New income streams for wetland landowners in Brue Valley Living Landscape

Final Report

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Disclaimer

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Summary

Introduction

Recent reforms to the Common Agricultural Policy (CAP) have resulted in changes to the way in which agri-environment funding is distributed. Under the new Rural Development Programme (RDP), funding for farming, environmental measures and rural development will be covered by the Basic Payment Scheme (BPS). This will consist of a basic payment, a greening payment and an additional payment for young farmers (Defra, 2014). However, the scheme will not be open to all farmers, with around half the previous coverage of Entry Level Stewardship (ELS).

Whilst the new RDP scheme could result in a more integrated approach to environmental enhancement in line with the Environment White Paper (HM Government, 2011), it could also lead to more land being returned to output based production, as environmental measures become unaffordable. Agri-environment payments to landowners in certain high wildlife value areas across the country are vital to ensure that these habitats and landscapes are appropriately managed. Indeed, Higher Level Stewardship (HLS), a scheme implemented prior to the CAP reforms, has been viewed as the most important tool for managing many aspects of the country's ecological network (Lawton et al, 2010). One such high value area is the Brue Valley Living Landscape (BVLL) within the Somerset Levels and Moors lowland wet grassland landscape. The BVLL has many designations including Ramsar, Special Protection Area (SPA), Site of Special Scientific Interest (SSSI) and National Nature Reserve (NNR). Funding is currently provided by HLS agreements as well as projects such as the EU INTERREG IVA funded project, the Value of Working Wetlands (WOW). The WOW project aims to encourage joint working and collaboration, as well as exchange of best practice in relation to sustainable wetland management within the France (Channel) England region.

Aims and objectives

This feasibility study, which was undertaken as part of the WOW project, aimed to:

- Map out, and take the first practical steps towards, the creation of innovative revenue frameworks which allow land managers to achieve economic sustainability while maintaining wet habitats.

The outputs from the study are to help with the achievement of the ultimate goal, which is the development of local instruments that can fit with national and local policy and socio-economics, optimising the provision of ecosystem services and sustaining landowning business. The key objectives included:

- Selection of two hydrological units to form the basis for the study;
- Establishment of the baseline of ecosystem services provided in the two units;
- Analysis of how ecosystem service provision could change within the two units under different land and water management scenarios;
- Sharing work with WOW partners (including consideration of how the research might apply to other lowland wetlands, in particular, in France); and
- A workshop presentation for WOW partners (delivered on 12th March 2015 in Saint-Nicolas-de-Redon).

Approach

The approach was broken down into a series of tasks covering:

- **Selection of two contrasting hydrological units**: discussions with the Somerset Wildlife Trust project manager enabled the identification of two units for study;
- **Description of the baseline provision of ecosystem services in these two units**: GIS mapping was used in conjunction with aerial photography and local knowledge to describe the landscape features present and hence the ecosystem services currently provided in the two units;
- **Identification of funding sources which could be used to implement land and water management actions within the units**: internet research was undertaken to identify and assess potential funding sources, and the ecosystem services to which they might be relevant;
- **Development of land and water management scenario**: the project team developed a set of seven scenarios, taking into account the types of land and water management actions which might be implemented in the BVLL;
- **Analysis of how the provision of ecosystem services might change under the different scenarios**: the likely change in service provision by each landscape feature under each scenario was determined for each unit and recorded using a scoring system (with ratings from large negative change through to no change and large positive change);
- **Identification of relevant funding sources and actions which would enable the scenarios to be implemented**: consideration was given to how the optimum scenarios could be identified, and which funds could be used to implement these scenarios. Potential actions and an engagement plan were developed for relevant funding sources; and
- **Consideration of the applicability of the funding sources beyond the BVLL**: the short listed funded sources were assessed to see whether they were applicable outside of the study area (in particular, to other UK wetlands in other areas, other UK features, and, importantly, to France).

Findings

Selection of units

The study needed to investigate areas likely to attract the highest level of agri-environment subsidy available, as well as those where funding might decrease in the future. Habitat diversity and land ownership, as well as the likely availability of funding sources also needed to be considered. Taking the above into account, the following units were selected for detailed analysis:

- **Meare Pool**: undesignated, used for intensive agriculture, wet and often flooded for periods during winter if Division Rhyne (a watercourse running through the centre of the unit) overtops; and
- **Catcott**: complex unit with many landowners. Includes designated area (Catcott, Edington and Chiltern Moors SSSI, Somerset Levels and Moors Ramsar site, Somerset Levels and Moors SPA), and peat voids now comprising reedbed.

Description of baseline

The study developed two baselines, to enable ongoing changes to funding availability within the BVLL to be taken into account. Table 1 provides a brief summary of both baselines, namely the 'Current (snapshot) baseline' and the 'Decreased funding baseline'. The latter is based on the likely decrease in funding availability due to changes to agri-environment payments and the general 'austerity' squeeze on public spending.

Table 1: Assumptions for the 'current baseline' and 'decreased funding baseline'	
Scenario	**Assumptions**
Current (snapshot) baseline	Current regime of agri-environment funding continues at pre-CAP reform levels. Land and water management actions continue as at present. All current habitats and land uses continue to provide ecosystem services. The level of provision may vary according to habitat condition
Decreased funding baseline	Agri-environment funding has changed. The most environmentally important sites are able to apply for grants and support. For other sites, environmental agreements are available but are dependent on a competitive online process, where applications are assessed against environmental priorities in the local area. There is also less money available from other sources, for example, local authorities and other organisations involved with the BVLL. Land and water management actions change in response, so that there is a focus on profitability with the exception of the most environmentally important sites

Given the large number of habitats and land use types within the two units, a set of 13 features was used when determining the baseline provision of ecosystem services in each unit. Table 2 summarises the features present within each of the units. Catcott has significantly more features than Meare Pool, since there is a wider variety of habitats and land uses within the unit. However, both units were found to provide a range of ecosystem services. Table 3 summarises the services provided by the two units. Whilst the types of service provided by the two units are very similar, the extent to which any one service is provided differs. For example, Meare Pool has significant areas of grassland for grazing and hay/silage (provision of ecosystem goods) whereas Catcott provides more biodiversity (greater habitat variety and better habitat condition) and cultural services.

Table 2: Features identified under the baseline	
Features within Catcott unit	**Features within Meare Pool unit**
Dry grassland of low value for wildlife	Dry grassland of low value for wildlife
Reedbeds	Rivers, streams, ditches, rhynes
Rivers, streams, ditches, rhynes	Wet grassland of low value for wildlife
Swamp and fen	Woodland/hedgerow/line of trees/scrub/bracken
Wet grassland of high value for wildlife	
Wet grassland of low value for wildlife	
Wet heath & purple moor grass habitats	
Woodland/hedgerow/line of trees/scrub/bracken	
Note: The feature 'other' was also recorded in both units. This includes tracks, buildings, roads, etc.	

Table 3: Ecosystem services provided by the two units under the 'Current (snapshot) baseline'			
Catcott unit		**Meare Pool unit**	
Service provided	**No. of features providing that service**	**Service provided**	**No. of features providing that service**
Ecosystem goods (food/fibre/peat/etc.)	5	Ecosystem goods (food/fibre/peat/etc.)	3
Provision of freshwater (and availability of freshwater)	1	Provision of freshwater (and availability of freshwater)	1
Biodiversity	6	Biodiversity	2
Climate regulation (avoiding mineralisation and so loss of carbon from soils)	7	Climate regulation (avoiding mineralisation and so loss of carbon from soils)	3
Water purification	2	Water purification	None
Water regulation (small-scale)	6	Water regulation (small-scale)	2
Erosion regulation	2	Erosion regulation	1
Aesthetics	7	Aesthetics	3
Educational value	5	Educational value	1
Cultural heritage	7	Cultural heritage	3
Recreation and tourism	5	Recreation and tourism	1
Note: Supporting services are not considered since they are assumed to underlie some of the services above, thus their inclusion could lead to double counting			

Identification of funding sources

In total, 36 funding sources were identified with 25 of these being short listed as applicable to the hydrological units based on the ecosystem services which they currently support. Table 4 presents the 25 short listed funding sources, along with the funding providers.

Table 4: Potential funding sources	
Funding source	**Funding provider**
Awards for All Lottery Fund	Big Lottery Fund
Corporate Social Responsibility (CSR)	Provider likely to vary; dependent on businesses involved
Countryside Stewardship	Defra has policy responsibility, with scheme delivered by Natural England, the Forestry Commission and the Rural Payments Agency
Defra Partnership Funding (Grant in Aid or GiA)	Defra sets policy, Environment Agency provides detailed guidance
European Agricultural Fund for Rural Development (EAFRD)	Delivered through the Heart of SouthWest Local Enterprise Partnership (LEP)
Entry fees	Varies; funds collected by businesses and other organisations providing a visitor attraction
Esmeé Fairbairn Foundation	Funding is provided by the organisation
Farming and Forestry Productivity Scheme (now Countryside Productivity Scheme)	Rural Development Programme for England (RDPE), policy managed by Defra
GHG emission offsets	Varies; likely to involve businesses
Heritage Lottery Fund	Heritage Lottery Fund
Higher Level Stewardship	Managed by Natural England on behalf of Defra

Table 4: Potential funding sources	
Funding source	**Funding provider**
Interreg Europe	European Commission; financed by the European Regional Development Fund (ERDF)
Landfill Communities Fund	Landfill operators
LEADER Programme	Defra and EAFRD through Local Action Groups (LAGs)
LIFE+ funds	EU LIFE+ programme
Local Growth Fund	Central government through the Local Enterprise Partnerships (LEPs)
Market value	Varies (businesses)
Payments for Ecosystem Services	Varies (different service providers and beneficiaries)
Peatland Code	Not yet known (businesses? landowners?)
Restoration of ecological network determined using Somerset's habitat evaluation protocol	Developers
Somerset District Council Community Grants	Somerset District Council
Somerset Flood Action Plan (FAP)	Central government, Somerset local authorities, other partners
Somerset Rivers Authority	Central government, local funding (e.g. local authorities)
Tourism charge ("tax")	Varies (businesses, other organisations)
Wessex Water Partners Programme	Wessex Water provides funding to projects carried out by wildlife organisations

Development of scenarios

Seven land and water management scenarios were developed taking account of the types of land and water management actions which could be implemented within the BVLL. A summary of each scenario is provided in Table 5. The scenarios focus on different types of ecosystem service. For example, the 'Nature tourism' scenario aims to enhance biodiversity and cultural services, whilst the 'Maintaining and improving the conveyance of water' scenario is aimed at enabling provisioning services to be optimised.

Table 5: Summary of land and water management scenarios	
Scenario name	**Brief description**
1) 'Conservation of peat soils'	Land and water management actions are implemented to maintain and enhance the condition of peat soils. Benefits for climate regulation and cultural services (conservation of archaeology, also landscape heritage) in particular
2) 'Nature tourism'	Landscape is managed to encourage and promote nature tourism, with key benefits for biodiversity and cultural services (including aesthetics, education, cultural heritage and recreation and tourism)
3) 'Flood storage'	Areas of the landscape are allocated for water storage during times of heavy rainfall and high water levels. Benefits water regulation (large-scale) (i.e. water regulation of main rivers which could affect a large area), with the potential to also benefit biodiversity
4) 'Habitat creation'	For Catcott: land and water management actions are implemented to enable habitat creation, in particular, of raised bog. Benefits for biodiversity, and potentially also climate regulation and cultural services (e.g. education, recreation and tourism). For Meare Pool: land and water management actions are implemented to enable the recreation of 'Meare Pool' as an area of reedbed and swamp surrounded by wet grassland. Benefits for biodiversity, and potentially also climate regulation and cultural services (e.g. education, recreation and tourism) but decreases land available for agricultural production

Table 5: Summary of land and water management scenarios	
Scenario name	**Brief description**
5) 'Maintaining and improving conveyance of water'	Scenario covers de-silting of main channels to maintain and improve water conveyance, with a focus on water quantity and quality. Main water arteries provide water in summer, and take water away in winter. Benefits for provision of freshwater and water regulation (large-scale and small-scale) (with small-scale water regulation relating to ditches, streams and rhynes which only influence their immediate surroundings). Knock on benefits for provision of ecosystem goods (through provision of water for irrigation and also wet fences)
6) 'Biomass production'	Land and water management actions are implemented to encourage the production of biomass (e.g. willows, reeds) within the Brue Valley. Benefits for ecosystem goods (fibre and fuel) and potentially also cultural heritage where traditional industries are regenerated
7) 'Branding'	Actions are implemented to improve and advertise the link between food and fibre products, and the location. Benefits for ecosystem goods (food, fibre) and also cultural heritage. Potentially also benefits for recreation and tourism if branding encourages visitors to come to the Brue Valley
Note: all scenarios are theoretical and are based on potential land and water management actions	

Identification of likely changes in service provision under the scenarios

The assessment identified significant differences between the scenarios in terms of the types of services which are likely to improve/benefit when compared with the baselines. When considering the scenarios against the 'Current (snapshot) baseline', the key findings were as follows:

Provisioning services

- Positive impacts are expected under:
  - 'Maintaining & improving conveyance of water'
  - 'Biomass production' (but note that there could be negative impacts for biodiversity due to loss of habitat)
  - 'Branding'
- Negative impacts could under:
  - 'Flood storage'
  - 'Habitat creation' (in particular for the Meare Pool unit)
  - 'Conservation of peat soils' (wet habitats do well but area of dry grassland for grazing and cutting decreases)

Regulating services

- Positive or experience no change for the majority of the services under all the scenarios, excepting possible negative impacts under:
  - 'Maintaining & improving conveyance of water'
  - 'Biomass production' (extensive woodland planting could dry out soils with negative impacts for climate regulation)

Cultural services

- Positive impacts under:
  - 'Nature tourism'

  - ‘Conservation of peat soils’ (in part due to raised water levels having significant benefits for cultural heritage including buried archaeology)
  - ‘Habitat creation’ (mainly due to recreation of ‘Meare Pool’, a landscape feature which used to exist when conditions were wetter)

- Negative impacts under:
  - ‘Maintaining and improving conveyance of water’ (for some cultural services delivered by particular features, such rivers, streams, ditches and rhynes. This habitat in particular could suffer from increased clearance and dredging, with negative impacts for the appearance and cultural heritage of the area, as well as biodiversity).

If the seven scenarios are considered against the ‘Decreased funding baseline’, the extent of the change in service provision varies by unit:

- For Catcott, ecosystem service provision under the ‘Decreased funding baseline’ is relatively similar to that under the current (snapshot) baseline.

- For Meare Pool, there are significant differences between the ‘Current (snapshot) baseline’, and the ‘Decreased funding baseline’. Several of the scenarios (e.g. ‘Conservation of peat soils’, ‘Nature tourism’) act to moderate the extremes of the ‘Decreased funding baseline’. However, others (e.g. ‘Branding’) could create additional points of conflict as the need to increase agricultural profitability competes with the requirement to look after and maintain habitats for tourism. In particular, the recreation of ‘Meare Pool’ (as a permanent area of reedbed/swamp and fen, surrounded by wet grassland dependent on the season) could cause issues due to the loss of dry grassland.

The optimum scenario for each unit is dependent on a range of factors. For example, the optimum scenario could be the one which results in the most positive change, or alternatively, the one which benefits the widest range of stakeholders. Consideration may additionally need to be given to the balance of ecosystem services provided, and whether a scenario results in adverse trade-offs between services. There may be increases in several services, but a significant decrease in another service with negative implications for a particular stakeholder group.

Bearing in mind the need to achieve a balance of ecosystem services, Table 6 identifies the scenarios which are likely to result in the most positive changes in each of the units for each group of ecosystem services (provisioning, regulating and cultural). Whilst ‘Habitat creation’ comes out strongly overall, it is important to remember that even this scenario has negative implications for some features and services (e.g. dry grassland and provision of ecosystem goods).

Table 6: Identification of the scenarios which are most suitable for each hydrological unit			
Target services for improvement	**Scenarios providing most positive changes in Catcott only**	**Scenarios providing most positive change in both**	**Scenarios providing most positive change in Meare Pool**
Provisioning services	'Branding' 'Maintaining and improving conveyance of water' 'Conservation of peat soils'	'Branding'	'Branding' 'Habitat creation'
Regulating services	'Conservation of peat soils' 'Habitat creation'	'Habitat creation'	'Habitat creation' 'Conservation of peat soils'
Cultural services	'Nature tourism' 'Habitat creation'	'Nature tourism'	'Nature tourism' 'Habitat creation'
All services	'Habitat creation'	'Habitat creation'	'Habitat creation'

Identification of funding sources and actions to implement the scenarios

Possible funding sources were identified for all of the scenarios listed in Table 6, thus ensuring that each scenario could potentially be implemented (subject to land manager engagement and agreement). The study also identified potential actions for each of the funding sources to enable the objectives to be met and the funds to be claimed. Table 7 identifies the funding sources and potential actions which could be used to implement the 'Habitat creation' scenario.

Table 7: Potential action plan for 'Habitat creation' based on funding sources identified			
Funding source	**Potential actions to obtain funding**	**Relevant to Catcott**	**Relevant to Meare**
Awards for All Lottery fund	Develop projects which provide benefits including landscape, aesthetics, educational experience, cultural heritage and recreation/tourism opportunities (incorporates actions for species recovery and habitat creation)	✓	✓
Countryside Stewardship	Support actions of rural businesses so that they improve regulating and cultural services	✓	✓
Interreg Europe	Encourage collaboration with European countries on projects which fit with research and innovation or environment and resource efficiency	✓	✓
Higher Level Stewardship	When existing agreements are reviewed, develop projects that support and enhance regulating services (note whilst the fund can encourage nature tourism, this is not a specific objective)	✓	✓
Landfill Communities Fund	Develop community projects (including land acquisition) which improve landscape aesthetics, educational experience, cultural heritage and enable general benefits for recreation and tourism	✓	✓
LIFE+ funds	Develop projects that contribute to environmental and climate policy, potentially benefiting projects that enable regulating services and cultural services	✓	✓
Market value	Encourage production of saleable goods	✓	✓

Table 7: Potential action plan for 'Habitat creation' based on funding sources identified			
Funding source	**Potential actions to obtain funding**	**Relevant to Catcott**	**Relevant to Meare**
Restoration of ecological networks using Somerset's habitat evaluation protocol	Where development occurs in other parts of Somerset, use funds generated to improve habitats which form part of the ecological network	✓	✓
Tourism charge ("tax")	Collect money from visitors to contribute to management of the area's habitats and have positive impacts for regulating and cultural services	✓	✓
Wessex Water Partners Programme	Develop projects which meet the aims of the UKBAP/Biodiversity and the WFD, with benefits for regulating and cultural services	✓	✓

Taking these actions forwards requires engagement with a wide range of stakeholders. Table 8 suggests the types of engagement activities which could be undertaken to enable these actions, and hence the scenario, to be implemented.

Table 8: Suggested engagement to enable implementation of actions relevant to 'Habitat creation'			
Actions	**Engagement with…**	**What they need to know**	**Suggested methods**
Develop projects which provide benefits including landscape, aesthetics, educational experience, cultural heritage and recreation/tourism opportunities (incorporates actions for species recovery and habitat creation)	Landowners	What funding is available How to access the funding What actions they need to undertake to access funding	Needs to be targeted to landowners to whom it is applicable therefore leaflet delivery or direct contact (depending on number of landowners)
Support actions of rural businesses so that they improve regulating and cultural services	Local businesses	What support is available How to access it What actions they are undertaking which apply	Access through Local Enterprise Partnerships. Hold drop-in sessions if there appears to be sufficient interest
Encourage collaboration with European countries on projects which fit with research and innovation or environment and resource efficiency	All interested parties	What other countries are doing Who to contact to collaborate	Needs to reach a wide audience so posters and advertisements in publications and media; contact with organisations that coordinate European bids
When existing HLS agreements are reviewed, develop projects that support and enhance regulating services	All interested parties	Examples of projects What funding/support is available	Needs to reach a wide audience so posters and advertisements in publications and media; contact through trade associations and/or special interest groups

Table 8: Suggested engagement to enable implementation of actions relevant to 'Habitat creation'			
Actions	**Engagement with…**	**What they need to know**	**Suggested methods**
Develop community projects (including land acquisition) which improve landscape aesthetics, educational experience, cultural heritage and enable general benefits for recreation and tourism	Local landowners Local community	What funds are available Potential contacts	Needs to reach a wide audience so posters and advertisements in local publications and media. Also contact local community groups
Develop projects that contribute to environmental and climate policy, potentially benefiting projects that enable regulating services and cultural services	All interested parties	Examples of projects What funding/support is available	Needs to reach a wide audience so posters and advertisements in publications and media; contact through trade associations and/or special interest groups
Encourage production of saleable goods	Local landowners Local community Local businesses	What products and goods are included Requirements for sale of goods	Needs to reach a wide audience so posters and advertisements in local publications and media; direct contact (depending on number of landowners). Also contact local community groups
Where development occurs in other parts of Somerset, use funds generated to improve habitats which form part of the ecological network	Local developers	How to access the funds How they benefit	Produce material to send to developers directly or through trade associations, specialist journals. Possibly have a member of staff arrange to speak to them at a meeting about opportunities
Collect money from visitors to contribute to management of the area's habitats and have positive impacts for regulating and cultural services	Local visitors	What the money is used for How much they need to pay	Information boards, leaflets and brochures highlighting potential to get involved
Develop projects which meet the aims of the UKBAP/Biodiversity and the WFD, with benefits for regulating and cultural services	All interested parties	Examples of projects What funding/support is available	Needs to reach a wide audience so posters and advertisements in publications and media; contact through trade associations and/or special interest groups

Implications beyond the Brue Valley

Since this study was undertaken as part of the WOW project, there is a need to look beyond the Brue Valley and consider the wider applicability of some of the funds identified. Table 9 indicates whether the 26 short-listed funds can be used for UK wetlands beyond the Somerset Levels and Moors, for other UK features (i.e. for other types of landscape), and in France.

