for advice being available for those wishing to pursue 'profitable farming within environmental limits'; this is likely to be increasingly important in the future if scheme payments reduce.

2.8 Future trends and consequences for nature values

Future trends in the interviewed farmers' approach to HNVF and the potential vulnerability of HNVF as a result of these trends are set out in Table A5 in Appendix 1.

For five farms in ELS/HLS (Farms 1, 2, 3, 4 and 6) the scheme should secure consistent, positive management of HNVF for the remainder of the agreement term. The future beyond that is less clear, although on three of the farms, there are potentially sustainable dairy, arable/beef and beef enterprises (Farms 2, 4 and 6) which would continue without ELS/HLS support (albeit potentially with some form of intensification). However a reduction in SPS would "*create a major problem if it goes*" (Farm 2). The two other farms (Farms 1 and 3) are more dependent on HLS income, although priority habitats have the added protection of SSSI designation over part of the HNVF.

HNVF on Farms 7 and 8 also enjoy ELS/HLS support however while one has the potential for future income from 'environmental commercial' enterprises, the HNVF on the other could well be agriculturally improved in places if the current ELS/HLS agreement is not replaced when it ends.

HNVF on Farm 5 is likely to be maintained at the owners' expense however this land is subject to other external threats such as a 'stock market crash' adversely impacting investment income available for continuing management and/or change in ownership.

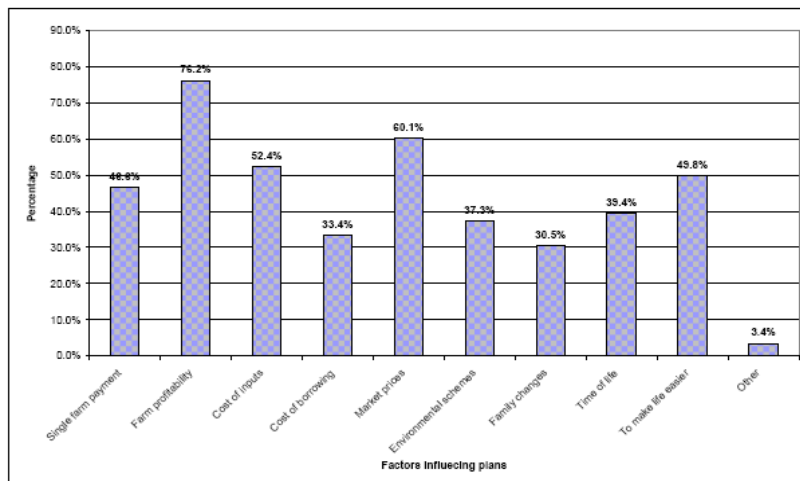
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The management of HNMF landscape features such as hedges, streams, ponds etc is likely to be generally static or improving, subject to the continued availability of agri-environment scheme funding. Less money from this source could result in less active management and restoration work being undertaken.

Additional evidence

There is a range of additional evidence available from studies and stakeholder interviews which provide some indication of future trends for farms with HNMF. Butler et al (2007) undertook a postal survey of 598 Devon farmers in late 2006 in part to ascertain farmer intentions and drivers of future plans. Key findings relevant to this study (albeit from a now dated survey) were as follows:

- 82.1% of farms will continue under the management of the same family over the next five years. This includes 62.9% of who intend to be managing their farm as they are now or with increased production or increased diversification activities and a proportion who intend to retire or semi-retire and have identified a successor to take over the family business.
- A minority of dairy farms (29.6%) account for the majority of expansion plans of all farmers in the survey. On the other hand, over one-third (36.5%) of cattle and sheep farmers intend to reduce their level of farming either through semi-retirement or increasing off-farm work, which may be partly due to the removal of headage payments and historically low livestock prices of recent years.
- 30.7% of farms will increase livestock numbers but conversely 24.8% will reduce numbers. This reflects gradual structural adjustment in the sector.
- The majority (76.2%) of Devon farmers consider farm profitability to be the main influencing factor affecting future farm plans. This includes agricultural enterprises, as well as schemes and other activities. Other factors include market prices (60.1%), cost of inputs (52.4%), 'to make life easier' (49.8%), SPS (46.6%), time of life (39.4%) and environmental schemes (37.3%), see Figure 2-5.