Table 9: Applicability of funds beyond the BVLL			
Funds applicable to the Brue Valley	**Applicable to UK wetlands**	**Applicable to other UK features**	**Applicable to France and Europe as a whole**
Awards for All Lottery Fund	✓	✓	
Corporate Social Responsibility (CSR)	✓	✓	✓
Countryside Stewardship	✓	✓	
Defra Partnership Funding (Grant in Aid or GiA)	✓	✓	
European Agricultural Fund for Rural Development (EAFRD)	✓	✓	✓
Entry fees	✓	✓	✓
Esmeé Fairbairn Foundation	✓	✓	
Farming and Forestry Productivity Scheme	✓	✓	
GHG emission offsets	✓	✓	✓
Heritage Lottery Fund	✓	✓	
Interreg Europe	✓	✓	✓
Higher Level Stewardship	✓	✓	
Landfill Communities Fund	✓	✓	
LEADER Programme	✓	✓	
LIFE+ funds	✓	✓	✓
Local Growth Fund	✓	✓	
Market value	✓	✓	✓
Payments for Ecosystem Services	✓	✓	✓
Peatland Code	✓		
Restoration of ecological network determined using Somerset's habitat evaluation protocol			
Somerset District Council Community Grants			
Somerset FAP			
Somerset Rivers Authority			
Tourism charge ("tax")	✓	✓	✓
Wessex Water Partners Programme			

Recommendations for further work

This study identified that there are funds available to implement a range of land and water management scenarios in wetland areas within the BVLL, the wider UK, and France. Some of these scenarios could result in improved ecosystem service provision when compared with the present. However, prior to the implementation of any of the scenarios, further work needs to be undertaken to investigate the potential funding sources in more detail, and importantly, the acceptability and viability of the scenarios to those who live and work in wetland areas. Engagement with land managers and other stakeholders is vital when trying to determine the optimum scenario in terms of balanced ecosystem service provision, feasibility and in working out which stakeholders will gain, and which will lose due to changes in land management.

Table of contents

1 Introduction

1.1 Background

1.1.1 Agri-environment funding

In June 2013, the European Commission, European Council and European Parliament reached agreement on the reform of the Common Agricultural Policy (CAP) (EC, 2013). The reforms affect the way that money is allocated between farmers and member states (EC, 2013). Under the previous Rural Development Programme (RDP), funding for farming, environmental measures and rural development was available as Single Payment Schemes. Under the new RDP, these areas will be covered by the Basic Payment Scheme (BPS). This will consist of a basic payment, a greening payment, which has certain requirements including crop diversification and will be worth 30% of the total payment, and an additional payment for young farmers (Defra, 2014). Funding which was previously awarded under Environment Stewardship schemes and English Woodland Grant Schemes will be replaced by a new scheme. The new scheme will offer (Defra, 2014a):

- Site specific agreements similar to the current Higher Level Stewardship (HLS) scheme;
- Area specific agreements aimed at targeted improvements in the wider countryside;
- Multi-annual agreements, normally for 5 years – but these could be longer if benefits take longer to achieve;
- A choice of management options, capital items and advisory support (depending on the agreement type); and
- Annual small-scale grants for certain activities – such as hedgerow laying, coppicing and gapping up, or stone wall restoration.

Around 11,000 Entry Level Stewardship Scheme (ELS) agreements are due to expire during 2015, after which they will not receive funding (Natural England, 2014). Unlike the previous ELS agreements, the new scheme will not be open to all farmers, with around half the previous coverage of ELS. Whilst the new scheme could result in a more integrated approach to environmental enhancement (in line with the White Paper (HM Government, 2011)), it could also lead to more land being returned to output based production, as environmental measures become unaffordable.

1.1.2 Wetlands and the Brue Valley

Wetlands are a valuable resource for wildlife and also provide important services to society, such as flood management, carbon and silt storage, nutrient cycling, and tourism and recreation through provision of attractive landscapes (Hume, 2008). Additional attributes making these areas important include their function as a stopover site for migratory birds, their high carbon stock, and their ability to store and regulate the release of freshwater, among others. Wetlands also provide the opportunity to understand how humans interacted with past environments through the archaeological evidence they preserve (Hume, 2008).

The Somerset Levels and Moors are a low-lying region of north and central Somerset bisected by limestone ridges and hills. They are composed of peat moors (the lowest lying areas usually a little way inland) and clay levels (these are a few metres higher and usually located within the coastal strip). Within the Levels and Moors, the Brue Valley provides an important area for wildlife and this has been recognised through its many designations (Ramsar, Special Protection Area (SPA), Site of

Special Scientific Interest (SSSI) and National Nature Reserve (NNR)) as well as the existence of Higher Level Stewardship (HLS) agreements. The area is being enhanced further by the Brue Valley Living Landscape (BVLL) programme, which is working towards the restoration, recreation and reconnection of wildlife habitats across the wetlands[1]. The valley is divided into hydrological units, with some of the smaller units classed as Raised Water Level Areas (RWLAs). Since these areas aim to benefit wintering wildfowl and waders and breeding waders, they attract some of the highest agri-environment subsidies available. The Brue Valley is also culturally important, with a significant number of ancient monuments, which have been scheduled by English Heritage.

1.1.3 Potential impacts of CAP reform

Agri-environment payments to landowners within the BVLL and other key environmental sites across the country are vital for these areas to remain protected. However, recent changes to the CAP mean that there is likely to be a reduction in funding available to some areas, in particular those where only lower tier agri-environment agreements are available. Although areas of high conservation value may receive increased funding, areas of lesser value may be left with reduced payments, with consequent impacts for the provision of ecosystem services, levels of biodiversity and the ability of farmers to generate an income.

Work on the future viability of farming businesses on the Levels and Moors is already underway as part of the WOW (Value of Working Wetlands[2]) project, an INTERREG IVA funded project for the France (Channel) England region. FWAG are undertaking a small study to assess the fixed and variable costs, and net and gross margins of cattle rearing (Somerset Wildlife Trust et al, 2014). This report concerns a feasibility study which intends to look wider to investigate new income streams for all types of agricultural land use, and thus enable the creation of a Living Landscape in the Brue Valley (Figure 1-1), despite the ongoing changes to agri-environment schemes.

Figure 1-1: Lowland wet grassland at Catcott, March 2015 (Credit: Geckoella)

[1] Somerset Wildlife Trust. Available at: http://www.somersetwildlife.org/brue_valley.html on 21st August 2014.

[2] Value of Working Wetlands. Available at: http://www.valueofworkingwetlands.com/ on 22nd August 2014.

1.2 Aims and Objectives

The aim of this feasibility study is:

- To map out, and take the first practical steps towards, the creation of innovative revenue frameworks which allow land managers to achieve economic sustainability while maintaining wet habitats.

The outputs from the study are to help with the achievement of the ultimate goal, which is the development of local instruments that can fit with national policy, optimising the provision of ecosystem services and sustaining landowning business. The key outputs include:

- Selection of two hydrological units;
- Establishment of the baseline of ecosystem services provided in the two units;
- Analysis of how ecosystem service provision could change under different land and water management scenarios;
- Sharing work with WOW partners (including consideration of how the research might apply to other lowland wetlands); and
- A workshop presentation for WOW partners.

The study also intends to:

- Identify ecosystem services which are likely to be of importance in establishing new revenue frameworks (this will incorporate a list of potential funding sources linked to ecosystem services);
- Identify, plan and implement mechanisms for establishing the optimum provision of ecosystem services in the two units (including analysis of stakeholders and beneficiaries based on who is benefiting);
- Identify and plan practical steps towards new funding instruments (including the development of a stakeholder engagement plan); and
- Implement practical steps towards new funding instruments.

1.3 Structure of this Report

The remainder of this report is structured as follows:

- Section 2 sets out the two units which have been chosen for study, and describes the current ecosystem service provision (the baseline);
- Section 3 provides an overview of the various different funding streams which have been identified. It highlights which funds could be relevant to the two units;
- Section 4 presents the seven land and water management scenarios, and the likely changes in service provision under these scenarios. It also identifies stakeholder groups who might benefit from service provision by the different features;
- Section 5 determines which scenarios could be implemented to enable optimum ecosystem service provision; and
- Section 6 discusses the ways in which the funding opportunities can be taken forwards, with identified actions and an outline engagement plan.

2 Baseline Ecosystem Services

2.1 Overview

This section provides information on the two hydrological units selected for this study. It includes an assessment of the baseline ecosystem service provision for each of the units under current land and water management. Information is also presented on the expected provision of ecosystem services under a decreased funding baseline. The assessment of a decreased funding baseline assumes that whilst there is some support under the new Common Agricultural Policy (CAP) schemes, there is less money available from other sources (e.g. local authorities).

2.2 Selection of Units

The study needs to investigate areas which are likely to attract the highest level of agri-environment subsidy available, as well as those where funding may decrease in the future when compared with current levels. Furthermore, consideration needs to be given to habitats and land uses which are important to the Brue Valley, as well as those which are likely to be able to attract additional funding. The patterns of land ownership are also likely to affect the types of revenue framework which could be implemented.

Taking the above into account, the following two units were selected for study at the start-up meeting on 5th September 2014:

- **Meare Pool**: undesignated, used for intensive agriculture, wet and often flooded for periods during winter if Division Rhyne overtops. This floodwater is not retained as a Raised Water Level Area (RWLA) so the benefits of small scale flash flowing (e.g. biodiversity, peat soil conservation) are not realised; and
- **Catcott**: complex unit with many landowners. Includes designated area (Catcott, Edington and Chiltern Moors SSSI, Somerset Levels and Moors Ramsar site, Somerset Levels and Moors SPA), and peat voids now comprising reedbed (with implications for funds related to carbon).

2.3 Habitats and Land Uses in the Brue Valley

To make the assessment more manageable, the large number of habitats and land uses within the Brue Valley (see Figure 2-1) was grouped to form a set of 13 features as follows:

- Cereal crops
- Dry grassland of high value for wildlife
- Dry grassland of low value for wildlife
- Orchards and horticulture
- Other
- Peat works and bare ground
- Ponds and lakes
- Reedbeds
- Rivers, streams ditches, rhynes
- Swamp and fen
- Wet grassland of high value for wildlife

- Wet grassland of low value for wildlife
- Wet heath & purple moor grass habitats
- Woodland/hedgerow/line of trees/scrub/bracken

Further information on the way the habitats and land uses were grouped is given in Annex 1.

Figure 2-1: Catcott, March 2015 (Credit: Geckoella)

2.4 Linking Habitat and Land Use Features to Ecosystem Services

An overview of the ecosystem services likely to be provided in the Brue Valley can be found in Annex 1. Table 2-1 brings together these services and the features above to indicate which services are likely to be provided by which features. Note that only those services identified as relevant to the Brue Valley are included. Also, where a service is provided by several features (or even by the same feature in different locations), the level of service provision is likely to vary. For example, the feature "dry grassland of low value for wildlife" is likely to provide the service "ecosystem goods" to a greater extent than the feature "wet grassland of high value for wildlife", because the latter is only expected to be used for limited grazing (with the focus likely to be more on habitat management than food production).

Table 2-1: Ecosystem services likely to be provided by features in the Brue Valley

Feature	Ecosystem service provided	Details
Cereal crops	Ecosystem goods (food/fibre/peat/etc.)	Cereal farming (e.g. maize) occurs in the Brue Valley mainly to provide additional food for livestock
Dry grassland of high value for wildlife	Ecosystem goods (food/fibre/peat/etc.)	Some grazing occurs on high value grassland to prevent succession
	Biodiversity	Species rich grassland has high biodiversity value. Comprises species rich grassland, including National

Table 2-1: Ecosystem services likely to be provided by features in the Brue Valley		
Feature	**Ecosystem service provided**	**Details**
		Vegetation Community MG5 and SSSI features
	Aesthetics	High wildlife value (including species diversity) could provide aesthetic benefits
	Educational value	High wildlife value could provide opportunities for education
	Cultural heritage	High wildlife value is part of the cultural experience of the area
	Recreation and tourism	High wildlife value could attract visitors for wildlife watching
Dry grassland of low value for wildlife	Ecosystem goods (food/fibre/peat/etc.)	Dry grassland is likely to be used for dairy, beef and silage production
	Aesthetics	Grassland contributes to the aesthetics of the landscape
	Cultural heritage	Grassland forms part of the cultural heritage of the Levels and Moors
Orchards and horticulture	Ecosystem goods (food/fibre/peat/etc.)	Provides fruits, vegetables, etc. for food
Other	N/A	Feature includes settlements, fences, roads, etc. so is not expected to provide any ecosystem services
Peat works and bare ground	Ecosystem goods (food/fibre/peat/etc.)	Peat is extracted for horticulture
	Climate regulation (avoiding mineralisation and so loss of carbon from soils)	Removal of peat has negative implications for climate regulation
Ponds and lakes	Provision of freshwater (and availability of freshwater)	Ponds/lakes provide a source of water (but there are local water quality issues due to diffuse and point sources of pollution)
	Biodiversity	Ponds and lakes support aquatic biodiversity
	Climate regulation (avoiding mineralisation and so loss of carbon from soils)	Carbon may be stored in sediments in ponds and lakes
	Water regulation (small-scale)	Ponds and lakes store water
	Aesthetics	Ponds/lakes may add to the appeal of the area
	Educational value	Ponds/lakes could provide learning opportunities
	Cultural heritage	Ponds/lakes may contribute to the landscape and cultural heritage of the area
	Recreation and tourism	Ponds/lakes may attract visitors (e.g. for angling, wildlife watching, wildfowling)
Reedbeds	Biodiversity	Reedbeds are dominated by tall stands of Common reed *Phragmites australis*, with occasional herbs such as Marsh bedstraw *Galium palustre*. Reedbeds help support several UK BAP species including the Bittern *Botaurus stellaris* and Reed bunting *Emberiza schoeniclus*
	Climate regulation (avoiding mineralisation and so loss of carbon from soils)	Reedbeds may take up and store carbon
	Water purification	Reedbeds filter water, retaining sediment and contaminants (there is the potential for knock-on benefits for quality of intertidal mudflats and muddy saltmarsh if any contaminants are retained and not transported downstream)

Table 2-1: Ecosystem services likely to be provided by features in the Brue Valley		
Feature	**Ecosystem service provided**	**Details**
	Water regulation (small-scale)	Reedbeds may help to attenuate flows
	Erosion regulation	Reedbeds may help limit erosion
	Aesthetics	Reedbeds provide an additional habitat, adding interest to the appearance of the area
	Educational value	Reedbeds may provide an educational resource
	Cultural heritage	Reedbeds may contribute to the landscape and cultural heritage of the area
	Recreation and tourism	Reedbeds may support particular species which are of interest to wildlife enthusiasts
Rivers, streams, ditches, rhynes	Provision of freshwater (and availability of freshwater)	These habitats provide a source of water (but there are local water quality issues due to diffuse and point sources of pollution)
	Biodiversity	Ditches and rhynes are wet fences and irrigation sources for agriculture in summer, and are also a key feature for several SSSIs, providing habitat for rare ditch flora such as Greater water parsnip *Sium latifolium* and invertebrates
	Climate regulation (avoiding mineralisation and so loss of carbon from soils)	Sediments in ditches and watercourses may retain carbon
	Water regulation (large-scale)	Where feature includes rivers, these provide a passage for water on the levels and moors
	Water regulation (small-scale)	Streams, ditches and rhynes enable water to move around
	Aesthetics	Watercourses and ditches may add to the appeal of the area
	Educational value	Aquatic habitats could provide learning opportunities
	Cultural heritage	Watercourses and ditches may contribute to the landscape and cultural heritage of the area
	Recreation and tourism	Watercourses and ditches may attract visitors (e.g. for angling, wildlife watching, wildfowling)
Swamp and fen	Biodiversity	Swamp and fen generally fringe open water and reedbed, with tall emergent such as Common bulrush *Typha latifolia* and Reed canary grass *Phalaris arundinacea*. It also includes occasional patches of sedge-rich fen habitat
	Climate regulation (avoiding mineralisation and so loss of carbon from soils)	Swamp and fen may take up and store carbon
	Water purification	Swamp and fen may help filter water, thus improving quality (there is the potential for knock-on benefits for quality of intertidal mudflats and muddy saltmarsh if any contaminants are retained and not transported downstream)
	Water regulation (small-scale)	Swamp and fen may help to attenuate flows
	Aesthetics	Swamp and fen provide an additional habitat, adding interest to the appearance of the area
	Educational value	Swamp and fen habitats may provide an educational resource
	Cultural heritage	Swamp and fen habitats are likely to be seen as part of the cultural heritage of the Brue Valley
	Recreation and tourism	High species diversity could attract wildlife tourists

Table 2-1: Ecosystem services likely to be provided by features in the Brue Valley		
Feature	**Ecosystem service provided**	**Details**
Wet grassland of high value for wildlife	Ecosystem goods (food/fibre/peat/etc.)	Some grazing (beef and dairy) is likely to occur as part of land management
	Biodiversity	Species rich grassland has high biodiversity value. The current grassland regime requires lower water levels in winter (achieved by pumping) and higher water levels in summer (by impounding water in the major rivers and diverting it into rhynes). This feature also requires intensive land management with very specific grazing and cutting regimes
	Climate regulation (avoiding mineralisation and so loss of carbon from soils)	Wet grassland may retain carbon in the soil
	Water regulation (small-scale)	Wet grassland may retain water, thus affecting water levels in the immediate area
	Aesthetics	High species diversity could enhance the appearance of the area
	Educational value	Wet grassland may provide an educational resource
	Cultural heritage	Wet grassland may also be seen as part of the cultural heritage of the Levels and Moors
	Recreation and tourism	High species diversity could attract visitors (habitat supports wetland birds)
Wet grassland of low value for wildlife	Ecosystem goods (food/fibre/peat/etc.)	Land likely to be used for dairy, beef and silage production
	Climate regulation (avoiding mineralisation and so loss of carbon from soils)	Wet grassland may retain carbon in the soil
	Water regulation (small-scale)	Wet grassland may retain water, thus affecting water levels in the surrounding area
	Aesthetics	Grassland contributes to the aesthetics of the landscape
	Cultural heritage	Grassland forms part of the cultural heritage of the Levels and Moors
Wet heath & purple moor grass habitats	Ecosystem goods (food/fibre/peat/etc.)	Some grazing to maintain sward composition and structure
	Biodiversity	The small area of wet heath is important for the biodiversity of the Brue Valley area. It includes relict Sphagnum rich lowland raised bog areas, representing a habitat that was once extensive across the Brue Valley, with Bog asphodel *Narthcium ossifragum* and Round-leaved sundew *Drosera rotundifolia*. This feature also includes heathy *Molinia* grassland
	Climate regulation (avoiding mineralisation and so loss of carbon from soils)	Wet heath and purple moor grass habitats may retain carbon in the soil
	Water regulation (small-scale)	Wet heath and purple moor grass habitats may retain water, thus affecting water levels in the surrounding area
	Aesthetics	Habitats may add interest to the area
	Educational value	Wet heath and purple moor grass habitats could be used as an educational resource when teaching people about the Brue Valley
	Cultural heritage	Wet heath and purple moor grass habitats may also be seen as part of the cultural heritage of the area
	Recreation and tourism	Species diversity could attract visitors

Table 2-1: Ecosystem services likely to be provided by features in the Brue Valley		
Feature	**Ecosystem service provided**	**Details**
Woodland/ hedgerow/ line of trees/scrub/ bracken	Ecosystem goods (food/fibre/peat/etc.)	Wet woodland is present in areas previously used for peat extraction. Some pollarding is likely to occur. There may also be withy production
	Biodiversity	Hedges, scrub and bracken are scattered around the Brue Valley. Wet woodland is present in areas previously used for peat extraction
	Climate regulation (avoiding mineralisation and so loss of carbon from soils)	Areas of woodland and lines of trees may take up carbon
	Erosion regulation	Roots from trees and shrubs may help to limit soil erosion (in times of flood, wet woodland may regulate water flow)
Notes: Details have been developed from baseline descriptions detailed in RPA et al (2011); whilst all features will contribute to the biodiversity of the area to a certain extent, biodiversity is only listed as a service against those features which have the potentially to provide significant biodiversity		

2.5 Development of Baseline

2.5.1 Assumptions for baseline and decreased funding baseline

To be able to assess potential changes in land and water management, and consequently ecosystem service provision, it is first necessary to define the baseline situation. In the hydrological units identified, the 'Current baseline' reflects the ecosystem services provided under the present land and water management regime, and prior to any changes to the CAP. This is a snapshot baseline; it cannot be assumed that this baseline will continue into the future given the changes to the CAP and the anticipated funding cuts for local authorities and other organisations.