Source: Butler et al (2007) using Devon sample from SW farm survey CRPR 2006

Figure 2-5: Factors that influence farm planning

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Aside from farmer views, it is important to note the following general trends and drivers likely to affect farming and land management in the Culm. These are based on a review of various studies and reports including Cumulus (2007) and Andersons (2010), together with stakeholder comments:

- **Market volatility.** There is likely to continue to be market volatility as both dairy products and beef are influenced by a range of global, European and domestic factors. After a difficult 2009, dairy farmers are becoming increasingly confident with dedicated supply chains and recent better prices. Most dairy farmers (75%) plan to stay in the sector for the next ten years and many will invest and expand (Dairy Co (2010) Farmer Intentions Survey). Beef farmers have experienced fairly stable prices recently and no real change in profitability, although for most this profit is highly dependent on SPS income. In the medium term, 'Mercosur' trade talks could result in downward pressure on beef prices. In the meantime, no significant increase or decrease in the size of the beef herd is expected locally.
- **Food security.** This will be a long term driver. While there may be now less likelihood of farmers seeking to crop or intensify marginal land, compared to previously, the productivist agenda will remain a potential threat to HNVF. There have been a number of recent cases of Culm grassland destruction (Burgess, 2010).
- **Local markets.** There continues to be an interest from consumers in locally-sourced food. A recent survey of 1000 shoppers in the UK by IGD (IGD (2010) Shopper Trends Report, see article on www.thefoodnetwork.co.uk) showed 30% had specifically bought local food in the last month (up from 15% in 2006) and 54% said they wanted to support local producers (up from 28%). This would suggest a continued place for the production and marketing of local foods even in the current recession - "*shoppers are looking for both value and values*".
- **Input prices.** Prices of inputs such as fertilisers and fuel are expected to continue to increase gradually over the years ahead, indicating continued need to make efficiencies to maintain profitability.
- **Single Payment.** The regional average payment is expected to increase to around £220/ha (before deductions) by 2012. Thereafter, CAP reform can be expected to result in a reduction in and re-targeting of support payments (possibly linked to the delivery of public goods / ecosystem services). Some estimate that the average Single Payment could be halved by 2020, although land of high environmental value could be protected from the worst of the cuts.
- **Agri-environment Schemes.** Environmental Stewardship will continue however it seems inevitable that it will come under budgetary pressure in the future. Existing ELS and HLS agreements are probably secure for the remainder of their agreement term, but prospects for new HLS agreements in terms of number and total payments could become more limited up to the end of 2012 and beyond. This may reduce funds for habitat restoration and re-creation on improved land, thereby limiting opportunities to buffer or connect priority habitats on HNVF. There is no absolute guarantee that the scheme will be available in any RDPE after 2013.
- **Other rural development expenditure** is similarly likely to be curtailed over the remainder of the 2007-2013 period, reducing investment in farm business, farm diversification and rural community projects.
- **Exchange rate.** A weak sterling over the past two years has benefited farming via improved export prospects and increased support payments. This may change if the pound strengthens (as a result of current government policies and the performance of the economy), with a resultant reduction having an adverse impact on farm profitability.

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- **Animal health and welfare.** TB and other animal diseases will continue to adversely affect livestock farming in the SW (including the Culm) both in terms of profitability and confidence.
- **Climate change.** In the medium-long term, livestock producers in the county will need to adapt to warmer summers and winters, reduced summer rainfall, more heavy rainfall events and a generally less predictable climate. These changes may result in changes in stock types, reduced stocking rates, different grazing regimes and changes in forage crops grown. In the Culm, prolonged periods of drought may impact on wet grassland communities and traditional forage management (e.g. later cutting).
- **Renewable energy.** Marginal agricultural land, such as HNVF, could be targeted for renewable energy, in particular biomass crops such as *Miscanthus*. However, the Culm is remote from major markets and this may limit demand and hence the viability of biomass cropping. More likely is growing interest in the use of woodfuel for home/local use derived from scrub and woodland located on HNVF and other land.
- **Ecosystem services.** Culm grassland with areas of peat, but also extensive grassland, scrub and woodland provide opportunities for storing and sequestering carbon as well as ecosystem services relating to biodiversity, water, cultural value/recreation etc.
- **Land market/land values.** In general, agricultural land values are expected to increase over the next few years on the back of growing population, demand for food and other products from the land, and rising commodity prices (Savills Agricultural Land Market Survey 2010). This will apply in the Culm as elsewhere. The attractiveness of the area to non-farming landowners also seems likely to continue.
- **General economic circumstances.** Reduced public expenditure, reduced consumption of certain goods and services, and increased unemployment could all adversely affect income from on-farm diversified enterprises and off-farm income, reducing farm profitability.

If these trends are applied to HNVF in the Culm, key points about the future to highlight include the following:

- The prospects for dairy and beef farms which support HNVF are uncertain in the short term, although the underlying trends for agriculture in terms of commodity and local markets are generally positive in the medium-long term.
- Commercial dairy farms, and to a much lesser extent commercial beef farms, look set to continue to invest and potentially expand individual herds.
- Beef and sheep farms, both lowland and LFA, are particularly vulnerable to a decrease in SPS income over the next CAP period to 2020, and also a reduction in agri-environment scheme and diversification income. This is likely adversely to affect farm profitability resulting in further restructuring (i.e. fewer farmers and farms being responsible for the grazing of more land). This may in turn reduce the availability of labour for HNVF management.
- Livestock numbers are vulnerable not only to underlying enterprise profitability but also animal disease risks.
- Traditional breed livestock is likely to continue to play an important part in grazing Culm grassland. There is opportunity to add value to this, but not all farmers will be well placed or wish to pursue this.
- Environmental outcomes will be dependent, to an extent, on the continued availability of agri-environment scheme income. However future budget cuts could limit the area of HNVF under HLS.