Consequently, a 'Decreased funding baseline' has been developed to take account of any changes which may occur should no new income streams be identified. This scenario reflects the ecosystem services which may be provided under a new land and water management regime, which will be driven by the anticipated changes to the CAP.

The differences between the 'Current (snapshot) baseline' and the 'Decreased funding baseline' represent the anticipated changes in ecosystem service provision which could occur given the changes to the CAP and decrease in availability of other funding. Table 2-2 provides a summary of the assumptions for the two scenarios.

Table 2-2: Assumptions for the current baseline and decreased funding baseline	
Scenario	**Assumptions**
Current (snapshot) baseline	Current regime of agri-environment funding continues at pre-CAP reform levels; Land and water management actions continue as at present; All habitats and land uses which currently exist continue to provide ecosystem services. The level of provision may vary according to habitat condition, e.g. where habitats are in poor condition, they may provide a lower level of service provision than where habitats are in good condition

Table 2-2: Assumptions for the current baseline and decreased funding baseline	
Scenario	**Assumptions**
Decreased funding baseline	Agri-environment funding has changed. The most environmentally important sites are able to apply for grants and support following a similar application process to the Higher Level Stewardship (HLS) scheme. For other sites, environmental agreements are available but are dependent on a competitive online process, where applications are assessed against environmental priorities in the local area. It is assumed that there is also less money available from other sources, for example, local authorities and other organisations involved with the Levels and Moors. Land and water management actions in the Brue Valley change in response, so that there is a focus on profitability with the exception of the most environmentally important sites. Where areas are designated, management measures focus on maintaining/restoring habitat condition and biodiversity
Notes: assumptions relating to the new CAP regime have been developed from information provided in Defra (2014b)	

Note that climate change has not been considered within the scenarios. The study is focusing on the identification of new revenue streams which could be taken up by landowners and managers, potentially within the next five years. Whilst there may be some changes in the Levels and Moors in the short term as a result of climate change, the time and resources available to this study preclude consideration of climate change scenarios in addition to funding scenarios. Land managers may need to take account of the implications of climate change and how these could affect their ability to meet the requirements of any funding sources that they may follow up.

2.5.2 Development of 'Current baseline' and 'Decreased funding baseline'

The development of the baseline for each unit involved:

- Describing the features present within each unit using a combination of GIS, Ordnance Survey maps, internet based aerial photography and local knowledge of the area;
- Adding information on feature condition and management (where available); and
- Drawing on the links made in Table 2-1 between features and ecosystem services to determine which services were likely to be provided by the two units.

Ecosystem service provision under the Decreased funding baseline was then determined by considering the likely direction of change for each of the services provided under the new agri-environment regime, according to the assumptions given in Table 2-2.

2.5.3 Description of 'Current (snapshot) baseline' for Catcott

Table 2-3 provides an overview of the features and associated ecosystem services identified as being relevant to the Catcott hydrological unit under the 'Current (snapshot) baseline'. It is important to note that the majority of the features within the Catcott unit provide biodiversity, with Catcott as a whole having a significantly higher biodiversity value than Meare. No features were identified as providing the service: water regulation (large-scale), however it is possible that there may be links to the main South Drain to the northeast of the unit. Water regulation within Catcott could also be affected by that in adjacent areas. There is anecdotal evidence to suggest that during the 2013/14 floods, water levels at Shapwick Heath (which neighbours Catcott) were considerably higher than normal winter levels in all the peat void units. Given that around half of the 500 ha heath is restored peat voids, this represents a considerable volume of water. It is likely that this had an impact on water levels over the wider area (potentially including Catcott).

For each of the features in Table 2-3, the likely extent of service provision is summarised in Annex 1 (Table A1-3), whilst a map of the features is in Annex 3.

Table 2-3: Features and ecosystem services present in the Catcott unit under the 'Current (snapshot) baseline'	
Feature	**Ecosystem service**
Dry grassland of low value for wildlife	Ecosystem goods (food/fibre/peat/etc.)
	Aesthetics
	Cultural heritage
Reedbeds	Biodiversity
	Climate regulation (avoiding mineralisation and so loss of carbon from soils)
	Water purification
	Water regulation (small-scale)
	Erosion regulation
	Aesthetics
	Educational value
	Cultural heritage
	Recreation and tourism
Rivers, streams, ditches, rhynes	Provision of freshwater (and availability of freshwater)
	Biodiversity
	Climate regulation (avoiding mineralisation and so loss of carbon from soils)
	Water regulation (small-scale)
	Aesthetics
	Educational value
	Cultural heritage
	Recreation and tourism
Swamp and fen	Biodiversity
	Climate regulation (avoiding mineralisation and so loss of carbon from soils)
	Water purification
	Water regulation (small-scale)
	Aesthetics
	Educational value
	Cultural heritage
	Recreation and tourism
Wet grassland of high value for wildlife	Ecosystem goods (food/fibre/peat/etc.)
	Biodiversity
	Climate regulation (avoiding mineralisation and so loss of carbon from soils)
	Water regulation (small-scale)
	Aesthetics
	Educational value
	Cultural heritage
	Recreation and tourism
	Ecosystem goods (food/fibre/peat/etc.)
	Climate regulation (avoiding mineralisation and so loss of carbon from soils)
	Water regulation (small-scale)
Wet grassland of low value for wildlife	Ecosystem goods (food/fibre/peat/etc.)
	Climate regulation (avoiding mineralisation and so loss of carbon from soils)
	Water regulation (small-scale)
	Aesthetics
	Cultural heritage

Table 2-3: Features and ecosystem services present in the Catcott unit under the 'Current (snapshot) baseline'	
Feature	**Ecosystem service**
Wet heath & purple moor grass habitats	Ecosystem goods (food/fibre/peat/etc.)
	Biodiversity
	Climate regulation (avoiding mineralisation and so loss of carbon from soils)
	Water regulation (small-scale)
	Aesthetics
	Educational value
	Cultural heritage
	Recreation and tourism
Woodland/hedgerow/line of trees/scrub/bracken	Ecosystem goods (food/fibre/peat/etc.)
	Biodiversity
	Climate regulation (avoiding mineralisation and so loss of carbon from soils)
	Erosion regulation

Table 2-4 below lists heritage records which have been identified within the unit, but are not connected to a particular feature. There are also several timber trackways/trackway sites close to the unit (for example, timber trackway site 700m west of Honeygar Farm and timber trackways 850m east of Catcott Burtle Farm[3]). Furthermore, the peat soils of the area may contain as yet undiscovered (below ground) archaeology which could be vulnerable if water levels were to decrease and the soil dried out. There may be funding opportunities associated with the preservation or protection of heritage assets and archaeologically important areas.

Table 2-4: Heritage records identified within the Catcott unit	
Heritage record	**Location**
Flint	ST 3997 4115
Possible Roman salt working mound	ST3986 4119
Flint find	ST403 405
Source: Somerset County Council (ND): Somerset Historic Environment Record, accessed at: http://webapp1.somerset.gov.uk/her/map.asp?flash=true on 10th October 2014	

2.5.4 Description of current baseline (snapshot) for Meare Pool

Table 2-5 provides an overview of the features and associated ecosystem services identified as relevant to the Meare Pool hydrological unit under the current baseline. Note that no features were identified providing the services of water purification and water regulation (large-scale). However, it is acknowledged that water levels within the area may be significantly influenced by the adjoining Brue River and Division Rhyne. For each of the features, the likely extent of service provision is summarised in Annex 1 (see Table A1-5), whilst a map of the features is in Annex 3.

[3] The National Heritage List for England, accessed at: http://list.english-heritage.org.uk/mapsearch.aspx on 4th November 2014.

Table 2-5: Features and ecosystem services present in the Meare Pool unit under the 'Current (snapshot) baseline'	
Feature	**Ecosystem service**
Dry grassland of low value for wildlife	Ecosystem goods (food/fibre/peat/etc.)
	Aesthetics
	Cultural heritage
Rivers, streams, ditches, rhynes	Provision of freshwater (and availability of freshwater)
	Biodiversity
	Climate regulation (avoiding mineralisation and so loss of carbon from soils)
	Water regulation (small-scale)
	Aesthetics
	Educational value
	Cultural heritage
	Recreation and tourism
Wet grassland of low value for wildlife	Ecosystem goods (food/fibre/peat/etc.)
	Climate regulation (avoiding mineralisation and so loss of carbon from soils)
	Water regulation (small-scale)
	Aesthetics
	Cultural heritage
Woodland/hedgerow/line of trees/scrub/bracken	Ecosystem goods (food/fibre/peat/etc.)
	Biodiversity
	Climate regulation (avoiding mineralisation and so loss of carbon from soils)
	Erosion regulation

Table 2-6 lists heritage records which have been identified within the unit and are important for cultural heritage, but are not connected to a particular feature.

Table 2-6: Heritage records identified within the Meare Pool unit	
Heritage record	**Location**
Mounds, Meare Pool	ST465 422
Duck decoy	ST4625 4241
Mounds or earthworks	ST4681 4180
Second World War pillbox	ST4673 4191
Source: Somerset County Council (ND): Somerset Historic Environment Record, accessed at: http://webapp1.somerset.gov.uk/her/map.asp?flash=true on 10th October 2014	

Just outside of the unit are the sites of the lake villages (northwest of Oxenpill) as well as the Abbot's Fish House and fishponds (at the northern edge of Meare, see Figure 2-2); these are all scheduled ancient monuments[4]. As for the Catcott unit, there may additionally be undiscovered (below ground) archaeology within the peat soils. Indeed, the Somerset Levels and Moors are considered to be of high archaeological value[4]. The existence of several heritage records within the unit, as well as scheduled ancient monuments outside the unit could provide opportunities for obtaining funding related to heritage and archaeology.

[4] Information obtained from English Heritage, accessed at: http://list.english-heritage.org.uk/mapsearch.aspx on 5th November 2014.

Figure 2-2: Grassland and rhynes at Meare with fish house on the right (just outside of the unit considered by this study), March 2015 (Credit: Geckoella)

2.5.5 Description of 'Decreased funding baseline' for Catcott and Meare Pool

Applying the assumptions from Table 2-2, the Decreased funding baseline can be developed by considering the direction of change in service provision from the current baseline. Table 2-6 provides an indication of the way in which ecosystem service provision is expected to change in each of the units as a result of revisions to the agri-environment funding regime. More detail is available in Tables A1-4 (Catcott) and A1-6 (Meare Pool) in Annex 1.

Catcott: Identification of differences between 'Current (snapshot) baseline' and 'Decreased funding baseline'

There are few differences in service provision between the 'Current (snapshot) baseline' and the 'Decreased funding baseline'. Investment in habitats which are designated and already of high value is expected to maintain their ability to provide services such as provision of fresh water, climate regulation (in particular, retention of captured carbon within the soils), water purification and water regulation. Biodiversity could be increased as SSSI unit condition is improved. Cultural services are not expected to undergo any significant changes because they are already deemed to be relatively good.

Meare Pool: Identification of differences between 'Current (snapshot) baseline' and 'Decreased funding baseline'

For Meare Pool, the key differences between the 'Current (snapshot) baseline' and the 'Decreased funding baseline' are that for many of the services, provision is expected to decrease in the future. This is mainly because there will be a move away from land management that balances agriculture and biodiversity. Farming practices will change to maximise productivity to compensate for lost income due to declining levels of agri-environment support. Provision of ecosystem goods will therefore increase. Conversely, biodiversity, regulating and cultural services provided by some features may decrease, as the features are managed to maximise the amount of grazing and hay/silage crops which can be taken. There is, however, a point at which management would no longer be viable due to the lack of state funding. This leads to some uncertainty including for services such as carbon regulation. More intensive agriculture could lead to increased management

of ditches and rhynes to enhance drainage and enable their use as wet fences. Very regular ditch clearance and removal of any vegetation could decrease the ability of ditches to sequester carbon and deliver biodiversity value. Alternatively, those ditches located furthest from the farm buildings could potentially be abandoned as efforts are focused on areas of land which are likely to be the most profitable. Carbon sequestration (and potentially other services provided by these ditches) could then actually increase. Overall impacts are dependent on the feature considered.

Table 2-6: Potential change in service provision from the 'Current (snapshot) baseline' under the 'Decreased funding baseline' in Catcott and Meare Pool

Ecosystem service	Feature	Potential change in Catcott	Potential change in Meare Pool
Ecosystem goods (food/fibre/peat/etc.)	Dry grassland of low value for wildlife	0	+
	Wet grassland of high value for wildlife	0	N/A
	Wet heath & purple moor grass habitats	0	N/A
	Wet grassland of low value for wildlife	0	+
	Woodland/hedgerow/line of trees/scrub/bracken	0	0
Provision of freshwater (and availability of freshwater)	Rivers, streams, ditches, rhynes	0	-
Biodiversity	Rivers, streams, ditches and rhynes	0	-
	Reedbeds	+	N/A
	Swamp and fen	+	N/A
	Wet grassland of high value for wildlife	+	N/A
	Wet heath & purple moor grass habitats	+	N/A
	Woodland/hedgerow/line of trees/scrub/bracken	0	0
Climate regulation (avoiding mineralisation and so loss of carbon from soils)	Rivers, streams, ditches, rhynes	0	-
	Wet heath & purple moor grass habitats	0	N/A
	Wet grassland of low value for wildlife	+	-
	Swamp and fen	0	N/A
	Reedbeds	0	N/A
	Wet grassland of high value for wildlife	0	N/A
	Woodland/hedgerow/line of trees/scrub/bracken	0	0
Water purification	Swamp and fen	0	N/A
	Reedbeds	0	N/A
Water regulation (small-scale)	Wet grassland of high value for wildlife	0	N/A
	Wet heath & purple moor grass habitats	0	N/A
	Rivers, streams, ditches, rhynes	0	+
	Wet grassland of low value for wildlife	0	-
	Swamp and fen	0	N/A
	Reedbeds	0	N/A
Erosion regulation	Reedbeds	0	N/A
	Woodland/hedgerow/line of trees/scrub/bracken	0	0
Aesthetics	Dry grassland of low value for wildlife	0	0
	Rivers, streams, ditches, rhynes	0	-
	Swamp and fen	0	N/A
	Reedbeds	0	N/A
	Wet grassland of high value for wildlife	0	N/A
	Wet grassland of low value for wildlife	0	0
	Wet heath & purple moor grass habitats	0	N/A

Table 2-6: Potential change in service provision from the 'Current (snapshot) baseline' under the 'Decreased funding baseline' in Catcott and Meare Pool			
Ecosystem service	**Feature**	**Potential change in Catcott**	**Potential change in Meare Pool**
Educational value	Rivers, streams, ditches, rhynes	0	-
	Swamp and fen	0	N/A
	Reedbeds	0	N/A
	Wet grassland of high value for wildlife	0	N/A
	Wet heath & purple moor grass habitats	0	N/A
Cultural heritage	Dry grassland of low value for wildlife	0	0
	Rivers, streams, ditches, rhynes	0	-
	Swamp and fen	0	N/A
	Reedbeds	0	N/A
	Wet grassland of high value for wildlife	0	N/A
	Wet grassland of low value for wildlife	0	0
	Wet heath & purple moor grass habitats	0	N/A
Recreation and tourism	Rivers, streams, ditches, rhynes	0	-
	Swamp and fen	0	N/A
	Reedbeds	0	N/A
	Wet grassland of high value for wildlife	0	N/A
	Wet heath & purple moor grass habitats	0	N/A
Key: + = likely to increase; - = likely to decrease; 0 = likely to stay the same; NA = feature not present in unit			

3 Identification and Assessment of Potential Revenue Streams

3.1 Approach to the Identification and Assessment of Potential Revenue Streams

Internet research was undertaken to identify potential funds and revenue streams, and the conditions under which they could be applied. Information was obtained from a variety of sources including reports and guidance documents, case study examples and websites highlighting specific grants and approaches. The funding sources and approaches were assessed against a range of criteria as given in Annex 2 (see Table A2-1). Funding sources which were deemed not applicable (e.g. due to their objectives) were screened out, with the justification for their exclusion recorded. The short listed funding sources (provided in Annex 2, Table A2-2) were matched to the ecosystem services present under the baseline and, specifically, to the ecosystem services provided in the two hydrological units. This enabled the identification of the services which are likely to be important for the establishment of new revenue frameworks.

3.2 Links between Revenue Streams and Services in the Hydrological Units

Table 3-1 provides an overview of the services which are likely to be of importance in establishing new revenue frameworks for Catcott, whilst Table 3-2 provides the same information for Meare Pool. In total, 36 funding sources were identified within this project. Of these, 25 were short listed as being applicable to the two hydrological units based on the ecosystem services identified in the Brue Valley. Some of the funds are believed to be more viable than others due to the area of habitat present that is providing the appropriate service. For example, there are limited features providing erosion regulation and educational value at Meare Pool, thus funds linked to these services may be less applicable than at Catcott (see Figure 3-1). For other funding sources, funding availability may be dependent on new projects being issued under existing programmes (e.g. the EAFRD).

Figure 3-1: Boardwalk providing access and educational opportunities at Catcott, March 2015 (Credit: Geckoella)

Table 3-1: Potential revenue streams linked to ecosystem services – Catcott												
Potential revenue streams	Comments and uncertainties	Service										
		Ecosystem goods	Freshwater provision	Biodiversity	Climate regulation	Water purification	Water regulation	Erosion regulation	Aesthetics	Educational value	Cultural heritage	Recreation and tourism
Awards for All Lottery Fund	Available for a variety of projects			Y					Y	Y	Y	Y
Corporate Social Responsibility (CSR)	Depends upon there being willing businesses within the area			Y	Y		Y		Y			
Countryside Stewardship	Funding for individual land-based businesses for land management	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Defra Partnership Funding (GiA)	Amount of money available is dependent on the option being implemented and the benefits likely to result						Y	Y				
European Agricultural Fund for Rural Development (EAFRD)	Depends upon whether a new scheme is implemented	Y		Y								
Entry fees	Depends upon there being visitors willing to pay			Y					Y	Y	Y	Y
Esmeé Fairbairn Foundation	Must contribute to the objective of the fund									Y		
Farming and Forestry Productivity Scheme (now Countryside Productivity Scheme)	New Rural Development Programme for England scheme	Y										
GHG emission offsets	Examples include the Eden Climate Fund				Y							
Heritage Lottery Fund	Landscape Partnerships are probably the most relevant fund										Y	
Higher Level Stewardship	Current agreements will be reviewed at the 5 year break to assess for additional water regulation benefits			Y			Y					
Interreg Europe	Depends on identification of partner organisations in other countries; also timing of call for proposals	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Table 3-1: Potential revenue streams linked to ecosystem services – Catcott												
Potential revenue streams	Comments and uncertainties	Service										
		Ecosystem goods	Freshwater provision	Biodiversity	Climate regulation	Water purification	Water regulation	Erosion regulation	Aesthetics	Educational value	Cultural heritage	Recreation and tourism
Landfill Communities Fund	The most local and largest landfill operator is Viridor Credits - there is a nearby landfill site at Walpole - within 10 miles of the Brue Valley			Y					Y	Y	Y	Y
LEADER Programme	There has been a Levels and Moors Local Action Group running a LEADER Programme - this is about to receive further funding under the new Rural Development Programme for England	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
LIFE+ funds	NGOs (e.g. the RSPB) apply to LIFE for Natura 2000 sites	Y	Y	Y	Y	Y	Y					
Local Growth Fund	Delivering sustainable natural flood management in line with Somerset Flood Action Plan						Y	Y	Y	Y	Y	Y
Market value	Designations may restrict removal of natural produce	Y										
Payments for Ecosystem Services	PES needs to be a voluntary transaction	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Peatland Code	The whole area is peat soil (relevance is likely to depend on exactly how the Peatland Code is developed, i.e. whether there is a focus on restoration or maintenance of existing peat)				Y							
Restoration of ecological network determined using Somerset's habitat evaluation protocol	It is important that this mechanism is only used with consideration being given to Somerset's ecological network		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Table 3-1: Potential revenue streams linked to ecosystem services – Catcott												
Potential revenue streams	Comments and uncertainties	Service										
		Ecosystem goods	Freshwater provision	Biodiversity	Climate regulation	Water purification	Water regulation	Erosion regulation	Aesthetics	Educational value	Cultural heritage	Recreation and tourism
Somerset District Council Community Grants	Includes a variety of areas, such as wildlife and countryside activities	Y							Y			
Somerset FAP	Somerset County Council currently holds funding towards the land management part of the FAP. Not clear whether applications are being accepted or whether funds are all already allocated to projects						Y					
Somerset Rivers Authority	Launched on the 31st January 2015, the Somerset Rivers Authority aims to develop a Common Works Programme, as well as an enhanced maintenance programme						Y					
Tourism charge ("tax")	This funding source will be very dependent on agreement from businesses and the amounts they feel they can charge in addition to what they already		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Wessex Water Partners Programme	Deadline for the Major Grants Scheme was 19th December 2014. Small Grants Scheme is more likely as an option	Y		Y	Y							
Note: funds may be applicable for services other than those identified here; the key aims and objectives of the funds have been used to identify where they are most likely to be relevant												

Table 3-2: Potential revenue streams linked to ecosystem services – Meare Pool												
Potential revenue streams	Comments and uncertainties	Service										
		Ecosystem goods	Freshwater provision	Biodiversity	Climate regulation	Water regulation	Erosion regulation	Aesthetics	Educational value	Cultural heritage	Recreation and tourism
Awards for All Lottery Fund	Available for a variety of projects			Y				Y	Y	Y	Y
Corporate Social Responsibility (CSR)	Depends upon there being willing businesses within the area			Y	Y					Y	
Countryside Stewardship	Funding for individual land-based businesses for land management	Y	Y	Y	Y	Y	Y	Y	Y		Y
Defra Partnership Funding (GiA)	Amount of money available is dependent on the option being implemented and the benefits likely to result					Y	Y				
European Agricultural Fund for Rural Development (EAFRD)	Depends upon whether a new scheme is implemented	Y		Y							
Entry fees	Depends upon there being visitors willing to pay			Y				Y	Y	Y	Y
Esmeé Fairbairn Foundation	Must contribute to the objective of the fund								Y		
Farming and Forestry Productivity Scheme (now Countryside Productivity Scheme)	New Rural Development Programme for England scheme	Y									
GHG emission offsets	Examples include the Eden Climate Fund				Y						
Heritage Lottery Fund	Landscape Partnerships are probably the most relevant fund									Y	
Higher Level Stewardship	Current agreements will be reviewed at the 5 year break to assess for additional water regulation benefits					Y					
Interreg Europe	Depends on identification of partner organisations in other countries; also timing of call for proposals	Y	Y	Y	Y		Y	Y	Y	Y	Y

Table 3-2: Potential revenue streams linked to ecosystem services – Meare Pool											
Potential revenue streams	Comments and uncertainties	Service									
		Ecosystem goods	Freshwater provision	Biodiversity	Climate regulation	Water regulation	Erosion regulation	Aesthetics	Educational value	Cultural heritage	Recreation and tourism
Landfill Communities Fund	The most local and largest landfill operator is Viridor Credits - there is a nearby landfill site at Walpole - within 10 miles of the Brue Valley			Y				Y	Y	Y	Y
LEADER Programme	There has been a Levels and Moors Local Action Group running a LEADER Programme - this is about to receive further funding under the new Rural Development Programme for England	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
LIFE+ funds	NGOs (e.g. the RSPB) apply to LIFE for Natura 2000 sites	Y	Y	Y	Y	Y					
Local Growth Fund	Delivering sustainable natural flood management in line with Somerset Flood Action Plan					Y	Y	Y	Y	Y	
Market value	Designations may restrict removal of natural produce	Y									
Payments for Ecosystem Services	PES needs to be a voluntary transaction	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Peatland Code	The whole area is peat soil (relevance is likely to depend on exactly how the Peatland Code is developed, i.e. whether there is a focus on restoration or maintenance of existing peat)				Y						
Restoration of ecological network determined using Somerset's habitat evaluation protocol	It is important that this mechanism is only used with consideration being given to Somerset's ecological network		Y	Y	Y		Y		Y	Y	Y

Table 3-2: Potential revenue streams linked to ecosystem services – Meare Pool											
Potential revenue streams	Comments and uncertainties	Service									
		Ecosystem goods	Freshwater provision	Biodiversity	Climate regulation	Water regulation	Erosion regulation	Aesthetics	Educational value	Cultural heritage	Recreation and tourism
Somerset District Council Community Grants	Includes a variety of areas, such as wildlife and countryside activities	Y						Y			
Somerset FAP	Somerset County Council currently holds funding towards the land management part of the FAP. Not clear whether applications are being accepted or whether funds are all already allocated to projects					Y					
Somerset Rivers Authority	Launched on the 31st January 2015, the Somerset Rivers Authority aims to develop a Common Works Programme, as well as an enhanced maintenance programme						Y				
Tourism charge ("tax")	This funding source will be very dependent on agreement from businesses and the amounts they feel they can charge in addition to what they already		Y	Y	Y	Y	Y	Y	Y	Y	Y
Wessex Water Partners Programme	Deadline for Major Grants Scheme was 19th December 2014. Small Grants Scheme is more likely as an option	Y	Y	Y	Y						
Note: funds may be applicable for services other than those identified here; the key aims and objectives of the funds have been used to identify where they are most likely to be relevant											

4 Identification and Assessment of Land and Water Management Scenarios

4.1 Approach to Identification of Scenarios

By using a set of scenarios, it is possible to assess how ecosystem service provision within the two hydrological units could change under different land and water management actions. Table 4-1 provides a summary of the seven scenarios produced for this study. The scenarios have been developed on the basis that they relate to actions and management practices which are relevant to the habitats and land use features in the wider Brue Valley. Figure 4-1 provides an illustration of a typical land use for the area (improved grassland).

Figure 4-1: Pollarded willows with improved grassland (Credit: Geckoella)

Table 4-1: Summary of land and water management scenarios		
Scenario name	**Brief description**	**Actions under the scenario**
1) Conservation of peat soils	Land and water management actions are implemented to maintain and enhance the condition of peat soils. Benefits for climate regulation and cultural services (conservation of archaeology, also landscape heritage) in particular	Water levels are retained in some areas and raised in others to ensure existing wet features are maintained at or achieve good condition and create new wet areas. Area of dry grassland in particular is decreased. Peat works/bare ground are re-wetted where possible to avoid further degradation and loss

Table 4-1: Summary of land and water management scenarios		
Scenario name	**Brief description**	**Actions under the scenario**
2) Nature tourism	Landscape is managed to encourage and promote nature tourism, with key benefits for biodiversity and cultural services (including aesthetics, education, cultural heritage and recreation and tourism)	The Brue Valley is promoted as a place to visit for its wildlife value. Features are managed to maximise biodiversity where possible (e.g. appropriate mowing and grazing regimes for grassland). Rights of way are well maintained and signposted
3) Flood storage	Areas of the landscape are allocated for water storage during times of heavy rainfall and high water levels. Benefits water regulation (large-scale) (i.e. water regulation of main rivers which could affect a large area), with the potential to also benefit biodiversity	Small patches of land which are close to rivers and drains are allocated as flood storage areas, with bunds/banks being constructed to help constrain/store floodwaters when river levels are high. Small areas of wetland habitat (including swamp and fen, reedbeds) are created at field edges. Land managers are given advice on best practice (e.g. minimising soil compaction, soil aeration) to decrease runoff and increase attenuation on higher ground
4) Habitat creation	For Catcott: land and water management actions are implemented to enable habitat creation, in particular, of raised bog. Benefits for biodiversity, and potentially also climate regulation and cultural services (e.g. education, recreation and tourism). For Meare Pool: land and water management actions are implemented to enable the recreation of 'Meare Pool' as an area of reedbed and swamp surrounded by wet grassland. Benefits for biodiversity, and potentially also climate regulation and cultural services (e.g. education, recreation and tourism) but loss of land for agricultural production	Raised bog/wet heath - manage water levels to ensure that remnant areas are sufficiently wet. Restore vegetation through managing invasive species and avoiding peat extraction close to habitat areas. Wet woodland: ceasing grassland management in wetter areas may result in succession occurring and wet woodland forming Wet/dry grassland of low wildlife value: manage habitat to increase area of grassland of high wildlife value. Reedbeds/swamp and fen: create wetland habitats through decreasing cultivation and modifying water levels
5) Maintaining and improving conveyance of water	Scenario covers de-silting of main channels to maintain and improve water conveyance, with a focus on water quantity and quality. Main water arteries provide water in summer, and take water away in winter. Benefits for provision of freshwater and water regulation (large scale and small-scale) (with small-scale water regulation relating to ditches, streams and rhynes which only influence their immediate surroundings). Knock on benefits for provision of ecosystem goods (through provision of water for irrigation and also wet fences)	Dredge main channels to improve conveyance of water. Manage smaller channels and ditches to enable conveyance but also ensure water quality (e.g. for irrigation, animals). Manage channel banks to avoid erosion and sedimentation

Table 4-1: Summary of land and water management scenarios		
Scenario name	**Brief description**	**Actions under the scenario**
6) Biomass production	Land and water management actions are implemented to encourage the production of biomass (e.g. willows, reeds) within the Brue Valley. Benefits for ecosystem goods (fibre and fuel) and potentially also cultural heritage where traditional industries are regenerated	Reedbed habitats are managed in line with the needs of biodiversity to enable reed harvesting for thatching. Withy growing and harvesting is promoted, with wetter areas being planted with willows. Withies are used for basketry, traditional furniture, cricket bats, charcoal and chair seating Woodland planting on drier areas and Short Rotation Coppice for wood chips and timber (e.g. pollarding for firewood as sustainable energy source)
7) Branding	Actions are implemented to improve and advertise the link between food and fibre products, and the location. Benefits for ecosystem goods (food, fibre) and also cultural heritage. Potentially also benefits for recreation and tourism if branding encourages visitors to come to the Brue Valley	Advertising and marketing of the Brue Valley brand is stepped up. Local products are labelled as "produced in the Brue Valley". Key products are likely to be tourism, meat and (small-scale) production of withy, wood, and biomass; bottled water is less significant. The area with its wetland landscape is also branded as a destination for its cultural heritage and wildlife
Note: all scenarios are theoretical and are based on potential land and water management actions		

4.2 Identification of Likely Changes in Service Provision under the Scenarios

4.2.1 Approach to identifying changes

The seven scenarios were assessed against each of the features and associated ecosystem services provided in the two hydrological units. A matrix was used to record the anticipated impact of each scenario on each feature/service combination. Where a feature provided two or more services, the impact for each service was considered separately. In addition to a text description/justification, the following rating system was used to indicate the extent of the change in service provision expected under each scenario for each feature:

- Large positive change in service provision anticipated
- Large negative change in service provision anticipated
- Medium positive change in service provision anticipated
- Medium negative change in service provision anticipated
- Small positive change in service provision anticipated
- Small negative change in service provision anticipated
- No change in service provision anticipated
- Unknown/uncertain change in service provision anticipated

4.2.2 Likely changes in service provision from current baseline according to the scenarios

Table 4-2 provides a summary of the ratings attached to each scenario for Catcott, whilst Table 4-3 presents the same information for Meare Pool. Colour coding of green, orange and blue is used to differentiate between provisioning, regulating and cultural services respectively. The assessment has been carried out by considering the direction and magnitude of change under the scenarios when compared with the 'Current (snapshot) baseline' not the 'Decreased funding baseline'.

There is significant variation between the scenarios in terms of the types of services which are likely to improve/benefit. The key findings are as follows:

Provisioning services

- Positive impacts are expected under:
  - 'Maintaining & improving conveyance of water'
  - 'Biomass production' (but note that there could be negative impacts for biodiversity due to loss of habitat)
  - 'Branding'
- Negative impacts could under:
  - 'Flood storage'
  - 'Habitat creation' (in particular for the Meare Pool unit)
  - 'Conservation of peat soils' (wet habitats do well but area of dry grassland for grazing and cutting decreases)

Regulating services

- Positive or experience no change for the majority of the services under all the scenarios, excepting possible negative impacts under:
  - 'Maintaining & improving conveyance of water'
  - 'Biomass production' (extensive woodland planting could dry out soils with negative impacts for climate regulation)

Cultural services

- Positive impacts under:
  - 'Nature tourism'
  - 'Conservation of peat soils' (in part due to raised water levels having significant benefits for cultural heritage including buried archaeology)
  - 'Habitat creation' (mainly due to recreation of 'Meare Pool', a landscape feature which used to exist when conditions were wetter)
- Negative impacts under:
  - 'Maintaining and improving conveyance of water' (for some cultural services delivered by particular features, such rivers, streams, ditches and rhynes. This habitat in particular could suffer from increased clearance and dredging, with negative impacts for the appearance and cultural heritage of the area, as well as biodiversity).

It is important to note that some of the scenarios do result in changes to the areas of some of the features. These changes have been taken into account as part of the process of considering whether service provision is likely to increase, decrease or stay the same. However, for clarity, Tables 4-4 and 4-5 provide a summary of which features are expected to expand, contract, or experience no change in area.

Table 4-2: Catcott unit: Likely change in service provision under the different scenarios when compared with the 'Current (snapshot) baseline'								
Ecosystem service	**Feature providing ecosystem services**	**Conservation of peat soils**	**Nature tourism**	**Flood storage**	**Habitat creation**	**Maintaining & improving conveyance**	**Biomass production**	**Branding**
Ecosystem goods	Dry grassland of low value for wildlife	---	0	--	-	+	-	+
	Wet grassland of high value for wildlife	?	0	-	0	+	+	++
	Wet heath & purple moor grass habitats	-	0	0	0	+	+	+
	Wet grassland of low value for wildlife	+	0	-	--	+	+	+
	Woodland/hedgerow/line of trees/scrub/bracken	0	0	0	+	+	++	0
Provision of freshwater	Rivers, streams, ditches and rhynes	+	0	0	0	+	0	0
Biodiversity	Rivers, streams, ditches and rhynes	+	++	+	0	-	0	+
	Reedbeds	++	++	+	++	+	+	+
	Swamp and fen	++	++	+	++	0	--	+
	Wet grassland of high value for wildlife	+	++	+	0	0	--	+
	Wet heath & purple moor grass habitats	++	++	+	++	-	--	+
	Woodland/hedgerow/line of trees/scrub/bracken	+	++	?	++	+	++	+
Climate regulation	Rivers, streams, ditches and rhynes	+	0	0	0	-	0	0
	Wet heath & purple moor grass habitats	+	0	0	+	-	+	0
	Swamp and fen	+	+	+	+	0	--	+
	Reedbeds	+	+	+	+	+	+	+

Table 4-2: Catcott unit: Likely change in service provision under the different scenarios when compared with the 'Current (snapshot) baseline'								
Ecosystem service	**Feature providing ecosystem services**	**Conservation of peat soils**	**Nature tourism**	**Flood storage**	**Habitat creation**	**Maintaining & improving conveyance**	**Biomass production**	**Branding**
	Wet grassland of high value for wildlife	0	+	0	0	0	+	0
	Wet grassland of low value for wildlife	++	+	0	+	-	+	0
	Woodland/hedgerow/line of trees/scrub/bracken	0	0	0	+	0	-	0
Water purification	Swamp and fen	+	+	+	+	+	?	++
	Reedbeds	+	+	+	+	+	?	++
Water regulation (small-scale)	Wet grassland of high value for wildlife	++	0	+	0	+	+	0
	Wet heath & purple moor grass habitats	+	0	0	+	+	+	0
	Rivers, streams, ditches and rhynes	+	0	0	0	+	0	0
	Wet grassland of low value for wildlife	++	0	+	?	+	+	0
	Swamp and fen	+	0	+	+	+	+	++
	Reedbeds	+	0	+	+	+	0	++
Erosion regulation	Reedbeds	+	+	+	+	+	+	++
	Woodland/hedgerow/line of trees/scrub/bracken	0	0	+	+	+	+	?
Aesthetics	Dry grassland of low value for wildlife	?	+	?	+	0	+	0
	Rivers, streams, ditches and rhynes	0	0	0	0	-	?	0
	Swamp and fen	0	0	+	+	0	--	0
	Reedbeds	0	0	+	0	0	0	0

Table 4-2: Catcott unit: Likely change in service provision under the different scenarios when compared with the 'Current (snapshot) baseline'								
Ecosystem service	**Feature providing ecosystem services**	**Conservation of peat soils**	**Nature tourism**	**Flood storage**	**Habitat creation**	**Maintaining & improving conveyance**	**Biomass production**	**Branding**
	Wet grassland of high value for wildlife	0	0	0	0	0	-	0
	Wet grassland of low value for wildlife	+	+	0	+	0	-	0
	Wet heath & purple moor grass habitats	0	+	0	0	-	-	+
Educational value	Rivers, streams, ditches and rhynes	0	+	0	0	-	0	+
	Swamp and fen	0	+	+	+	0	?	+
	Reedbeds	0	+	+	+	0	+	+
	Wet grassland of high value for wildlife	0	+	0	+	0	++	+
	Wet heath & purple moor grass habitats	0	+	0	+	0	+	+
Cultural heritage	Dry grassland of low value for wildlife	?	++	0	+	0	-	0
	Rivers, streams, ditches and rhynes	+	++	0	0	-	0	+
	Swamp and fen	+	++	?	+	0	?	+
	Reedbeds	+	++	+	+	0	+	+
	Wet grassland of high value for wildlife	+	++	0	+	0	++	+
	Wet grassland of low value for wildlife	+	++	0	+	0	++	0
	Wet heath & purple moor grass habitats	+	++	0	+	-	+	+

Table 4-2: Catcott unit: Likely change in service provision under the different scenarios when compared with the 'Current (snapshot) baseline'								
Ecosystem service	**Feature providing ecosystem services**	**Conservation of peat soils**	**Nature tourism**	**Flood storage**	**Habitat creation**	**Maintaining & improving conveyance**	**Biomass production**	**Branding**
Recreation and tourism	Rivers, streams, ditches and rhynes	+	0	0	0	-	?	0
	Swamp and fen	0	0	?	+	0	-	0
	Reedbeds	0	0	?	0	0	?	0
	Wet grassland of high value for wildlife	0	0	0	0	0	+	0
	Wet heath & purple moor grass habitats	0	0	0	0	0	+	0
Key: +++ = Large positive change in service provision anticipated, ++ = Medium positive change in service provision anticipated; + = Small positive change in service provision anticipated; --- = Large negative change in service provision anticipated; -- = Medium negative change in service provision anticipated; - = Small positive change in service provision anticipated; 0 = No change in service provision anticipated; ? = Unknown/ uncertain change in service provision anticipated								

Table 4-3: Meare Pool unit: Likely change in service provision under the different scenarios when compared with the 'Current (snapshot) baseline'								
Ecosystem service	**Feature providing ecosystem services**	**Conservation of peat soils**	**Nature tourism**	**Flood storage**	**Habitat creation**	**Maintaining & improving conveyance**	**Biomass production**	**Branding**
Ecosystem goods	Dry grassland of low value for wildlife	--	---	--	---	++	-	++
	Wet grassland of low value for wildlife	++	-	--	---	++	+	++
	Woodland/hedgerow/line of trees/scrub/bracken	0	0	0	++	0	++	0
Provision of freshwater	Rivers, streams, ditches, rhynes	+	+	0	+	?	0	+
Biodiversity	Rivers, streams, ditches, rhynes	+	+	+	+	-	0	+
	Woodland/hedgerow/line of trees/scrub/bracken	+	+	?	++	-	---	+