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- There is a risk associated with budget reductions. It is possible that some farmers may seek to improve their HNVF on expiry of agreements (if they have them), however a greater risk relates to reduced management or abandonment to scrub and woodland.
- The growth of the woodfuel market may provide some opportunities to secure additional value, and support beneficial management, of hedges, scrub and woodland on HNVF.
- Ecosystem services in the form of land management for biodiversity, water, cultural/recreational value and carbon storage/sequestration may also provide some private sector income-generating opportunities, in addition to sustaining SPS and agri-environment scheme payments.
- The sale of smaller units to non-farming landowners and larger blocks to commercial farmers also seems likely to continue. This brings opportunities for HNVF management and restoration, but also potential threats.
- There is likely to be continued polarisation between medium-large family farms highly dependent on agriculture (including schemes) as an income source and groups of smaller farms where agricultural income is supplemented by a variety of sources such as pensions, rental income and income from diversification and off-farm working.

3 Conclusions

Our conclusions from this case study are as follows:

- HNVF is estimated to cover 8,578ha or 21% of the Culm study area, which is centred around the Knowstone & Witheridge and Torridge & Tamar Working Wetland areas. They include Culm grassland which encompasses a broad range of habitats including damp neutral meadow in transition to fen meadow, tall-herb fen, wet flush, swamp and species-rich pasture and wet heath. HNVF also includes large expanses of semi-improved grassland characterised by rough grasses and rushes, together with wood pasture, scrub, mixed deciduous woodland, orchards and areas of lowland heathland. Other landscape features include dense networks of hedges, hedge banks and watercourses. 28% of this HNVF is designated SSSI or CWS and 61% of HNV farmland is under some form of agri-environment scheme (mainly Environmental Stewardship).
- HNVF occurs in a spectrum of farming situations. The farms surveyed represent this range, including small holdings with a high proportion of HNVF owned by non-farming landowners, through to larger holdings managed by commercial farmers, where HNVF represents a lower proportion of the total farm area. These farms are predominantly (lowland and LFA) grazing livestock farms with dairy, beef and sheep enterprises. HNVF varies from 30% to 95% of total farm area on those farms visited. It should be noted that estimating % area of HNVF is not an exact science.
- HNVF is generally regarded by the farmers surveyed as being important to their business. In four cases, the grazing management of HNVF is fully integrated into core livestock systems and enterprises, and on another farm a new traditional beef breed enterprise has been developed specifically to manage and utilise HNVF. On two other farms, conservation management is itself the main enterprise. All the farmers surveyed regarded HNVF as a net asset to them personally and in most cases to their farm business too, although this is mainly due to the agri-environment scheme payments received for it. On the one farm where HNVF is positively managed without these payments, the owners recognise the associated financial burden. Two of the farms surveyed currently or intend to use HNVF to help add value when marketing their produce or enterprises (e.g. farm shop, holiday let and horse riding enterprise); there may be potential to do more of this in the Culm. Additional income from these sources complements agri-environment scheme payments (which remain of key importance).
- HNVF management is influenced by the dairy, beef rearing and finishing, and sheep systems which predominate in the Culm study area. In the majority of cases, on the farms visited, HNVF habitats are in fair to good condition as a result of light-moderate summer grazing; HNVF features such as hedges are also in fair to good condition. However, Kenderdine (2009) indicates that loss of HNVF in the Culm is continuing to take place, and that 50% of grassland/heathland CWS are in unfavourable condition.
- Farm business profitability is low for many farms with HNVF in the Culm study area. SPS and agri-environment scheme payments represent a high proportion of farm business income for (lowland and LFA) grazing livestock and mixed farms, and these farms will be particularly vulnerable to subsidy cuts which are expected to occur as

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part of CAP reform from 2013 onwards. All commercial farms with HNMF (including dairy, beef and sheep, and mixed farms) are subject to financial pressures arising from (often short term) market volatility; this affects output and input prices, profitability and ultimately land use and land management decisions.