Table 4-3: Meare Pool unit: Likely change in service provision under the different scenarios when compared with the 'Current (snapshot) baseline'								
Ecosystem service	**Feature providing ecosystem services**	**Conservation of peat soils**	**Nature tourism**	**Flood storage**	**Habitat creation**	**Maintaining & improving conveyance**	**Biomass production**	**Branding**
Climate regulation	Rivers, streams, ditches, rhynes	+	?	0	+	-	0	0
	Wet grassland of low value for wildlife	++	+	+	+	0	+	0
	Woodland/hedgerow/line of trees/scrub/bracken	0	0	0	+	0	--	0
Water regulation (small-scale)	Rivers, streams, ditches, rhynes	+	0	0	+	+	+	+
	Wet grassland of low value for wildlife	++	0	+	?	+	+	0
Erosion regulation	Woodland/hedgerow/line of trees/scrub/bracken	0	0	+	+	+	+	0
Aesthetics	Dry grassland of low value for wildlife	0	++	+	++	-	--	0
	Rivers, streams, ditches, rhynes	+	++	0	+	-	0	+
	Wet grassland of low value for wildlife	+	++	0	++	0	-	0
Educational value	Rivers, streams, ditches, rhynes	+	+	0	+	-	0	+
Cultural heritage	Dry grassland of low value for wildlife	+	++	+	++	-	--	0
	Rivers, streams, ditches, rhynes	+	++	0	++	0	0	+
	Wet grassland of low value for wildlife	+	++	0	++	0	+	0
Recreation and tourism	Rivers, streams, ditches, rhynes	+	++	0	+	-	0	+

Key: +++ = Large positive change in service provision anticipated, ++ = Medium positive change in service provision anticipated; + = Small positive change in service provision anticipated; --- = Large negative change in service provision anticipated; -- = Medium negative change in service provision anticipated; - = Small positive change in service provision anticipated; 0 = No change in service provision anticipated; ? = Unknown/ uncertain change in service provision anticipated

Table 4-4: Catcott unit: Likely change in feature area under the different scenarios when compared with the 'Current (snapshot) baseline'							
Current feature	**Conservation of peat soils**	**Nature tourism**	**Flood storage**	**Habitat creation**	**Maintaining & improving conveyance**	**Biomass production**	**Branding**
Dry grassland of low value for wildlife (current area is around 102 ha)	Decrease (raised water levels so decreased area of dry habitats)	No change	Decrease (patches of feature may be used for flood storage)	Decrease (some change to dry grassland of high value, also woodland)	No change	Decrease (woodland planting occurs)	No change
Reedbeds (current area is around 9 ha)	No change	No change	Increase (areas used for flood storage may become reedbeds)	Increase (habitat is created)	Increase (reeds may be planted to minimise bank erosion, loss of sediment, etc.)	Increase (to enable more reed harvesting)	Minimal change (may be slight increase to enable provide more habitat and reeds to harvest)
Rivers, streams, ditches, rhynes (uncertainty over current area; volume of water likely to be more important)	No change (but water levels could be raised)	No change	No change	No change (but water levels could be raised)	Minimal change (increased dredging and channel clearance)	No change	No change
Swamp and fen (current area is around 41 ha)	No change	No change	Increase (habitat creation in marginal areas)	Increase (habitat creation for biodiversity)	No change	Decrease (focus on production of biomass)	No change
Wet grassland of low value for wildlife (mapping suggests current area is around 132 ha; but some of this may be high value)	Increase (more wetter features)	Decrease (becomes high value)	Decrease (may become reedbed or swamp and fen)	Decrease (may become reedbed, swamp and fen, wet woodland or wet heath)	No change	Decrease (focus on withies and reedbeds)	Minimal change (some may become reedbed)
Wet grassland of high value for wildlife (mapping suggests current area is around 67 ha)	Increase (more wetter features)	Increase (as low value habitat becomes high value)	Decrease (part of feature may be used for flood storage)	Increase (low value habitat becomes high value)	No change	Decrease (land used for withy growing, also reedbeds)	No change

Table 4-4: Catcott unit: Likely change in feature area under the different scenarios when compared with the 'Current (snapshot) baseline'							
Current feature	**Conservation of peat soils**	**Nature tourism**	**Flood storage**	**Habitat creation**	**Maintaining & improving conveyance**	**Biomass production**	**Branding**
Wet heath and purple moor grass (current area is < 0.1 ha)	No change	No change	No change	Increase (habitat is created)	No change	Decrease (move to withy growing)	No change
Woodland, hedgerow, line of trees, scrub, bracken (current area is uncertain; site observations suggest area is greater than mapping indicates)	Minimal change (may be some loss if patches become too wet)	No change	Minimal change (may be some loss if patches become too wet)	Increase (cessation of management of grassland areas)	No change	Increase (planting of woodland and withies)	No change
***Note*:** areas obtained from GIS mapping based on the Integrated Habitat System (IHS) provided for use in this study by Somerset Wildlife Trust							

Table 4-5: Meare Pool unit: Likely change in feature area under the different scenarios when compared with the 'Current (snapshot) baseline'							
Current Feature	**Conservation of peat soils**	**Nature tourism**	**Flood storage**	**Habitat creation**	**Maintaining & improving conveyance**	**Biomass production**	**Branding**
Dry grassland of low value for wildlife (current area is around 53 ha)	Decrease (due to increased water levels)	Decrease (change towards high value habitat)	Decrease (feature may be used for flood storage; patches of reedbed could be created)	Decrease (feature becomes wetter, forming wet grassland)	No change	Decrease (woodland planting)	No change
Rivers, streams, ditches, rhynes (uncertainty over current area; volume of water likely to be more important)	No change (but water levels are likely to be raised)	No change	No change	Increase (area of aquatic habitat may increase to enable recreation of 'Meare Pool')	No change (but more frequent dredging and bank clearance)	No change	No change
Wet grassland of low value for wildlife (mapping suggests current area is around 50 ha; some of this may be high value)	Increase (dry habitats become wetter)	Minimal change (habitat may become more diverse, with higher biodiversity value)	Decrease (may be used for flood storage or converted to reedbed, swamp and fen)	Decrease (becomes reedbed or swamp and fen as part of re-formation of 'Meare Pool')	No change	Decrease (move to withy growing, reedbeds)	No change (but potential for some increase in biodiversity)
Woodland, hedgerow, line of trees, scrub, bracken (current area is uncertain; site observations suggest area is greater than mapping indicates)	Minimal change (may be some loss if patches become too wet)	No change	Minimal change (may be some loss if patches become too wet)	Increase (cessation of grassland management in some areas)	No change	Increase (woodland and withy planting)	No change
***Note*:** areas obtained from GIS mapping based on the Integrated Habitat System (IHS) provided for use in this study by Somerset Wildlife Trust							

4.2.3 Implications of 'Decreased funding baseline'

If the seven scenarios are considered against the 'Decreased funding baseline' rather than the 'Current (snapshot) baseline', the extent of the change in service provision varies by unit:

- For Catcott, ecosystem service provision under the 'Decreased funding baseline' is relatively similar to that under the 'Current (snapshot) baseline'. Thus, the likely change in service provision between the 'Decreased funding baseline' and the seven scenarios in Table 4-1 is not much different to the anticipated change in provision between the 'Current (snapshot) baseline' and the seven scenarios (see Table 4-2).

- For Meare Pool, there are significant differences between the 'Current (snapshot) baseline', and the 'Decreased funding baseline'. Thus, if the 'Decreased funding baseline' is compared with the seven scenarios, changes in ecosystem service provision are likely to be as follows:

  - Scenario 1: 'Conservation of peat soils': there are considerable improvements in regulating and cultural services (e.g. through conservation of buried archaeological assets), and also in biodiversity compared to what could occur under the Decreased funding baseline. However, other provisioning services decrease as grassland becomes less suitable for intensive grazing and cutting due to wetter conditions.

  - Scenario 2: 'Nature tourism': cultural services including recreation and tourism, educational value, cultural heritage and aesthetics improve in comparison to the current scenario. There are also benefits for biodiversity and provision of freshwater, due to a focus on habitat quality. Conversely, provision of ecosystem goods declines as management has a joint focus on biodiversity as well as agricultural production.

  - Scenario 3: 'Flood storage': regulating services are improved, enabling agricultural productivity to be intensified as envisaged under the Decreased funding baseline. There is no real change in provision of cultural services.

  - Scenario 4: 'Habitat creation': this scenario effectively reverses the decline in biodiversity and cultural services seen under the Decreased funding baseline. Recreation of Meare Pool brings benefits for biodiversity and cultural services (but negative changes for ecosystem goods due to loss of grassland for grazing).

  - Scenario 5: 'Maintaining and improving conveyance of water': this scenario further enhances the provision of ecosystem goods which already occurs under the Decreased funding baseline. Water regulation is also increased, but at the expense of cultural services, and biodiversity which suffer further declines.

  - Scenario 6: 'Biomass production': this scenario builds on the increased provision of ecosystem goods which is already occurring under the Decreased funding baseline. Aesthetics and cultural heritage decline as large scale biomass and withy growing occurs. Whilst there are some benefits for climate regulation (carbon is taken up by rapidly growing withies), there are significant implications for water levels for wetland habitats. Peat soils may suffer further mineralisation, and biodiversity decreases.

  - Scenario 7: 'Branding': some of the drive towards ecosystem goods which occurs under the Decreased funding baseline is tempered by a need to maintain good habitat quality

and biodiversity so that the area can be marketed as a wildlife tourism destination. There are, however, still pressures on the peat soils of the area, with high demand for water for agricultural production competing with the requirements of habitats.

Thus, in some cases, the scenarios act to moderate the extremes of the 'Decreased funding baseline', whilst in others (e.g. 'Branding') they could create additional conflict points as a need to increase agricultural profitability competes with the requirement to look after and maintain habitats for tourism. In particular, the recreation of 'Meare Pool' (as a permanent area of reedbed/swamp and fen, surrounded by wet grassland dependent on the season) could cause issues due to the loss of dry grassland.

4.2.4 Likely impacts of the scenarios on key features not present within the two units

Overview

The GIS data, along with internet mapping and photography suggest that two key features, namely cereal crops, and peat works/bare ground, are absent from the Catcott and Meare Pool units. Whilst cereal crops are not common in the Levels and Moors, they do cause a disproportionate amount of damage to peat soils. Peat extraction has previously occurred within the Catcott unit (there is a peat void), but there are not currently any areas of peat works or bare ground (note that the GIS mapping does indicate some bare ground in the west of the Catcott unit, but on closer inspection this has been re-classed as 'other'). However, it is an issue for the wider Brue Valley, and the Levels and Moors as a whole.

To ensure these two features are given adequate consideration, the following text discusses the likely impact of the seven scenarios on cereal crops and peat works/bare ground.

Cereal crops

Table 4-6 provides an indication of the likely impact of the scenarios on a hypothetical area of cereal crops which is currently providing ecosystem goods at a moderate/good level. The scenario providing the best outcome for cereal crops is likely to be 'Maintaining and improving conveyance of water'. In contrast, under 'Conservation of peat soils', cereal crops would no longer be grown.

Peat works and bare ground

Table 4-7 provides an indication of the likely impact of the scenarios on a hypothetical area of peat works/bare ground which is currently providing ecosystem goods (peat) at a moderate/good level. Three scenarios ('Conservation of peat soils', 'Nature tourism' and 'Habitat creation') result in the complete cessation of peat extraction. Whilst this results in a negative change in the provision of ecosystem goods in the Brue Valley area, there are benefits for other ecosystem service categories (e.g. climate regulation, biodiversity). However, there could be negative impacts, associated with the need to import more peat from other areas, should peat production companies still operate in the region as a whole. In contrast, the scenario 'Maintaining and improving conveyance of water' could lead to an increase in peat extraction, as drier conditions open up more areas.

Table 4-6: Likely impact of the scenarios on the cereal crops: anticipated change in provision of ecosystem goods						
Conservation of peat soils	**Nature tourism**	**Flood storage**	**Habitat creation**	**Maintaining & improving conveyance of water**	**Biomass production**	**Branding**
Due to damaging nature of feature for soil, cereal crops are no longer grown. Ground is re-wetted to help restore the condition of the peat soils	Feature is managed with biodiversity in mind; this may result in a slight decrease in provision of ecosystem goods	Feature is managed to maximise attenuation of water and minimise runoff, improving soil condition; land is not used for flood storage due to high value of crops	No change in land management expected (and so service provision); habitat creation is targeted towards wet features and marginal area	Water management is optimised for conveyance, so management of drier feature like cereal crops can be optimised to produce crops	Cereal crops may be replaced with biomass production, but economics are unlikely to result in such a change in the short term at least	Branding encourages production of premium goods (e.g. cereal products such as muesli), but area unlikely to increase because wildlife habitats are also valued
---	-	0	0	++	0	+
Key: + = Small positive change in service provision anticipated; ++ = Medium positive change in service provision anticipated; --- = Large negative change in service provision anticipated; - = Small negative change in service provision; 0 = No change in service provision anticipated						

Table 4-7: Likely impact of the scenarios on the peat works/bare ground: anticipated change in provision of ecosystem goods						
Conservation of peat soils	**Nature tourism**	**Flood storage**	**Habitat creation**	**Maintaining & improving conveyance of water**	**Biomass production**	**Branding**
Areas of bare ground and former peat works are re-wetted to avoid mineralisation and loss of soil. No further peat extraction occurs	Areas of bare ground and former peat works are managed for biodiversity. No further peat extraction occurs	Feature could be managed to enable creation of wetland (e.g. reedbed), but other areas may be used first (turning peat works/bare ground into a wetland would take away the opportunity of further peat extraction)	Water levels at feature are managed to encourage the formation of wet heath and purple moor grass habitat; no further peat extraction occurs	Water management is optimised for conveyance, so peat works/bare ground are kept dry; additional areas may become available for extraction	Areas of bare ground are used where possible to grow biomass crops. Any peat works are likely to be wetter so could be used for withy growing or short rotation coppice	Production of peat could be branded and promoted, but this would have negative impacts for other services (e.g. carbon regulation) and potentially conflict with the promotion of the area as somewhere to see wildlife rich habitats
---	---	?	---	++	-	?
Key: + = Small positive change in service provision anticipated; ++ = Medium positive change in service provision anticipated; --- = Large negative change in service provision anticipated; - = Small negative change in service provision; 0 = No change in service provision anticipated;						

4.3 Identification of Stakeholder Beneficiaries

The different scenarios are likely to have different impacts on the various stakeholder groups. Table 4-8 identifies the likely beneficiaries of the services provided. It is important to note that whilst some stakeholders are located within the Brue Valley, there are others who are located elsewhere but have an interest in the land management of the area e.g. tourists, wildlife watchers (Figure 4-2).

Figure 4-2: Bird hide at Catcott, March 2015 (Credit: Geckoella)

Looking broadly across the three ecosystem service types:

- Beneficiaries of provisioning services are likely to gain the most from the following three scenarios: 'Maintaining & improving conveyance of water'; 'Biomass production'; and 'Branding'. These scenarios generally favour the production of ecosystem goods, so could improve service provision for farmers and land managers;
- Those receiving regulating services, for example, abstractors and the global community (through carbon regulation) may benefit most from scenarios including 'Conservation of peat soil'; and 'Flood storage'. The extent of the benefit may depend on the location of the beneficiary; and
- Considering cultural services, the 'Nature tourism' scenario provides the most benefits in both the Catcott and Meare Pool units (with the 'Habitat creation' scenario also providing significant benefits in Meare Pool). This is primarily because the aim of the 'Nature tourism' scenario is to promote wildlife watching and associated tourism within the Brue Valley, thus, there are considerable benefits for services such as recreation and tourism, and education.

Taking the above into account, it is important to remember that the type of beneficiary, and the extent of the benefit received will depend on the where the scenario is implemented and what actions are used, as well as the current land use and condition.

Table 4-8: Likely beneficiaries of improvements to each ecosystem service											
Beneficiaries	**Ecosystem service**										
	Ecosystem goods	**Freshwater provision**	**Biodiversity**	**Climate regulation**	**Water purification**	**Water regulation (small-scale)**	**Erosion regulation**	**Aesthetics**	**Educational value**	**Cultural heritage**	**Recreation and tourism**
Farmer (producer)	Grazing, crops	Access for abstraction				Water availability; water manage-ment to enable production	Protection of soils				
Producer of peat	Peat					Water manage-ment to enable production					
Producer of timber products	Woodland										
Landowners	Economic output from land						Protection of soils				
Water companies		Access for abstraction			Reduced treatment costs	Water availability					
Global community			Enhanced biodiver-sity	Reduced carbon loss							

Table 4-8: Likely beneficiaries of improvements to each ecosystem service											
Beneficiaries	**Ecosystem service**										
	Ecosystem goods	**Freshwater provision**	**Biodiversity**	**Climate regulation**	**Water purification**	**Water regulation (small-scale)**	**Erosion regulation**	**Aesthetics**	**Educational value**	**Cultural heritage**	**Recreation and tourism**
Local community			Improved quality of life					Improved quality of life		Retained and enhanced	Improved opportun-ities
Traditional industries										New opportun-ities	
School/college /university groups									Learning opportun-ities		
Tourists			Reasons to visit					Attractive environ-ment		Reasons to visit	Reasons to visit
Wildfowlers			Reasons to visit								Reasons to visit
Wildlife watchers			Reasons to visit								Reasons to visit

5 Determination of Optimum Ecosystem Service Provision

5.1 Approach to Identifying Optimum Ecosystem Service Provision

When determining which scenario(s) to take forwards to achieve optimum ecosystem service provision, there are several points to consider:

- Optimising to achieve positive change in the greatest number of ecosystem services could provide significant benefits. However, care needs to be taken to ensure a balance of ecosystem services is still provided. For example, whilst one scenario could improve provision of a large number of ecosystem services, it could also lead to a significant decrease in one or two services. Consideration needs to be given to the whole range of services provided. A scenario which improves a smaller number of services may be preferred, if this avoids a decrease in a particular service which is vital to the area (for Catcott, such a service could be biodiversity).

- Different stakeholders are likely to benefit under the different scenarios. This could affect the relevance of some types of funding source, for example, PES. Defra's best practice guide for payments for ecosystem services suggests a five phase approach for designing a PES scheme (Defra, 2013). The final stage involves considering the opportunities for a multiple-benefit PES scheme, where this could involve bundling (several ecosystem services are sold as a package) or layering (each service provided by an area is sold separately). Consideration also needs to be given to so-called 'piggy backing', where one service is sold as an umbrella service, and others are provided free of charge (Defra, 2013). In practice, when optimising to increase the provision of and so sell one particular ecosystem service, there could also be an increase in other services, which may benefit the same (or different) beneficiaries.

- Care needs to be taken to ensure that there are no adverse trade-offs in ecosystem service provision, and any regulatory requirements (for example, in relation to existing/ongoing agri-environment funding) are met. Both of these points are highlighted as aspects to monitor in Defra's PES guidance (Defra, 2013).

- Optimising in terms of what is achievable may need to be considered:
  - Aspects of some scenarios may be achieved through land abandonment or a reduction in farming intensity rather than targeted funding. For example, removal of management from some grassland in wet areas could lead to the 'habitat creation' of wet woodland. Thus, it may be possible for provision of some services to change without funding;
  - Funding sources may include private funds/private enterprise irrespective of external funding sources. Such funding could potentially be used to target (and improve) specific ecosystem services which do not necessarily fare well under the scenario;
  - There may be conflicting funding streams. For example, existing farming subsidies for current farming practices may represent a negative financial incentive to change management to proposed scenarios. Consideration needs to be given as to whether the optimum scenario could actually be achieved given current land use and objectives of land management. It may be better to optimise on the basis of what is more compatible with existing land use at first, and then build on the small changes over time;

- Many of the scenarios will require wholesale changes across an entire unit. Complex land ownership patterns increase the costs of achieving such change (for example, there could be expenses associated with the cost of complex negotiations/contractual discussions). The need to get everyone on board may prevent change altogether. In this case, an optimum scenario might be the one which could actually be implemented, rather than the one which provides the most positive change in ecosystem services. Alternatively, land amalgamation may be a relatively cheap way to simplify land ownership so that any changes can be achieved (land ownership patterns in the Catcott unit are particularly complex. This may, however, prove complex given that land is often acquired as an investment, so landowners may be unwilling to sell).

As a first step towards the creation of innovative revenue frameworks which allow land managers to achieve economic sustainability whilst maintaining wet habitats, this study optimises on the basis of positive changes in service provision. Whilst this is relatively simplistic, Table 5-1 illustrates that there is a potential funding stream for each scenario. Thus, any of the seven scenarios could potentially be funded. More detailed research is required to determine exactly who might benefit and whether the optimum scenario(s) could be implemented in reality.

5.2 Combining Scenarios to Enable Optimum Service Provision

This section provides an overview of the results of combining the scenarios to optimise service provision.

5.2.1 Catcott

Table 5-2 indicates which scenarios provide the greatest positive change in ecosystem service provision when compared with the 'Current (snapshot) baseline' in Catcott. The services are grouped by category (provision, regulating, cultural) to avoid focusing in on any particular service. The table lists the most applicable funds for each of the scenarios and considers how relevant the funding is given the estimated area of the various features available within the unit.