- The profitability of HNMF management *per se* is generally positive, but this is heavily reliant on SPS and agri-environment scheme income. This is positive in the sense that it shows that policy is having an important effect. However, agri-environment schemes are, in some cases, enabling HNMF management only on an artificial, temporary basis which may not be sustainable after the end of an agreement. Reduced income from SPS and agri-environment schemes could lead to a change of management of HNMF. This is likely to have mainly negative impacts arising from abandonment, under management and in some cases intensification.
- Aside from financial pressures, there is a range of other obstacles to managing HNMF. These include complexity of HLS and associated conditions; lack of knowledge and awareness, and animal health and welfare concerns.
- On the positive side, DWT advice and services provided through the Working Wetlands Project appear to be very successful in getting farmers interested and involved with HNMF and supporting the appropriate management, and is well regarded by farmers and other stakeholders alike. The more generous payments provided by HLS are also appreciated.
- Key policy messages from the case study include the following:
 - There is a need for pragmatic advice and guidance to continue (such as that provided by NGOs such as DWT via the Working Wetlands Project, and FWAG). This support is valued by farmers and underpins good uptake and implementation of agri-environment schemes.
 - The poor profitability of farming in the Culm is a key threat to HNMF condition and management. This reflects the wet, less productive farmland in the area. The profitability of many farms with HNMF is highly dependent on SPS and agri-environment scheme income and vulnerable to changes in scheme design and payment rates.
 - SPS will evolve with CAP reform, but where farms provide valuable public benefits via HNMF management, scheme payments should be sustained to avoid significant, adverse effects on farm profitability and hence HNMF management.
 - Agri-environment schemes are very beneficial for HNMF but could be improved. Environmental Stewardship needs to be rebalanced to ensure greater delivery via ELS (and/or cross compliance). HLS needs to be made simpler, more flexible and more user-friendly, harnessing the knowledge and experience of farmers. HLS also needs to address better the particular challenges of small, fragmented sites in the Culm. Where scheme payments are not available, small grants should continue to be available (e.g. for non-farming landowners).
 - Ecosystem services provide an opportunity for additional/alternative income sources for HNMF; however appropriate payment mechanisms and markets

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need to be developed. This is beginning to happen and should be encouraged. For example, South West Water's 'Upstream Thinking' project will invest a total of £10 million between 2010 and 2015 into moorland and farmed-land improvements⁶, in order to improve water quality; this will benefit HNMF and farm holdings with HNMF (Burgess, 2010)

- Encouragement should also be given to other income-generating opportunities including woodfuel sustainably sourced from HNMF and diversification utilising and benefiting HNMF assets.
- There is a need to look at HNMF in a very holistic way (biodiversity, water, recreation etc) and with a landscape perspective (such as that undertaken by the Working Wetlands project). In the same way, there needs to be joined up thinking and delivery from the range of organisations involved with HNMF. This approach should help to address some of the practical obstacles associated with managing HNMF.

The implications of these findings for policy and for future conservation of HNMF will be developed in the report for Phase 3 of this project.

⁶ This will include direct payments to farmers for improvements such as the restoration of peatland, changes in land use by watercourses and other measures to reduce diffuse water pollution from farms.

Appendix 1: Farm Interview Findings – Summary Tables

	Farm 1	Farm 2	Farm 3	Farm 4	Farm 5	Farm 6	Farm 7	Farm 8
Categorisation	Small, low input, beef farm (owners have downsized farm over time)	Large, commercial dairy, beef and sheep farm	Large commercial beef and sheep farm (1/3 is in SDA)	Medium-sized, commercial beef, sheep and arable farm	Small, amenity-focused farm run by non-farming landowners	Medium-sized family beef farm	Small grassland farm run by non-farming landowner	Large commercial dairy and beef family farm
Holding area /ha	28	365	270	98	32	100	22	200
Tenure	Freehold	Freehold	Freehold	Freehold	Freehold	Freehold and rented	Freehold	Freehold
Enterprises	Rented out grazing, conservation management.	Dairy (125 cows), beef (35 cow suckler herd) sheep (375 ewes), game, farm shop, forestry.	Beef (80 suckler cows), sheep (600 ewes).	Beef (150 beef stores reared from calf, also 100 indoor steers), sheep (60 ewes), arable (75 ac. spring cereals)	Conservation management	Beef (70 beef stores), residential lets	Conservation management (using own cattle and other stock, and contractors), holiday lets.	Dairy (90-125 dairy cows), beef (30-35 suckler cows).
Designations	Part SSSI and CWS	Part CWS	Part SSSI and CWS	None	None	SSSI on CWS on rented land	None (SSSI and NNR adjacent)	Part SSSI
Agri-env participation	ELS/HLS	ELS/HLS	ELS/HLS	ELS/HLS	None	ELS/HLS	ELS/HLS&EWG S/FWPS (no SPS)	ELS/HLS

Table A1: Description of Sample Farms

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	Farm 1	Farm 2	Farm 3	Farm 4	Farm 5	Farm 6	Farm 7	Farm 8
HNVF habitats⁷	<ul style="list-style-type: none"> • Purple moor grass & rush pasture • Lowland fen/mire/bog • Acid grassland • Wet scrub & woodland • Orchard • S/I grassland 	<ul style="list-style-type: none"> • Purple moor grass & rush pasture • Mixed decid woodland • Orchard • S/I grassland 	<ul style="list-style-type: none"> • Purple moor grass & rush pasture • S/I grassland • Lowland heath • Mixed decid woodland 	<ul style="list-style-type: none"> • Purple moor grass & rush pasture • Unimproved grassland • S/I grassland • Orchard • Mixed decid woodland 	<ul style="list-style-type: none"> • Purple moor grass & rush pasture • Lowland meadow • Scrub • Mixed decid woodland 	<ul style="list-style-type: none"> • Purple moor grass & rush pasture • Lowland fen/mire/bog • S/I grassland 	<ul style="list-style-type: none"> • Purple moor grass & rush pasture • S/I grassland • Mixed deciduous woodland (incl new plantation) 	<ul style="list-style-type: none"> • Purple moor grass & rush pasture • S/I grassland • Mixed decid woodland
HNVF habitats as % of farm	95%	30%	95%	40%	95%	95%	95%	30%
Context of HNVF– S/I land⁸	Habitats are separated by third party S/I grassland, and adjoin arable land	Most other land is S/I. But also maize and conifer woodland.	Mosaic of Culm grassland, woodland and S/I grassland	S/I grassland lies alongside other habitats as well as cropped land.	No S/I grassland on farm.	Mosaic of Culm grassland and other habitats with S/I land.	S/I grassland adjacent house, remainder HNVF	S/I grassland buffers other habitats from more intensively managed leys.
HNVF landscape features	Ancient hedges, hedgerow trees, stream, river	Ancient hedges, in field trees, copses stream valley	Ancient hedges woodland, in-field trees, ponds streams	Ancient hedges, small fields, hedgerow trees, in field trees, ponds, river and stream.	Ancient hedges, Hedgerow trees, in field trees, ponds, stream	Ancient hedges, hedge banks, hedgerow trees, in field trees.	Hedges, hedge banks, ponds	Hedges, hedge banks, ponds, watercourses.
Density of HNVF landscape features⁹	High density, small field size, concentrated on parts of farm.	Medium density overall, but variable across farm	High density in conjunction with woodland features	Variable – high density in parts, lower in more productive areas.	High density, small open areas	Variable – high density in parts, medium density elsewhere.	High density, small field size	Variable – high density in parts, medium density elsewhere.

Table A2: HN VF Farmland and Features on Sample Farms

⁷ Habitat composition of main areas of semi-natural vegetation on the farm

⁸ Are the semi-natural habitats in isolation amongst improved land, or is there a 'buffer' of semi-improved (S/I) land around them – a progression from semi-natural, through semi-improved, to improved?

⁹ Higher density of HN VF landscape features suggests greater ecological connectivity across the holding

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	Farm 1	Farm 2	Farm 3	Farm 4	Farm 5	Farm 6	Farm 7	Farm 8
Attitude to HNMF habitats	Positive, interested, keen on wildlife, engaged with HLS	Very positive, interested, likes wildlife, buying more HNMF	Positive, pleased to have and enjoy managing it. Now an integral part of farm business with SSSI, HLS.	Positive, pleased to manage Ham and marsh areas via HLS, and see wildlife.	Very positive and interested in wildlife habitats and species, part of the reason for buying the farm.	Very interest in both wildlife and farming, would like to sustain both	Very positive and interested in range of habitats on farm. Seeking to enhance.	Interested in wildlife habitats but dislikes SSSI and schemes in general.
Attitude to HNMF landscape features	Positive, interested. Management done by contractor	Positive and interested.	Positive, pleased to have and enjoy managing it.	Positive, hedges etc are managed.	Positive and interested in HNMF features.	Positive management of hedges etc	Positive, active restoration and management of hedges and hedge banks etc	Traditional attitude to hedgerow management
Method of management	Light summer grazing with Friesian steers	Light grazing with Devon and Longhorn cattle, also sheep	Light grazing with SimmentalX suckler cows and Exm. mule sheep	Light grazing with beef breed cattle and pedigree Charollais sheep.	Mowing, burning and conservation/ woodland management.	Light summer grazing with Friesian steers	Light grazing with Highland cattle and horses	Light-medium grazing with dairy and suckler cows.
Effect of a-e scheme	HLS supports continued conservation management of habitats and features. Flexibility obtained via derogations.	HLS supports extensive grazing of HNMF and development of traditional breed suckler herd. Also, supported creation and restoration of Culm pasture from conifer woodland.	HLS has continued and expanded WES, including more capital works (eg scrub mgt) to improve farm. HLS provides more money, but less contact with NE.	HLS supports conservation management in key areas and boundary features across farm. HLS provides useful income.	No agreement (feels HLS designed for farmers as opposed to non-farming landowners)	HLS makes quite a bit of difference financially and enables enhanced management of land and restoration of hedges and other features.	HLS supports restoration of hedges and hedge banks, restoration of Culm grassland via reseeding, and ongoing costs. FWPS supports farm woodland management.	HLS supports conservation management of SSSI etc and has funded restoration of Culm grassland from coniferous woodland.
Relevance to/integration with main farm business	Farm business equates to HNMF management, supported by HLS and facilitated by third party grazing.	HNMF is managed separately from main dairy enterprise, but is basis for traditional breed beef enterprise	HNMF, HLS and SSSI is now integral part of farm business. Culm grassland is most profitable part of farm.	HNMF is managed with adjoining land via commercial beef and sheep enterprises, hence fully integrated.	HNMF farmland and woodland pretty much covers whole farm. No farm business as such.	HNMF is fully integrated into whole farm business, and its management is supported by HLS.	Whole farm is HNMF farmland and woodland. Conservation management is main land-based enterprise but owner keen to link to holiday lets etc.	HNMF management is fully integrated into farm business. HLS income is welcome but not main driver.