Within Catcott, the scenario which provides positive change in the greatest number of features/service combinations is Scenario 4 ('Habitat creation'):

- 58% of feature/service combinations result in a positive change in service provision (8% of are medium positive changes, 50% are small positive changes); and
- A small number of negative changes is predicted (4% of feature/service combinations).

Scenario 1 ('Conservation of peat soils') also has a high positive change in service provision:

- 57% positive change (45% are small positive changes and 11% are medium positive changes).
- A small number of negative changes is predicted (4% of feature/service combinations).

Scenario 5 ('Maintaining and improving conveyance of water') has the least proportion of positive changes:

- 36% of feature/service combinations result in positive changes in service provision.
- 21% of feature/service combinations result in negative change in service provision.

5.2.2 Meare Pool

Table 5-3 indicates which scenarios provide the greatest positive change in ecosystem service provision when compared with the 'Current (snapshot) baseline' in Meare Pool. The services are grouped by category (provision, regulating, cultural) to avoid focusing in on any particular service. The table lists the most applicable funds for each of the scenarios and considers how relevant the funding is given the estimated area of the various features available within the unit.

Within Meare Pool, the scenario which provides positive change in the greatest number of features/service combinations is Scenario 4 ('Habitat creation'):

- 85% of feature/service combinations result in a positive change in service provision (50% are small positive changes, 35% are medium positive changes).
- two feature/service combinations are thought to result in negative changes in service provision, with these changes expected to be large negative changes (due to loss of grassland for grazing/cutting).
- for the remaining 5% (one service/feature combination), the direction of change is not clear.

As for Catcott, Scenario 5 ('Maintaining and improving conveyance of water') has the least positive changes:

- 25% of feature/service combinations with positive changes
- 40% of feature/service combinations resulting in negative changes to service provision.

Table 5-1: Funds potentially available for each scenario							
Funds	**1) Conservation of peat soils**	**2) Nature tourism**	**3) Flood storage**	**4) Habitat creation**	**5) Maintaining and improving conveyance of water**	**6) Biomass production**	**7) Branding**
Awards for All Lottery Fund	Possible	Applicable	Not applicable	Applicable	Not applicable	Possible	Not applicable
Corporate Social Responsibility (CSR)	Possible	Not applicable	Applicable	Possible	Possible	Not applicable	Applicable
Countryside Stewardship	Applicable	Applicable	Not applicable	Applicable	Possible	Applicable	Not applicable
Defra Partnership Funding (Grant in Aid/ GiA)	Possible	Not applicable	Applicable	Possible	Applicable	Not applicable	Not applicable
European Agricultural Fund for Rural Development (EAFRD)	Not applicable	Applicable	Possible	Not applicable	Not applicable	Applicable	Possible
Entry fees	Not applicable	Applicable	Not applicable	Possible	Not applicable	Not applicable	Not applicable
Esmeé Fairbairn Foundation	Not applicable	Possible	Not applicable	Possible	Not applicable	Possible	Not applicable
Farming and Forestry Productivity Scheme (now Countryside Productivity Scheme)	Not applicable	Not applicable	Possible	Not applicable	Possible	Applicable	Possible
GHG emission offsets	Possible	Not applicable	Possible	Possible	Not applicable	Possible	Not applicable
Heritage Lottery Funds	Not applicable	Applicable	Not applicable	Not applicable	Not applicable	Applicable	Applicable
Higher Level Stewardship	Applicable	Not applicable	Not applicable	Applicable	Applicable	Applicable	Not applicable
Interreg Europe	Applicable	Applicable	Applicable	Applicable	Not applicable	Applicable	Not applicable
Landfill Communities Fund	Applicable	Applicable	Not applicable	Applicable	Not applicable	Applicable	Not applicable
LEADER Programme	Possible	Possible	Possible	Possible	Possible	Applicable	Applicable

Table 5-1: Funds potentially available for each scenario							
Funds	**1) Conservation of peat soils**	**2) Nature tourism**	**3) Flood storage**	**4) Habitat creation**	**5) Maintaining and improving conveyance of water**	**6) Biomass production**	**7) Branding**
LIFE+ funds	Applicable	Not applicable	Applicable	Applicable	Possible	Applicable	Not applicable
Local Growth Fund	Not applicable	Applicable	Not applicable	Not applicable	Not applicable	Applicable	Applicable
Market value	Not applicable	Not applicable	Not applicable	Applicable	Applicable	Applicable	Possible
Payments for Ecosystem Services	Possible	Applicable	Possible	Possible	Possible	Not applicable	Possible
Peatland Code	Possible	Not applicable	Possible	Possible	Not applicable	Not applicable	Not applicable
Restoration of ecological network determined using Somerset's habitat evaluation protocol	Applicable	Not applicable	Possible	Applicable	Not applicable	Not applicable	Not applicable
Somerset District Council Community Grants	Not applicable	Possible	Possible	Not applicable	Applicable	Applicable	Possible
Somerset FAP	Possible	Not applicable	Applicable	Possible	Possible	Applicable	Not applicable
Somerset Rivers Authority	Possible	Not applicable	Applicable	Possible	Applicable	Not applicable	Not applicable
Tourism charge ("tax")	Not applicable	Applicable	Not applicable	Applicable	Not applicable	Not applicable	Applicable
Wessex Water Partners Programme	Applicable	Not applicable	Applicable	Applicable	Applicable	Not applicable	Not applicable
Notes: Justifications for allocation of the funds to each scenario have been recorded in the spreadsheet and are available on request							

Table 5-2: Scenarios and funds most likely to result in improvements in service provision in Catcott			
Ecosystem service for improvement	**Scenario most likely to result in positive change in service provision**	**Most applicable funding sources**	**Applicability based on area of feature**
Provisioning services (ecosystem goods, provision of freshwater)	'**Maintaining and improving conveyance of water**' Small positive change in 67% of service provision by the 12 features/ provisioning services combinations, no change in 17% and small negative change in 17%	Defra Partnership Funding (Grant in Aid or GiA) Higher Level Stewardship Market value Somerset District Council Community Grants Somerset Rivers Authority Wessex Water Partners Programme	There are around 9 ha of reedbeds and up to 41 ha of swamp and fen, with numerous ditches and rhynes crossing the site. This suggests that there is a large potential improvement under this scenario if the areas of water conveyance features are increased. However the designations on the site might restrict significant changes to feature composition on the site
	'**Conservation of peat soils'** Positive change in 67% of service provision by the 12 features/provisioning service combinations, with no change in 1 combination and negative change in 2 (17%)	Countryside Stewardship Interreg Europe Higher Level Stewardship Landfill Communities Fund LIFE+ funds Restoration of ecological networks using Somerset's habitat evaluation protocol Wessex Water Partners Programme Countryside Stewardship	There is a considerable area of wet grassland (more than 130 ha), with a significant area of swamp and fen also present. This suggests that the potential for conserving peat soils is significant, should water levels be kept high enough. There are additionally 102 ha of dry grassland which could be made wetter, thus increasing the potential benefits
	'**Branding'** Positive change in 83% of service provision (small change in 75%, medium change in 8%) by the 12 features/provisioning services combinations, no change in 17%	Corporate Social Responsibility (CSR) Heritage Lottery fund LEADER Programme Local Growth Fund Tourism charge ("tax")	Branding is dependent largely on the production of goods. Within Catcott there is a large area which could be used for grazing (nearly 50 ha of dry grassland of low value for wildlife, nearly 70 ha of wet grassland of high value for wildlife and a further 82 ha of wet grassland of low or high value for wildlife). This suggests that production of premium products such as beef has a high potential for raising money. However due to the designations on the site there may be restrictions on any increases in stocking densities or areas of grazing land

Table 5-2: Scenarios and funds most likely to result in improvements in service provision in Catcott			
Ecosystem service for improvement	**Scenario most likely to result in positive change in service provision**	**Most applicable funding sources**	**Applicability based on area of feature**
Regulating services (climate regulation, water purification, water regulation, erosion regulation)	' **Conservation of peat soils'** Positive change in 82% of service provision (small change in 65%, medium change in 18%) by the 17 features/regulating services combinations, no change in 18%	Countryside Stewardship Interreg Europe Higher Level Stewardship Landfill Communities Fund LIFE+ funds Restoration of ecological networks using Somerset's habitat evaluation protocol Wessex Water Partners Programme	At present, there are no areas of peat extraction within Catcott, however, the unit as a whole has peat soils. The area of dry grassland is the only feature within Catcott which might decrease through rewetting. This area covers nearly 50 ha, however the potential to rewet this area may be restricted due to designations on the land. Already wet areas include reedbeds, swamp and fen, wet grassland and wet heath and purple moor grass habitat which cover around 200 ha (nearly 80% of the whole hydrological unit area). These would be maintained and potentially improved.
	'Habitat creation' Small positive change in 71% of service provision by the 17 features/ regulating services combinations, no change in 24%, unknown change in 6%	Awards for All Lottery fund Countryside Stewardship Interreg Europe Higher Level Stewardship Landfill Communities Fund LIFE+ funds Market value Restoration of ecological networks using Somerset's habitat evaluation protocol Tourism charge ("tax") Wessex Water Partners Programme	This scenario involves improving habitat already in place to provide higher quality habitat, therefore restrictions associated with designation should not impact the potential to implement actions. Most significant changes will be to areas of low value for wildlife including nearly 50 ha of dry grassland for low value for wildlife. This area may be decreased through rewetting or improved through management for wildlife habitat.

Table 5-2: Scenarios and funds most likely to result in improvements in service provision in Catcott			
Ecosystem service for improvement	**Scenario most likely to result in positive change in service provision**	**Most applicable funding sources**	**Applicability based on area of feature**
Cultural services (aesthetics, educational value, cultural heritage, recreation and tourism)	' **Nature tourism'** Positive change in 63% of service provision (small change in 33%, medium change in 29%) by the 24 features/services combinations, no change in 38%	Awards for All Lottery fund Countryside Stewardship European Agricultural Fund for Rural Development (EAFRD) Entry fees Heritage Lottery Funds Interreg Europe Landfill Communities Fund Local Growth Fund Payments for Ecosystem Services Tourism charge ("tax")	This scenario involves management to improve biodiversity. Most significant changes will be to areas of low value for wildlife including nearly 50 ha of dry grassland for low value for wildlife, although the area will not necessarily change
	'Habitat creation' Small positive change in 58% of service provision by the 24 feature/cultural service combinations, no change in 42%	Awards for All Lottery fund Countryside Stewardship Interreg Europe Higher Level Stewardship Landfill Communities Fund LIFE+ funds Market value Restoration of ecological networks using Somerset's habitat evaluation protocol Tourism charge ("tax") Wessex Water Partners Programme	This scenario involves improving habitat already in place to provide higher quality habitat, therefore restrictions associated with designation should not impact the potential to implement actions. Most significant changes will be to areas of low value for wildlife including nearly 50 ha of dry grassland for low value for wildlife. This area may be decreased through rewetting or improved through management for wildlife habitat
Note: % may not add up to 100% due to rounding			

Table 5-3: Scenarios and funds most likely to result in improvements in service provision in Meare Pool			
Ecosystem service for improvement	**Scenario most likely to result in positive change in service provision**	**Most applicable funding sources**	**Applicability based on area of feature**
Provisioning services (ecosystem goods, provision of freshwater)	**'Habitat creation'** Positive change in 67% of service provision (33% small change, 33% medium change) by the 6 feature/provisioning service combinations. Large negative change in 33% of feature/ provisioning service combinations	Awards for All Lottery fund Countryside Stewardship Interreg Europe Higher Level Stewardship Landfill Communities Fund LIFE+ funds Market value Restoration of ecological networks using Somerset's habitat evaluation protocol Tourism charge ("tax") Wessex Water Partners Programme	The extensive area of dry grassland (around 53ha) and wet grassland (around 50ha) suggests that there is great potential to recreate 'Meare Pool'. Reedbed and swamp and fen could be formed on areas which are currently wet grassland, with drier grassland patches becoming seasonally wet (areas of the Meare Pool unit are already flooded in winter when Division Rhyne overtops). Creation of Meare Pool could lead to significant negative impacts for grazing and also the land manager's ability to take a hay or silage crop. This could limit the potential for market value to be used as a funding source
	'Branding' Positive change in 83% of service provision (50% small change, 33% medium change) by the 6 feature/provisioning service combinations, no change in 17%	Corporate Social Responsibility (CSR) Heritage Lottery fund LEADER Programme Local Growth Fund Tourism charge ("tax")	Branding is dependent largely on the production of goods. Within Meare Pool there is a large area which could be used for grazing (over 50ha of dry grassland of low value for wildlife, and a further 50 ha of wet grassland of low or high value for wildlife). This suggests that production of premium products such as beef have a high potential for raising money in this area

Table 5-3: Scenarios and funds most likely to result in improvements in service provision in Meare Pool			
Ecosystem service for improvement	**Scenario most likely to result in positive change in service provision**	**Most applicable funding sources**	**Applicability based on area of feature**
Regulating services (climate regulation, water purification, water regulation, erosion regulation)	**'Conservation of peat soils'** Positive change in 67% of service provision (33% small change, 33% in medium change) by the 6 feature/regulating service combinations, no change in 33%	Countryside Stewardship Interreg Europe Higher Level Stewardship Landfill Communities Fund LIFE+ funds Restoration of ecological networks using Somerset's habitat evaluation protocol Wessex Water Partners Programme	There is no peat extraction within Meare Pool. The area is dominated by dry grassland (53 ha) and wet grassland of low or high value for wildlife (50 ha). The area of dry grassland is the only feature which might decrease through rewetting as part of this scenario. Already wet areas, mainly the wet grassland, would be maintained and potentially improved
	'Habitat creation' Positive change in 83% of service provision (all small positive changes) by the 6 feature/provisioning service combinations. Uncertain direction of change for one service/feature combination	Awards for All Lottery fund Countryside Stewardship Interreg Europe Higher Level Stewardship Landfill Communities Fund LIFE+ funds Market value Restoration of ecological networks using Somerset's habitat evaluation protocol Tourism charge ("tax") Wessex Water Partners Programme	The area of grassland (around 53ha of dry grassland and 50ha of wet grassland) means that there is the opportunity for significant habitat creation. Increasing water levels to enable Meare Pool to re-form could provide considerable benefits for water purification and regulation. The potential for carbon benefits, as well as the proximity to the settlement of Meare could attract funding from a variety of sources, for instance, Interreg Europe, Landfill Communities Fund and restoration of ecological networks

Table 5-3: Scenarios and funds most likely to result in improvements in service provision in Meare Pool			
Ecosystem service for improvement	**Scenario most likely to result in positive change in service provision**	**Most applicable funding sources**	**Applicability based on area of feature**
Cultural services (aesthetics, educational value, cultural heritage, recreation and tourism)	**'Nature tourism'** Positive change in 100% of service provision (13% small change, 88% medium change) by the 8 feature/cultural service combinations	Awards for All Lottery fund Countryside Stewardship European Agricultural Fund for Rural Development (EAFRD) Entry fees Heritage Lottery Funds Interreg Europe Landfill Communities Fund Local Growth Fund Payments for Ecosystem Services Tourism charge ("tax")	This scenario involves management to improve biodiversity. Most significant changes will be to areas of low value for wildlife including over 50 ha of dry grassland for low value for wildlife. This area will be managed under this scenario with the aim of increasing opportunities for biodiversity in these areas
	'Habitat creation' Positive change in 100% of service provision (63% are medium positive changes, the remainder are small positive changes) by the 6 feature/provisioning service combinations	Awards for All Lottery fund Countryside Stewardship Interreg Europe Higher Level Stewardship Landfill Communities Fund LIFE+ funds Market value Restoration of ecological networks using Somerset's habitat evaluation protocol Tourism charge ("tax") Wessex Water Partners Programme	Recreating Meare Pool is feasible based on the area of wet grassland (50ha) and dry grassland (53ha), with areas which are currently wetter forming reedbed and swamp and fen. The potential for significant recreation and tourism benefits, as well as the return to a wetter landscape (with cultural heritage benefits) means that funding sources such as a tourism change are likely to be highly applicable. Specific funds including the Wessex Water Partners Programme may also be useful where BAP objectives are met
Note: % may not add up to 100% due to rounding			

5.3 Comparison between Catcott and Meare Pool

The most appropriate scenario for improving Catcott and Meare Pool depends upon the specific goals for improvement. The table below provides an indication of the similarities and differences between Catcott and Meare Pool in terms of the scenarios providing the greatest positive change in service provision.

Table 5-4: Identification of the scenarios which are most suitable for each hydrological unit

Target services for improvement	Scenarios providing most positive changes in Catcott only	Scenarios providing most positive change in both	Scenarios providing most positive change in Meare Pool
Provisioning services	'Branding' 'Maintaining and improving conveyance of water' 'Conservation of peat soils'	'Branding'	'Branding' 'Habitat creation'
Regulating services	'Conservation of peat soils' 'Habitat creation'	'Habitat creation'	'Habitat creation' 'Conservation of peat soils'
Cultural services	'Nature tourism' 'Habitat creation'	'Nature tourism'	'Nature tourism' 'Habitat creation'
All services	'Habitat creation'	'Habitat creation'	'Habitat creation'

Of the scenarios identified as having the greatest potential for positive changes, 'Habitat creation' appears most frequently and is most likely to provide positive changes. However, it should be noted that for particular service/feature combinations, this scenario could be very detrimental (e.g. provision of ecosystem goods by dry grassland and by wet grassland).

5.4 Conflicts

The main conflicts are likely to occur between those scenarios promoting ecosystem goods and those working to improve biodiversity. These could be felt where habitat areas conflict with potential areas for agricultural production, such as grasslands.

The majority of the funding sources do not have specific restrictions limiting their use in combination with other funding sources; however, there is a likelihood that the features targeted for improvement by some funds may conflict with the features targeted by other funds. This could be the case with funds which focus on provision of marketable goods, for market value, and funds which aim to improve the biodiversity of areas, such as restoration of ecological networks using Somerset's habitat evaluation protocol. Potential conflicting objectives and examples of funds to which these are applicable are presented in Table 5-5. In many cases, these conflicts do not prohibit application of both funds, but the objectives of the different funding sources would have to be considered to ensure collaborative working is maximised and does not operate against the overall targets or scenario aims.

Table 5-5 Potential conflicts between funding source objectives		
Example objective	**Potential conflict with…**	**Conflict**
Encourage production of marketable goods (e.g. market value)	Increase biodiversity (e.g. Wessex Water Partners)	Both objectives require land on which to undertake their objectives
Contribute to flood and erosion risk management (e.g. Defra Partnership Funding GiA)	Increase biodiversity (e.g. restoration of ecological networks determined using Somerset's habitat evaluation protocol)	Management methods of river banks and wet areas may conflict
Encourage traditional rural industries (e.g. market value of reeds)	Benefit the local area and economy (e.g. Local Growth Fund)	Traditional industries may not be as economically advantageous as modern alternatives and could therefore reduce the appeal of these industries

5.5 Key Uncertainties when Interpreting the Data and Findings

There are several points to note when interpreting the data and findings for this study:

- The GIS mapping of the two units indicates that there are several patches of habitat which have been classed as 'other'. These may be roads, tracks and odd scraps of land which are not given another classification. The category of 'other' has not been included within the assessment since it is not thought to provide any ecosystem services, and also is not likely to be relevant to any funding sources. Furthermore, not all roads and tracks have been classified as 'other'; there are gaps in the data. Thus, the total area allocated to 'other' does not accurately reflect the actual area on the ground. Excluding the category therefore avoids presenting a misleading picture.

- There are several GIS mapping layers which are relevant to the feature 'rivers, streams, ditches and rhynes'. The use of these different layers leads to slightly different results in terms of the locations and area of the feature when producing a map of the unit. This point should be borne in mind when considering the baseline descriptions and maps in comparison to the appearance of the unit on the ground. However, the inconsistences are not seen as an issue for the assessment, since the approach has taken into account the services arising from the features (i.e. irrigation, water for stock), rather than the actual area of each feature (focusing on area alone could under-represent the importance of water to the units).

- Internet mapping and photography suggest that the area covered by trees is under-estimated by the GIS mapping, especially around the rhynes, ditches and tracks on Catcott. Trees are captured within the feature 'woodland/hedgerow/line of trees/scrub/bracken, which is assessed for both Meare Pool and Catcott.

- On the ground, the distinction between dry grassland of low value for wildlife, and wet grassland of low or high value for wildlife, was not necessary clear (albeit during a January field visit). Thus, the importance of these different features within the two units may differ slightly to what is presented in this document (based on the GIS mapping).