Table A3: Farmer attitude to HNMF, management, scheme effect and relevance to farm business on Sample Farms

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	Farm 1	Farm 2	Farm 3	Farm 4	Farm 5	Farm 6	Farm 7	Farm 8
HNVF habitats								
Stocking level	Light, 1 LU/ha prescribed by HLS	Light, 1.1 LU/ha across whole farm, prescribed by HLS	Light, 0.7 LU/ha, prescribed by HLS (red deer also graze across the farm)	Medium, 1.5 LU/ha. Mainly focused on more productive grassland.	None (aside from grazing by red deer)	Light, 0.5-0.75 LU/ha. In part prescribed by HLS	Very light, 0.4 LU/ha. Owner plans to increase cattle numbers.	Light-medium, 1.3 LU/ha. In part, prescribed by HLS.
Timing of grazing	Spring, summer, autumn	Spring, summer, autumn	Spring, summer, autumn	Spring, summer autumn	None	Spring, summer, autumn	Spring, summer, autumn	Spring, summer, autumn
Resulting condition of HNVF habitats	Good, favourable condition.	Good and recovering condition	Good favourable condition	Fair-good condition.	Good condition (from mowing, burning, other management and deer grazing)	Good favourable condition	Fair-good and recovering condition.	Good favourable condition (incl SSSI), part recovering
HNVF landscape features								
Management of linear features	Hedge trimming alternate years	Hedges trimming every 2-3 years	Hedge trimming on rotation	Alternative year hedge trimming and some laying	Hedge trimming on rotation, hedge restoration, ditching	Hedge trimming on rotation, hedge restoration	Hedge trimming, hedge restoration / laying	Hedge trimming on rotation
Woodland	Small areas minimally managed for conservation	Deciduous woodland minimally managed for conservation	Positive management of woodland.	Some limited management.	Positive management for conservation	Limited woodland, minimal management.	Plantation maintenance	Minimal management (except restoration of conifer area)
Resulting condition of HNVF landscape features	Good, thick hedges, woodland ok	Thick hedges, good condition.	Good condition.	Good condition of HNV features where present.	Good condition.	Good thick hedges.	Fair-good and recovering condition.	Good condition

Table A4: HNV Management Prescriptions and Condition on Sample Farms

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	Farm 1	Farm 2	Farm 3	Farm 4	Farm 5	Farm 6	Farm 7	Farm 8
HNVF habitats								
HNVF costs being met, absorbed or rejected	Costs now being met through HLS (previously through WES) and SPS. However if labour fully factored in, would be losing money.	Costs are met by SPS/HLS and have provided small margin to pay for traditional breed cows. Costs kept down by doing conservation work in house.	Costs met through HLS, (although does not take full account of labour input). Culm (grassland) 'adds to profit'.	Costs met by ELS/HLS, small margin made. Capital payments cover material costs.	Costs are being met/absorbed by landowners directly. This has included restoration work and annual management.	Costs are being covered by ELS/HLS and SPS payments.	Direct costs met by ELS/HLS, although owner paying 25% of capital works undertaken by contractor.	Costs met by HLS (at best)
Is the HNVF an asset, burden or irrelevance to the farm business?	HNVF is regarded as an asset because of personal interest, although it has in past limited options.	HNVF is regarded as an asset, because of personal interest, income stream and as basis for developing enterprise.	HNVF is an asset. It is integral to the business and 'helps make farm profitable'. Owner also enjoys managing it. Was a burden when SSSI designated.	HNVF is considered an asset. It's grazed with rest of farm. Provides additional income via HLS. Owner likes wildlife, also rough shoots.	HNVF is considered a valued asset but it is also a drain on financial resources.	HNVF is considered both an asset (wildlife, beauty, HLS), but also a burden in terms of limited flexibility etc.	HNVF is regarded as an asset because of personal interest, income, and potential link to other farm enterprises	HNVF is asset from personal perspective but is neither asset or burden from business perspective (just part of farm). In past, have sought to improve it.
Trends in approach to HNVF	SSSI, HLS and farmers' approach mean HNVF is secure during current owners' tenure However High dependency on SPS/HLS income.	HNVF is secure with current scheme support.	Stable, positive approach to HNVF now as long as SPS/HLS continues.	HNVF is secure note farm is less dependent on scheme support than some other farms.	HNVF is secure under current ownership, subject to resources being available for ongoing management.	HNVF is secure with current scheme support, but if payments went down too much then would consider managing land outside of schemes.	HNVF is secure. Owner would like to increase area, stock numbers and run farm on 'environmental commercial' basis. Also get more involved encouraging barn owls etc	HNVF is secure via SSSI and for length of HLS agreement. But could be prone to improvement in future (outside of HLS type scheme).

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Vulnerability of HNMF resulting from above	Secure for short term (10 years), but vulnerable if SPS/AE income reduces	Secure for short term (10 years) but more vulnerable if SPS/AE income reduces	Secure for short term (10 years) but more vulnerable if SPS/AE income reduces	Secure for short term (10 years) but more vulnerable if SPS/AE income reduces	Secure but potentially vulnerable to stockmarket crash and /or change in ownership.	Secure for short term (10 years), but vulnerable if SPS/AE income reduces	Secure for short term (10 years) and probably in medium/long term.	Fairly secure for short term (10 years) but more vulnerable in future outside of HLS type scheme.
HNMF landscape features								
HNMF costs being met, absorbed or rejected	Met by ELS/HLS payments but relatively low.	Met by ELS/HLS.	Met by ELS/HLS	Met by ELS/HLS.	Met/absorbed by landowners directly.	Met by ELS/HLS	Mainly met by ELS/HLS.	Met in part by ELS/HLS, otherwise absorbed
Is the HNMF an asset, burden or irrelevance to the farm business?	An asset because of personal interest.	An asset due to personal interest, stock benefits etc.	An asset due to personal interest, stock benefits etc.	An asset due to personal interest, stock benefits, shoot etc.	An asset due to personal interest and enjoyment.	An asset and a burden (see above)	An asset due to personal interest and enjoyment.	Regarded as normal part of farm maintenance
Trends in approach to HNMF landscape features	Benign approach will continue while current owners are there	Positive management will continue.	Stable, positive approach.	Positive management will continue	Stable, positive management.	Stable, positive management	Stable, positive management	Static
Vulnerability of HNMF resulting from above	Safe during current owners' tenure	Safe	Safe	Safe	Safe during current owners' tenure	Safe	Safe	Safe

Table A5: Socio-economic Context for HNMF Management – Relevance, Trends and Vulnerability – on Sample Farms

Appendix 2: Notes

NOTE 1: METHODOLOGY FOR DERIVING THE DRAFT MAP OF HNVF EXTENT

The following data were used to produce the map:

- OS Mastermap (used as the base map from which HNVF land parcels were copied)
- Sites of Special Scientific Interest
- County Wildlife Sites
- Semi-natural vegetation
- Topography/slope
- Field size
- Landscape character
- Aerial photographs

The HNVF layer consists of copied OS Mastermap polygons. These polygons are taken from the Topo_Boundary layer. To facilitate selection and copying of the polygons the OS Mastermap layer was simplified to white polygon outline so that aerial photography could be seen beneath them.

The process for identifying HNVF was as follows:

1. The first stage was to digitise those OS Mastermap polygons which are co-located with SSSI and CWS.
2. The next stage was to work systematically across the case study area, using up to date aerial photographs, and digitise every instance of what appeared to be, from the aerial photographs, semi-natural vegetation (scrub, rough grazing, ponds etc.).
3. Another set of criteria for selection into the HNVF layer were agglomerations of small fields (high density of hedgerows), areas of orchard, small farm woodlands (broadleaved or mixed only – pure conifer plantation was excluded) and in some cases larger arable or grassland fields.
4. Finally, woodlands were brought in as High Nature Value Forestry is an aspect of the HNVF project.

Critique of effectiveness of aerial photograph analysis

Aerial photograph analysis varies in its ability to identify these categories of HNVF occurrence. HNVF on steep slopes around the springline is generally tussocky mire or rush pasture, and is easily identified remotely. Similarly, plateau heath stands out clearly. Lowland meadows (neutral grassland) tends to occur in fields which have been partially improved in the past, and have a more even, smooth texture from the air, which can easily be overlooked. Riparian wetland is usually rough in texture and can be identified.

Hence aerial photograph analysis can (provided it is carried out by a trained individual) identify a large proportion of HNVF in this type of landscape, but difficulties include the following:

- Good quality semi/unimproved neutral grassland, where not identified as SSSI or CWS, are almost impossible to identify from aerial photography. Rough/scrubby grassland is quite obvious. Some semi-improved rush pasture may also be overlooked.

- Arable land is problematic. CWS/SSSI do not generally represent good quality arable (i.e. rare plant/bird interest), though some CWS are designated for bird interest (South Devon Cirl Bunting CWSs). Stubbles or other cropland could also be mis-identified as being heath/tussock, given their similar rough texture
- Field patterns are not necessarily an indicator of high nature value.

NOTE 2: DATA SOURCES FOR FARMING CHARACTERISTICS AND TRENDS

Farming characteristics and trends in the case study area can be analysed through the following data sources:

- Farm Survey data (from the latest Defra June Survey). This data is available for the case study area and the sample parishes. For the sample parishes, some limited data for holdings with HNVF has also been obtained from Natural England. More detailed data on the farming characteristics of holdings with HNVF is unfortunately not available.
- Rural Land Register data (from the Rural Payments Agency). For the sample parishes, some limited RLR data for holdings with HNVF has been obtained from Natural England. More detailed data (e.g. RLR holding size, field size etc) is unfortunately not available.
- Single Payment Scheme data (from the Rural Payments Agency). This has the potential to show, by individual holding, land use, stock type present and other data. Unfortunately, this data was unavailable to review and analyse.