- For the purposes of this study, the two units investigated (Catcott and Meare Pool) are assumed to be hydrologically distinct, meaning that water levels within them can be controlled relatively independently of outside influences. In reality, there are likely to be external factors which could affect water regulation within the units, and hence also their ability to provide other ecosystem services. As mentioned earlier, anecdotal evidence suggests that water levels at Shapwick Heath, which is adjacent to Catcott, were considerably higher than normal during the winter 2013/14 floods. It is conceivable that the volume of water present at Shapwick would have had some influence on Catcott. Thus, when taking forward the conclusions of the study, it should be acknowledged that there is some uncertainty about the extent to which outside factors could influence water levels and so service provision within the units.

- There are constraints in relation to the viability of the scenarios. Without in depth investigation of particular scenarios and specific funding sources, it is not clear whether the available funds would be sufficient and long-lasting enough to achieve the expected benefits. Furthermore, the viability of the various scenarios would also need to be assessed in detail, for example, how much could 'Nature tourism' reasonably be expected to deliver? Could 'Habitat creation' actually enable improvement in provision across the majority of ecosystem services?

6 Taking Funding Opportunities Forwards

6.1 Implications of Potential Future Revenue Frameworks for the Selected Units

Many of the funding sources identified require development of specific projects for which the funds can be allocated. These projects will need to fit with the scope and objectives of the funding source but are relatively variable in terms of the implications for the management of the area. The potential impacts for the two units will therefore be dependent on the scenario pursued and the overall aims of the individual land and water management actions implemented. From the assessments undertaken in this study, 'Habitat creation' appears to be the scenario which provides the most positive changes in service provision for both Catcott and Meare Pool. This scenario could potentially be applied more widely across the BVLL.

6.2 Action Plans and Engagement Plan to Enable Rollout of the Findings

6.2.1 Action plans

To be able to take the scenarios forwards, it is necessary to identify the actions which could be implemented as part of the process of obtaining funding. This section presents action plans and an engagement plan to provide the first steps towards the following outputs:

- Identification and planning of practical steps towards new funding instruments; and
- Implementation of practical steps towards new funding instruments.

Catcott

For Catcott, the scenario likely to provide the greatest number of positive changes over the feature/service combinations assessed was 'Habitat creation'. Table 6-1 below presents the funding sources which are relevant to this scenario, along with the actions which are likely to be required to obtain the funding and fulfil the scenario.

Table 6-1: Potential action plan for Catcott for 'Habitat creation' based on funding sources identified

Funding source	Potential actions to obtain funding
Awards for All Lottery fund	Develop projects that provide benefits including landscape, aesthetics, educational experience, cultural heritage and recreation/tourism opportunities (incorporates actions for species recovery and habitat creation). Projects could build on existing recreation and tourism assets
Countryside Stewardship	Support actions of rural businesses so that they improve regulating and cultural services
Interreg Europe	Encourage collaboration with European countries on projects which fit with research and innovation or environment and resource efficiency
Higher Level Stewardship	When existing agreements are reviewed, develop projects that support and enhance regulating services (note whilst the fund can encourage nature tourism, this is not a specific objective)

Table 6-1: Potential action plan for Catcott for 'Habitat creation' based on funding sources identified	
Funding source	**Potential actions to obtain funding**
Landfill Communities Fund	Develop community projects (including land acquisition) which improve landscape aesthetics, educational experience, cultural heritage and enable general benefits for recreation and tourism (e.g. at existing nature reserves)
LIFE+ funds	Develop projects that contribute to environmental and climate policy, potentially benefiting projects that enable regulating services and cultural services
Market value	Encourage production of saleable goods
Restoration of ecological networks using Somerset's habitat evaluation protocol	Where development occurs in other parts of Somerset, use funds generated to improve habitats which form part of the ecological network
Tourism charge ("tax")	Collect money from visitors (e.g. to existing nature reserves) to contribute to management of the area's habitats and have positive impacts for regulating and cultural services
Wessex Water Partners Programme	Develop projects which meet the aims of the UKBAP/Biodiversity and the WFD, with benefits for regulating and cultural services

Meare Pool

For Meare Pool, the scenario likely to provide the greatest number of positive changes over the feature/service combinations assessed was also 'Habitat creation'. Table 6-2 below presents the funding sources which are relevant to this scenario, along with the actions which are likely to be required to obtain the funding and fulfil the scenario.

Table 6-2: Potential action plan for Meare Pool for 'Habitat creation' based on funding sources identified	
Funding source	**Potential actions to obtain funding**
Awards for All Lottery fund	Develop projects which provide benefits including landscape aesthetics, educational experience, cultural heritage and recreation/tourism opportunities (incorporates actions for species recovery and habitat creation)
Countryside Stewardship	Support actions of rural businesses so that they improve landscape aesthetics, educational experience, cultural heritage and enable general benefits for recreation (Meare unit has a number of public footpaths)
Interreg Europe	Encourage collaboration with European countries on projects which fit with research and innovation or environment and resource efficiency
Higher Level Stewardship	When existing agreements are reviewed, develop projects that support and enhance regulating services (note whilst the fund can encourage nature tourism, this is not a specific objective)
Landfill Communities Fund	Develop community projects (including land acquisition) which improve landscape aesthetics, educational experience, cultural heritage and enable general benefits for recreation and tourism (recreating 'Meare Pool' has the potential to provide aesthetic benefits, as well as contributing to the cultural heritage and generating recreation and tourism opportunities)
LIFE+ funds	Develop projects that contribute to environmental and climate policy, potentially benefiting projects that enable regulating services and cultural services
Market value	Encourage production of saleable goods (this could include reeds harvested from the new wetland area)

Table 6-2: Potential action plan for Meare Pool for 'Habitat creation' based on funding sources identified	
Funding source	**Potential actions to obtain funding**
Restoration of ecological networks using Somerset's habitat evaluation protocol	Where development occurs in other parts of Somerset, use funds generated to improve habitats which form part of the ecological network
Tourism charge ("tax")	Collect money from visitors to contribute to management of the area's habitats, to generate positive impacts for regulating and cultural services. Improved access through better maintenance of public footpaths could help increase visitor numbers and hence funding obtained
Wessex Water Partners Programme	Develop projects which meet the aims of the UKBAP/Biodiversity and the WFD, with benefits for regulating and cultural services

Although 'Habitat creation' has the greatest number of positive changes in feature/service combinations for Meare Pool; this is driven primarily by improvement in the cultural services. Given the current focus in the unit (with land being managed for agricultural production), it is prudent to consider the actions that might be required under a scenario, which also provides benefits for provisioning services. 'Conservation of peat soil' would likely benefit provisioning services as well as cultural services. Table 6-3 below presents the funding sources and suggested actions which could enable this scenario to be fulfilled.

Table 6-3: Potential action plan for Meare Pool for 'Conservation of peat soil' based on funding sources identified	
Funding source	**Potential actions to obtain funding**
Countryside Stewardship	Support actions of rural businesses so that they improve provisioning and cultural services
Interreg Europe	Encourage collaboration with European countries on projects which fit with research and innovation or environment and resource efficiency
Higher Level Stewardship	When existing agreements are reviewed, develop projects that support and enhance regulating services (note whilst the fund can encourage nature tourism, this is not a specific objective)
Landfill Communities Fund	Develop community projects (including land acquisition) which improve landscape aesthetics, educational experience, cultural heritage and enable general benefits for recreation and tourism
LIFE+ funds	Develop projects that contribute to environmental and climate policy, potentially benefiting projects that enable cultural services
Restoration of ecological networks using Somerset's habitat evaluation protocol	Where development occurs in other parts of Somerset, use funds generated to improve habitats which form part of the ecological network
Wessex Water Partners Programme	Develop projects which meet the aims of the UKBAP/Biodiversity and the WFD, with benefits for climate, water and erosion regulation

6.2.2 Engagement plan

Successful achievement of the objectives of the funds and of the scenarios will depend, in many cases, on effective engagement. Table 6-4 presents suggested methods of engagement for each of the funds relevant to 'Habitat creation' for Catcott.

Table 6-4: Suggested engagement for Catcott to enable implementation of actions relevant to 'Habitat creation'			
Actions	**Engagement with**	**What they need to know**	**Suggested methods**
Develop projects that provide benefits including landscape, aesthetics, educational experience, cultural heritage and recreation/tourism opportunities (incorporates actions for species recovery and habitat creation). Projects could build on existing recreation and tourism assets	Landowners	What funding is available How to access the funding What actions they need to undertake to access funding	Needs to be targeted to landowners to whom it is applicable therefore leaflet delivery or direct contact (depending on number of landowners)
Support the actions of rural businesses so that they improve regulating and cultural services	Local businesses	What support is available How to access it What actions they are undertaking which apply	Access through Local Enterprise Partnerships. Hold drop-in sessions if there appears to be sufficient interest
Encourage collaboration with European countries on projects which fit with research and innovation or environment and resource efficiency	All interested parties	What other countries are doing Who to contact to collaborate	Needs to reach a wide audience so posters and advertisements in publications and media; contact with organisations that coordinate European bids
When existing agreements are reviewed, develop projects that support and enhance regulating services (note: whilst the fund can encourage nature tourism, this is not a specific objective)	All interested parties	Examples of projects What funding/support is available	Needs to reach a wide audience so posters and advertisements in publications and media; contact through trade associations and/or special interest groups
Develop community projects (including land acquisition) which improve landscape aesthetics, educational experience, cultural heritage and enable general benefits for recreation and tourism (e.g. at existing nature reserves)	Local landowners Local community	What funds are available Potential contacts	Needs to reach a wide audience so posters and advertisements in local publications and media. Also contact local community groups
Develop projects that contribute to environmental and climate policy, potentially benefiting projects that enable regulating services and cultural services	All interested parties	Examples of projects What funding/support is available	Needs to reach a wide audience so posters and advertisements in publications and media; contact through trade associations and/or special interest groups

Table 6-4: Suggested engagement for Catcott to enable implementation of actions relevant to 'Habitat creation'			
Actions	**Engagement with**	**What they need to know**	**Suggested methods**
Encourage production of saleable goods	Local landowners Local community Local businesses	What products and goods are included Requirements for sale of goods	Needs to reach a wide audience so posters and advertisements in local publications and media; direct contact (depending on number of landowners). Also contact local community groups
Where development occurs in other parts of Somerset, use funds generated to improve habitats which form part of the ecological network	Local developers	How to access the funds How they benefit	Produce material to send to developers directly or through trade associations, specialist journals. Possibly have a member of staff arrange to speak to them at a meeting about opportunities
Collect money from visitors (e.g. to existing nature reserves) to contribute to management of the area's habitats and have positive impacts for regulating and cultural services	Local visitors	What the money is used for How much they need to pay	Information boards, leaflets and brochures highlighting potential to get involved
Develop projects which meet the aims of the UKBAP/Biodiversity and the WFD, with benefits for regulating and cultural services	All interested parties	Examples of projects What funding/support is available	Needs to reach a wide audience so posters and advertisements in publications and media; contact through trade associations and/or special interest groups

Table 6-5 presents suggested methods of engagement for each of the funds relevant to the optimal scenarios for Meare Pool (funding sources from the two most applicable scenarios, 'Habitat creation' and 'Conservation of peat soil', and have been combined).

Table 6-5: Suggested engagement for the Meare Pool unit to enable implementation of actions relevant to 'Habitat creation' and 'Conservation of peat soil'			
Actions	**Engagement with**	**What they need to know**	**Suggested methods**
Develop projects which provide benefits including landscape aesthetics, educational experience, cultural heritage and recreation/tourism opportunities (incorporates actions for species recovery and habitat creation)	Landowners	What funding is available How to access the funding What actions they need to undertake to access funding	Needs to be targeted to landowners to whom it is applicable therefore leaflet delivery or direct contact (depending on number of landowners)

Table 6-5: Suggested engagement for the Meare Pool unit to enable implementation of actions relevant to 'Habitat creation' and 'Conservation of peat soil'			
Actions	**Engagement with**	**What they need to know**	**Suggested methods**
Support actions of rural businesses so that they improve landscape aesthetics, educational experience, cultural heritage and enable general benefits for recreation (Meare unit has a number of public footpaths)	Local businesses	What support is available How to access it What actions they are undertaking which apply	Access through Local Enterprise Partnerships. Hold drop-in sessions if there appears to be sufficient interest
Encourage collaboration with European countries on projects which fit with research and innovation or environment and resource efficiency	All interested parties	What other countries are doing Who to contact to collaborate	Needs to reach a wide audience so posters and advertisements in publications and media; contact with organisations that coordinate European bids
When existing agreements are reviewed, develop projects that support and enhance regulating services (note whilst the fund can encourage nature tourism, this is not a specific objective)	All interested parties	Examples of projects What funding/support is available	Needs to reach a wide audience so posters and advertisements in publications and media; contact through trade associations and/or special interest groups
Develop community projects (including land acquisition) which improve landscape aesthetics, educational experience, cultural heritage and enable general benefits for recreation and tourism (recreating 'Meare Pool' has the potential to provide aesthetic benefits, as well as contributing to the cultural heritage and generating recreation and tourism opportunities)	Local landowners Local community	What funds are available Potential contacts	Needs to reach a wide audience so posters and advertisements in local publications and media. Also contact local community groups
Develop projects that contribute to environmental and climate policy, potentially benefiting projects that enable regulating services and cultural services	All interested parties	Examples of projects What funding/support is available	Needs to reach a wide audience so posters and advertisements in publications and media; contact through trade associations and/or special interest groups
Encourage production of saleable goods (this could include reeds harvested from the new wetland area)	Local landowners Local community Local businesses	What products and goods are included Requirements for sale of goods	Needs to reach a wide audience so posters and advertisements in local publications and media; direct contact (depending on number of landowners). Also contact local community groups

Table 6-5: Suggested engagement for the Meare Pool unit to enable implementation of actions relevant to 'Habitat creation' and 'Conservation of peat soil'			
Actions	**Engagement with**	**What they need to know**	**Suggested methods**
Where development occurs in other parts of Somerset, use funds generated to improve habitats which form part of the ecological network	Local developers	How to access the funds How they benefit	Produce material to send to developers directly or through trade associations, specialist journals. Possibly have a member of staff arrange to speak to them at a meeting about opportunities
Collect money from visitors to contribute to management of the area's habitats and have positive impacts for regulating and cultural services. Improved access through better maintenance of public footpaths could help increase visitor numbers and hence funding obtained	Local visitors	What the money is used for How much they need to pay	Information boards, leaflets and brochures highlighting potential to get involved
Develop projects which meet the aims of the UKBAP/Biodiversity and the WFD, with benefits for regulating and cultural services	All interested parties	Examples of projects What funding/support is available	Needs to reach a wide audience so posters and advertisements in publications and media; contact through trade associations and/or special interest groups

6.2.3 Implications beyond the Brue Valley

Given that this study is undertaken as part of the WOW project, there is a need to look beyond the Brue Valley and consider the wider applicability of some of the funds identified. Table 6-6 indicates whether the short-listed funds can be used:

- For UK wetlands beyond the Somerset Levels and Moors;
- For other UK features (i.e. for other types of landscape); and
- For France and wider Europe

Whilst there are a few funds which are only available to the study area and its immediate surrounds, several of the funding sources identified could potentially be used for other types of habitat, and indeed outside the UK.

Table 6-6: Scale of applicability of funds			
Funds applicable to the Brue Valley	**Applicable to UK wetlands**	**Applicable to other UK features**	**Applicable to France and Europe as a whole**
Awards for All Lottery Fund	✓	✓	
Corporate Social Responsibility (CSR)	✓	✓	✓
Countryside Stewardship	✓	✓	
Defra Partnership Funding (Grant in Aid or GiA)	✓	✓	

Table 6-6: Scale of applicability of funds			
Funds applicable to the Brue Valley	**Applicable to UK wetlands**	**Applicable to other UK features**	**Applicable to France and Europe as a whole**
European Agricultural Fund for Rural Development (EAFRD)	✓	✓	✓
Entry fees	✓	✓	✓
Esmeé Fairbairn Foundation	✓	✓	
Farming and Forestry Productivity Scheme	✓	✓	
GHG emission offsets	✓	✓	✓
Heritage Lottery Fund:	✓	✓	
Interreg Europe	✓	✓	✓
Higher Level Stewardship	✓	✓	
Landfill Communities Fund	✓	✓	
LEADER Programme	✓	✓	
LIFE+ funds	✓	✓	✓
Local Growth Fund	✓	✓	
Market value	✓	✓	✓
Payments for Ecosystem Services	✓	✓	✓
Peatland Code	✓		
Restoration of ecological network determined using Somerset's habitat evaluation protocol			
Somerset District Council Community Grants			
Somerset FAP			
Somerset Rivers Authority			
Tourism charge ("tax")	✓	✓	✓
Wessex Water Partners Programme			

6.3 Recommendations for Further Work

This study has not been able to quantify the changes in service provision to the extent originally envisaged. This is due to a number of reasons including issues with the mapping dataset for the two units (e.g. differences in the way in which rivers/streams are recorded in Catcott and Meare) and uncertainty with regard to the extent of the change. Furthermore, there is limited availability of information on the current condition of the features, in particular for those which are not in a designated area and thus do not have condition reports.

Several recommendations for further work have been drawn from the issues raised by this project:

1) Further work needs to be undertaken to check the condition of features, and also the areas (in particular for woodland and watercourses) to enable quantification to be undertaken without the need for a whole suite of assumptions.

2) Consideration should be given to investigating cereal crops and the bare earth/peat feature in more detail. These features are not present in either the Catcott or the Meare Pool unit, thus have not been assessed in depth here.

3) Several of the funding sources have very specific criteria which need to be met when submitting an application. In some cases, it is not possible to determine exactly how applicable a fund is without presenting the funders with a project plan for a specific location with set goals and actions.

In others, potential funders may wish to discuss project plans prior to submission of any written application. Therefore, it is recommended that where there is interest in using a particular funding source, further investigations are undertaken with regard to the fund's applicability, the location where the fund is to be used, the stakeholders who need to be involved, and the time period in which funding can be obtained. The time period in particular, may affect the choice of one fund over another.

4) The viability of each scenario should be investigated in terms of whether the available funds are sufficient to provide the expected benefits. Where significant changes in land and water management are required, long term support will likely be needed to ensure that the changes are fully implemented and the desired benefits achieved.

5) It is recommended that considerable engagement is undertaken with the landowners in the hydrological units considered here, and the wider Brue Valley area. This will enable the identification of the scenarios which are most closely aligned with current land and water management plans, and whether there is a willingness to move towards any other scenarios. Given the large number of landowners (for example, within the Catcott unit), a consensus is considered unlikely. However, using appropriate engagement will ensure that where any management changes are implemented, stakeholders will understand the reasons behind any changes, and potentially be interested in changing their own land management practices so that they can take advantage of some of the different revenue streams identified by this study. Such engagement will also help determine the optimum scenario in terms of balanced ecosystem service provision, feasibility and the types of beneficiary who gain/lose.

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Annex 1 Habitats, Land Uses and Ecosystem Services

A1.1 Habitats and Land Uses in the Brue Valley

There are many habitats and land uses within the Brue Valley. They can be identified and coded using the Integrated Habitat System (IHS), which was developed by SERC and others to bring together several existing classification systems[5]. Due to the number of different types of habitat, it is not feasible to assess each one individually. Instead, habitat types and land uses can be grouped into features. Table A1-1 categorises the habitats and land uses into different features, based on the links made in RPA et al (2011).

Table A1-1: Grouping of habitats/land uses into features

Habitat/land use	Feature
Cereal crops	Cereal crops
Lowland meadow with calcareous indicators	Dry grassland of high value for wildlife
Lowland meadow with acid indicators	Dry grassland of high value for wildlife
Species-rich dry grassland	Dry grassland of high value for wildlife
Grass and grass clover leys	Dry grassland of low value for wildlife
Improved grassland	Dry grassland of low value for wildlife
Species-poor dry grassland	Dry grassland of low value for wildlife
Intensively managed orchards	Orchards and horticulture
Other non-cereal crops	Orchards and horticulture
Other arable/horticultural	Orchards and horticulture
Fence	Other
Roads	Other
Settlements	Other
Ex-peat working site	Peat works and bare ground
Bare ground	Peat works and bare ground
Quarry	Peat works and bare ground
Standing open water and canal	Ponds and lakes
Eutrophic standing waters	Ponds and lakes
Reedbed	Reedbeds
River/stream	Rivers, streams ditches, rhynes
Marginal and inundation vegetation	Rivers, streams ditches, rhynes
Dry ditch	Rivers, streams ditches, rhynes
Swamp	Swamp and fen
Alkaline fen	Swamp and fen
Other lowland fen	Swamp and fen
Species rich rush pasture	Wet grassland of high value for wildlife
Species rich wet grassland	Wet grassland of high value for wildlife
Species poor wet grassland	Wet grassland of low value for wildlife
Species poor rush pasture	Wet grassland of low value for wildlife
Species rich purple moorgrass pasture	Wet heath & purple moor grass habitats
Species poor purple moorgrass pasture	Wet heath & purple moor grass habitats
Lowland raised mire	Wet heath & purple moor grass habitats
Wet heath	Wet heath & purple moor grass habitats

[5] See Integrated Habitat System, accessed at: http://ihs.somerc.co.uk/ on 23rd September 2014.