NOTE 3: DATA SOURCES FOR FARM BUSINESS INCOME

Farm Business Income (FBI) data is collated for Defra by Duchy College in the SW region. It provides robust financial data for a sample of farms in the SW region however it is not possible to extract a sub-sample for farms in the case study area, let alone farms with HNVF in the area.

The Farm Business Income section also draws on reports produced by the Centre for Rural Policy Research for Devon County Council. These include 'Farm Incomes in Devon 2007/8' (Lobley et al, 2009), which has been updated to include the latest available FBS data for South West England (2008/9). FBI is Defra's preferred measure of farm income and represents the return to all unpaid labour (farmers, spouses and others with an entrepreneurial interest in the farm business) and to all their capital invested in the farm business including land and farm buildings. This is essentially the same as net profit. Note only farms capable of supporting at least 0.5 labour unit are included in the FBS (for lowland grazing livestock farms, this equates to 30 suckler cows and progeny, equivalent to a 75 acre farm at an average stocking density).

NOTE 4: NATURAL ENGLAND HOLDING ASSESSMENT TOOLKIT SCORING

Natural England uses the Holding Assessment Toolkit (HAT) to score individual holdings in terms of the presence of particular features, designations or other characteristics in order to prioritise holdings for HLS funding. The criteria include:

- Target areas and theme areas
- Access, including

- Public rights of way
- CROW (Countryside and Rights of Way Act 2000) designated land
- Biodiversity, including
 - SSSI and other designations
 - BAP habitats
 - Rare species
- Historic Environment, including
 - Scheduled Monuments
 - Undesignated sites/features
- Landscape, including
 - AONB
- Resource Protection, including
 - Catchment Sensitive Farming area
 - Flood risk

There are five categories of HAT score: A (highest), B, C, D and E (lowest).

Not all holdings have been HAT scored.

NOTE 5: HNV FARM TYPOLOGY

A number of studies have attempted to identify farming systems associated with HNV farmland. These include Anderson et al (2003) and IEEP (2007) which both set out HNV farming systems typologies. Simplified versions of the more recent IEEP typology is set out below, showing those HNV farming systems potentially relevant to the Devon case studies.

Broad Category	HNV Farming System
Potential HNV cattle systems (beef and dairy)	Extensive systems using semi-natural pastures
	Extensive grass based systems
	Extensive grass/arable systems
Potential HNV sheep and goat systems	Sedentary low-intensity systems on semi-natural grassland
Potential HNV arable crop systems	Semi-intensive arable systems
Potential HNV permanent crop systems	Traditional orchards

Source: adapted from IEEP (2007)

Table A6: HNV Farm Typology - IEEP

When scoping potential farms to be surveyed, a number of categories were identified by the project team as representing the range of farms in the Culm study area likely to have HNV farmland – essentially a local HNV farm typology. This typology was based on an analysis of Defra farm survey data for the area and sample parishes, and a review by the project team of farming systems known and likely to support HNV farmland. The typology provides a number of sub-categories reflecting the extent of HNV land and the nature of the ownership. The local typology is shown in Table A7 alongside the relevant IEEP categories and Defra farm types (using our best estimates).

HNV farm type (Culm Grasslands)	HNV farm type (IEEP)	Defra farm type
Lowland grazing livestock farm (beef/sheep) – small amount of HNV	Extensive grass based systems	Grazing livestock (lowland)
Lowland grazing livestock farm (beef/sheep) - high amount of HNV	Extensive grass based systems	Grazing livestock (lowland)
LFA grazing livestock farm (beef/sheep) – medium amount of HNV	Extensive systems using semi-natural pastures	Grazing livestock (LFA)
LFA grazing livestock farm (beef/sheep) - high amount of HNV	Extensive systems using semi-natural pastures	Grazing livestock (LFA)
Dairy farm – small amount of HNV	Extensive grass based systems	Dairy
Dairy farm – high amount of HNV	Extensive grass based systems	Dairy
Mixed farm/estate – medium/high amount of HNV	Extensive grass/arable systems	Mixed farm
Non-farming landowner – small amount of HNV	Extensive grass based systems	Other
Non-farming landowner – high amount of HNV	Extensive grass based systems	Other

Table A7: HNV Farm Typology –Local

Sample Parishes

A series of four sample parishes in the Culm study area were identified at the outset of the case study in order to provide a manageable area as the basis for analysing detailed RPA/NE data including RLR and SPS data. These parishes were also used to identify suitable farms for survey using the local typology referred to above. The sample parishes – Knowstone & Witheridge, Pancrasweek etc. - are broadly characteristic of the two selected Working Wetland areas as a whole.

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