Table A1-1: Grouping of habitats/land uses into features	
Habitat/land use	**Feature**
Bracken	Woodland/hedgerow/line of trees/scrub/bracken
Species rich hedgerow	Woodland/hedgerow/line of trees/scrub/bracken
Species poor hedgerow	Woodland/hedgerow/line of trees/scrub/bracken
Line of trees	Woodland/hedgerow/line of trees/scrub/bracken
Scrub	Woodland/hedgerow/line of trees/scrub/bracken
Wet woodland	Woodland/hedgerow/line of trees/scrub/bracken
Deciduous woodland	Woodland/hedgerow/line of trees/scrub/bracken
Coniferous woodland	Woodland/hedgerow/line of trees/scrub/bracken
Source: based on RPA et al, 2011	

A1.2 Ecosystem Services in the Brue Valley

Table A1-2 provides an overview of the main ecosystem services likely to be relevant to the Brue Valley. It is based on Defra's (2007) ecosystem service groupings, with justifications from RPA's previous work on the Brue Valley (RPA et al, 2011).

Table A1-2: Ecosystem services relevant to the Brue Valley		
Ecosystem service	**Relevant?**	**Justification for inclusion/exclusion**
Supporting Services		
Photosynthesis	No	These services are assumed to underpin the other services so are not considered separately to avoid double counting (as per UK National Ecosystem Assessment)
Primary production	No	
Soil formation	No	
Provisioning Services		
Ecosystem goods (food, fibre, fuel, peat, etc.)	Yes	This covers a range of services, many of which are currently available in the Brue Valley
Provision of freshwater (and availability of freshwater)	Yes	Although there are some local water quality issues, these do not relate to drinking water
Biochemicals, genetics	Yes	Referred to as biodiversity, to ensure that this is given adequate consideration
Regulating Services		
Air quality regulation	No	This is unlikely to be relevant at the Brue Valley scale
Climate regulation (avoiding mineralisation and so loss of carbon from soils)	Yes	Peat soils are particularly important in storage and sequestration of carbon. In the Brue Valley, avoiding the loss of carbon due to soils drying out (mineralisation) is key
Pest and disease regulation	No	Unlikely to be relevant for funding purposes
Pollination	No	This is unlikely to be relevant at the Brue Valley scale
Water purification	Yes	Inputs from agriculture are absorbed by aquatic vegetation thereby regulating water quality (good/bad water quality in larger watercourses e.g. River Brue could also have implications for quality of intertidal mudflats and muddy saltmarsh downstream)
Water regulation (small-scale and large-scale)	Yes	Water levels are controlled by ditches, sluices, culverts and pumping stations thereby allowing other ecosystems services to be delivered

Table A1-2: Ecosystem services relevant to the Brue Valley		
Ecosystem service	**Relevant?**	**Justification for inclusion/exclusion**
Erosion regulation	Yes	The area could provide a useful reservoir to protect downstream urban areas
Cultural Services		
Aesthetics	Yes	The variety of the habitats in the Brue Valley provide a range of aesthetic benefits
Educational value	Yes	Guided walks and school visits are conducted within the Brue Valley area
Cultural heritage	Yes	The Brue Valley is very important as a cultural heritage site with continuous human occupation since prehistory and archaeological remains of international and national importance
Recreation and tourism	Yes	Activities such as canoeing, rowing, angling, boating, cycling, etc. are all popular within the Brue Valley. Wildfowling also occurs
Source: based on Defra (2007) and RPA et al (2011)		

Although several of the ecosystem service categories in Table A1-2 are rather broad, the assessment will ensure that any components which make up the wider categories (e.g. physical and mental health and wellbeing, historic environment and heritage) are taken into account where appropriate. This will avoid any potential revenue frameworks from being excluded.

A1.3 Service Provision under the Current Baseline (Snapshot) and Decreased funding baseline

For Catcott, Table A1-3 describes the ecosystem service provision under the current baseline, whilst Table A1-4 provides the likely changes under the Decreased funding baseline.

For Meare Pool, Table A1-5 describes the ecosystem service provision under the current baseline. Table A1-6 presents the anticipated changes under the Decreased funding baseline.

Table A1-3: Ecosystem service provision under the current baseline (snapshot) for Catcott			
Service	**Feature**	**Area/location of feature**	**Likely current level of service provision**
Ecosystem goods (food/fibre/peat/ etc.)	Dry grassland of low value for wildlife	Significant patches all around the unit, making up at least 1/6th of the total area	Current level of service provision assumed to be moderate due to area potentially available for cutting and grazing. However, provision is likely to vary according to weather conditions and water levels, with drier years enabling more grazing
	Wet grassland of high value for wildlife	Considerable number of habitat patches, making up just under half of the unit	Current level of service provision assumed to be moderate due to area potentially available for cutting and grazing. However, provision is likely to vary according to weather conditions and water levels, with drier years enabling more grazing
	Wet heath & purple moor grass habitats	Very narrow patchy strip of habitat in middle of unit	Minimal service provision due to small area available for grazing
	Wet grassland of low value for wildlife	Several patches covering a significant area of the unit, in particular in southern half	Current level of service provision assumed to be moderate due to area potentially available for cutting and grazing
	Woodland/hedgerow /line of trees/scrub/bracken	Small block in middle of eastern side of the unit (around Canada Farm), as well as small patches scattered around	Provision of fibre and fuel assumed minimal due to size of site, isolated location and limited access (in addition to presence within designated area)
Provision of freshwater (and availability of freshwater)	Rivers, streams, ditches, rhynes	Numerous rhynes and ditches forming field boundaries across the unit	Streams/ditches may be used for water supply for adjacent areas e.g. to maintain wet habitats (note that several abstraction licences within the wider area are for environmental support (Somerset Drainage Boards Consortium, 2010))
Biodiversity	Rivers, streams, ditches and rhynes	Numerous rhynes and ditches forming field boundaries across the unit	Service provision is assumed to be moderate/good given presence of numerous ditches/rhynes crossing the unit
	Reedbeds	Several blocks in middle of unit	Moderate (SSSI units are in unfavourable recovering condition). Reedbeds contribute to biodiversity by providing habitat for high profile species such as bittern; they also help support several other UK BAP species
	Swamp and fen	Significant block of habitat in northern part of unit, as well as smaller blocks near the centre	Moderate (SSSI units are in unfavourable recovering condition)
	Wet grassland of high value for wildlife	Considerable number of habitat patches, making up just under half of the unit	Moderate (SSSI units are in unfavourable recovering condition)
	Wet heath & purple moor grass habitats	Very narrow patchy strip of habitat in middle of unit	Feature area is very small, so contribution to biodiversity is likely to be limited (although feature does provide important rare habitat)
	Woodland/hedgerow /line of	Small block in middle of eastern side of the unit (around Canada Farm), as well as small	Service provision is assumed to be moderate; area of feature is relatively low, but feature will still be providing habitat diversity

Table A1-3: Ecosystem service provision under the current baseline (snapshot) for Catcott			
Service	**Feature**	**Area/location of feature**	**Likely current level of service provision**
	trees/scrub/bracken	patches scattered around	
Climate regulation (avoiding mineralisation and so loss of carbon from soils)	Rivers, streams, ditches, rhynes	Numerous rhynes and ditches forming field boundaries across the unit	On site emissions from land managed for peat extraction can be 2.8 tonnes of CO_2 per ha per year and 6.1kg CH_4 per ha per year (IPCC, 2013). Restoration of site may have decreased amount released. Rewetting decreases CO2 emissions from organic soils and may lead to the recovery of a net CO_2 sink (IPCC, 2013)
	Wet heath & purple moor grass habitats	Very narrow patchy strip of habitat in middle of unit	Small area of habitat means that any carbon sequestration is likely to be minimal
	Wet grassland of low value for wildlife	Several patches covering a significant area of the unit, in particular in southern half	Extent of carbon sequestration likely to be affected by water levels and management, in addition to current condition of habitat. May be moderate given that habitat is unfavourable recovering
	Swamp and fen	Significant block of habitat in northern part of unit, as well as smaller blocks near the centre	Extent of carbon sequestration likely to be affected by water levels and management, in addition to current condition of habitat. May be moderate given that habitat is unfavourable recovering
	Reedbeds	Several blocks in middle of unit	Extent of carbon sequestration likely to be affected by water levels and management, in addition to current condition of habitat. May be moderate given that habitat is unfavourable recovering
	Wet grassland of high value for wildlife	Considerable number of habitat patches, making up just under half of the unit	Extent of carbon sequestration likely to be affected by water levels and management, in addition to current condition of habitat. May be moderate given that habitat is unfavourable recovering
	Woodland/hedgerow /line of trees/scrub/bracken	Small block in middle of eastern side of the unit (around Canada Farm), as well as small patches scattered around	Service provision assumed to be moderate. Woodlands are important for carbon sequestration in the UK, but note that planting trees on peaty soils may lead to carbon release as peat dries out (Natural England, 2012)
Water purification	Swamp and fen	Significant block of habitat in northern part of unit, as well as small patches near the centre	Service provision assumed to be moderate due to habitat condition. Wetlands can reduce levels of nutrients (e.g. phosphorus and nitrogen from agricultural runoff) and help avoid eutrophication in downstream waterbodies (Ramsar Convention Secretariat, 2010). There may also be benefits for quality of intertidal mudflats and muddy saltmarsh if contaminants are trapped and not transported downstream
	Reedbeds	Several blocks in middle of unit	Service provision assumed to be moderate due to habitat condition. Wetlands can reduce levels of nutrients (e.g. phosphorus and nitrogen from agricultural runoff) and help avoid eutrophication in downstream

Table A1-3: Ecosystem service provision under the current baseline (snapshot) for Catcott			
Service	**Feature**	**Area/location of feature**	**Likely current level of service provision**
			waterbodies (Ramsar Convention Secretariat, 2010). There may also be benefits for quality of intertidal mudflats and muddy saltmarsh if contaminants are trapped and not transported downstream
Water regulation (small-scale)	Wet grassland of high value for wildlife	Considerable number of habitat patches, making up just under half of the unit	Service provision assumed to be considerable due to area of habitat (also due to extent of water level management via small-scale ditches and rhynes)
	Wet heath & purple moor grass habitats	Very narrow patchy strip of habitat in middle of unit	Service provision relatively low due to small area of habitat
	Rivers, streams, ditches, rhynes	Numerous rhynes and ditches forming field boundaries across the unit	Service provision is assumed to be moderate, because area of feature is limited. Surrounding area is mainly grassland, so presence of streams/ditches provides local water storage
	Wet grassland of low value for wildlife	Several patches covering a significant area of the unit, in particular in southern half	Service provision assumed to be considerable due to area of habitat (also due to extent of water level management via small-scale ditches and rhynes)
	Swamp and fen	Significant block of habitat in northern part of unit, as well as smaller blocks near the centre	Service provision assumed to be considerable due to area of habitat (also due to extent of water level management via small-scale ditches and rhynes)
	Reedbeds	Several blocks in middle of unit	Service provision assumed to be considerable due to area of habitat (also due to extent of water level management via small-scale ditches and rhynes)
Erosion regulation	Reedbeds	Several blocks in middle of unit	Service provision assumed to be moderate because habitat is in unfavourable recovering condition. Provision may improve if habitat improves
	Woodland/hedgerow /line of trees/scrub/bracken	Significant block in the eastern side of the unit (around Canada Farm), as well as small patches scattered around	Service provision is assumed to be moderate (provided that minimal management occurs to avoid damaging soils)
Aesthetics	Dry grassland of low value for wildlife	Significant patches all around the unit, making up at least 1/6th of the total area	Service provision assumed to be moderate due to condition of habitat. However, habitat will still be contributing to the overall appearance of the Levels and Moors landscape
	Rivers, streams, ditches, rhynes	Numerous rhynes and ditches forming field boundaries across the unit	Service provision assumed to be good. Area is a nature reserve, Catcott Complex Nature Reserves (SWT, 2014) so is likely to attract a number of visitors. SWT (2014) notes that vistors can see restored peat workings with

Table A1-3: Ecosystem service provision under the current baseline (snapshot) for Catcott			
Service	**Feature**	**Area/location of feature**	**Likely current level of service provision**
			reedbeds, open water and islands from the tower hide. The streams/ditches are contributing to the overall attractiveness of the area
	Swamp and fen	Significant block of habitat in northern part of unit, as well as small patches near the centre	Service provision assumed to be good. Area is a nature reserve, Catcott Complex Nature Reserves (SWT, 2014) so is likely to attract a number of visitors. SWT (2014) notes that visitors can see restored peat workings with reedbeds, open water and islands from the tower hide. The streams/ditches are contributing to the overall attractiveness of the area
	Reedbeds	Several blocks in middle of unit	Service provision assumed to be good. Area is a nature reserve, Catcott Complex Nature Reserves (SWT, 2014) so is likely to attract a number of visitors. SWT (2014) notes that vistors can see restored peat workings with reedbeds, open water and islands from the tower hide. The streams/ditches are contributing to the overall attractiveness of the area
	Wet grassland of high value for wildlife	Considerable number of habitat patches, making up just under half of the unit	Service provision assumed to be good. Area is a nature reserve, Catcott Complex Nature Reserves (SWT, 2014) so is likely to attract a number of visitors. SWT (2014) notes that there are flower rich meadows alongside the drove
	Wet grassland of low value for wildlife	Several patches covering a significant area of the unit, in particular in southern half	Service provision assumed to be moderate due to condition of habitat. However, habitat will still be contributing to the overall appearance of the Levels and Moors landscape
	Wet heath & purple moor grass habitats	Very narrow patchy strip of habitat in middle of unit	Service provision assumed to be good. Area is a nature reserve, Catcott Complex Nature Reserves (SWT, 2014) so is likely to attract a number of visitors. The presence of purple moor grass is highlighted by the "what to see" section of the SWT website on the reserve (SWT,2014)
Educational value	Rivers, streams, ditches, rhynes	Numerous rhynes and ditches forming field boundaries across the unit	Service provision assumed to be moderate (limited access may affect number of people able to benefit from service). However, events are organised by SWT; there is also a leaflet to tell visitors what they might see during a visit (SWT, ND)
	Swamp and fen	Significant block of habitat in northern part of unit, as well as small patches near the centre	Service provision assumed to be moderate (limited access may affect number of people able to benefit from service). However, events are organised by SWT; there is also a leaflet to tell visitors what they might see during a visit (SWT, ND)
	Reedbeds	Several blocks in middle of unit	Service provision assumed to be moderate (limited access may affect

Table A1-3: Ecosystem service provision under the current baseline (snapshot) for Catcott			
Service	**Feature**	**Area/location of feature**	**Likely current level of service provision**
			number of people able to benefit from service). However, events are organised by SWT; there is also a leaflet to tell visitors what they might see during a visit (SWT, ND)
	Wet grassland of high value for wildlife	Considerable number of habitat patches, making up just under half of the unit	Service provision assumed to be moderate (limited access may affect number of people able to benefit from service). However, events are organised by SWT; there is also a leaflet to tell visitors what they might see during a visit (SWT, ND)
	Wet heath & purple moor grass habitats	Very narrow patchy strip of habitat in middle of unit	Service provision assumed to be moderate (limited access may affect number of people able to benefit from service). However, events are organised by SWT; there is also a leaflet to tell visitors what they might see during a visit (SWT, ND)
Cultural heritage	Dry grassland of low value for wildlife	Significant patches all around the unit, making up at least 1/6th of the total area	Service provision assumed to be moderate due to condition of habitat. However, habitat will still be contributing to the overall cultural heritage of the wider Levels and Moors
	Rivers, streams, ditches, rhynes	Numerous rhynes and ditches forming field boundaries across the unit	Service provision assumed moderate due to relatively limited accessibility. Streams/ditches add interest to the landscape, forming part of the cultural heritage of the area
	Swamp and fen	Significant block of habitat in northern part of unit, as well as small patches near the centre	Service provision assumed moderate due to relatively limited accessibility. Feature adds interest to the landscape, forming part of the cultural heritage of the area
	Reedbeds	Several blocks in middle of unit	Service provision assumed moderate due to relatively limited accessibility. Feature adds interest to the landscape, forming part of the cultural heritage of the area
	Wet grassland of high value for wildlife	Considerable number of habitat patches, making up just under half of the unit	Service provision assumed moderate due to relatively limited accessibility. Feature adds interest to the landscape, forming part of the cultural heritage of the area
	Wet grassland of low value for wildlife	Several patches covering a significant area of the unit, in particular in southern half	Service provision assumed to be moderate due to condition of habitat. However, habitat will still be contributing to the overall cultural heritage of the wider Levels and Moors
	Wet heath & purple moor grass habitats	Very narrow patchy strip of habitat in middle of unit	Service provision assumed moderate due to relatively limited accessibility. Feature adds interest to the landscape, forming part of the cultural heritage of the area

Table A1-3: Ecosystem service provision under the current baseline (snapshot) for Catcott			
Service	**Feature**	**Area/location of feature**	**Likely current level of service provision**
Recreation and tourism	Rivers, streams, ditches, rhynes	Numerous rhynes and ditches forming field boundaries across the unit	Service provision is assumed to be good. Streams/ditches are one of features to see at Catcott Complex Nature Reserves. The habitats additionally attract wildfowl and waders (SWT, 2014)
	Swamp and fen	Significant block of habitat in northern part of unit, as well as small patches near the centre	Service provision is assumed to be good. Swamp and fen are one of the features to see at Catcott Complex Nature Reserves. The habitats additionally attract wildfowl and waders (SWT, 2014)
	Reedbeds	Several areas of reedbed near the middle of the unit, also very small patches in the southern half	Service provision is assumed to be good. Reedbeds are one of several habitat types to see at Catcott Complex Nature Reserves. The habitats additionally attract wildfowl and waders (SWT, 2014)
	Wet grassland of high value for wildlife	Considerable number of habitat patches, making up just under half of the unit	Service provision is assumed to be good. Flower rich meadows are one several habitat types to see at Catcott Complex Nature Reserves. The habitats additionally attract wildfowl and waders (SWT, 2014)
	Wet heath & purple moor grass habitats	Very narrow patchy strip of habitat in middle of unit	Service provision is assumed to be good. Wet heath is one of the habitat types to see at Catcott Complex Nature Reserves. The habitats additionally attract wildfowl and waders (SWT, 2014)
Notes: full references where used are as provided in the associated spreadsheet on the 'References' tab			

Table A1-4: Ecosystem service provision under the Decreased funding baseline for Catcott			
Service	**Feature**	**Anticipated change in provision**	**Justification/assumptions**
Ecosystem goods (food/fibre/peat/ etc.)	Dry grassland of low value for wildlife	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to avoid deterioration in provision of ecosystem service by this feature (but note that funding may be prioritised towards areas of high value for wildlife)
	Wet grassland of high value for wildlife	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to avoid overgrazing and retain current provision of service
	Wet heath & purple moor grass habitats	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to avoid overgrazing and so retain current level of service provision
	Wet grassland of low value for wildlife	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to avoid overgrazing and so retain current level of service provision (but note that funding may be prioritised towards areas currently of high value for wildlife)
	Woodland/hedgerow	Likely to stay the same/no	Area is designated as SSSI, SPA and Ramsar so is assumed to retain sufficient funding to

Table A1-4: Ecosystem service provision under the Decreased funding baseline for Catcott			
Service	**Feature**	**Anticipated change in provision**	**Justification/assumptions**
	/line of trees/scrub/bracken	impact expected	avoid clearance of trees and drainage for agricultural production
Provision of freshwater (and availability of freshwater)	Rivers, streams, ditches, rhynes	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to maintain level of service provision
Biodiversity	Rivers, streams, ditches and rhynes	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to maintain level of service provision
	Reedbeds	Likely to increase	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to return SSSI unit condition to favourable (currently unfavourable recovering)
	Swamp and fen	Likely to increase	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to return SSSI unit condition to favourable (currently unfavourable recovering)
	Wet grassland of high value for wildlife	Likely to increase	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to return SSSI unit condition to favourable (currently unfavourable recovering)
	Wet heath & purple moor grass habitats	Likely to increase	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to return SSSI unit condition to favourable (currently unfavourable recovering)
	Woodland/hedgerow /line of trees/scrub/bracken	Likely to stay the same/no impact expected	Likely to stay the same/no impact expected
Climate regulation (avoiding mineralisation and so loss of carbon from soils)	Rivers, streams, ditches, rhynes	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to avoid deterioration in provision of ecosystem service by this feature
	Wet heath & purple moor grass habitats	Likely to stay the same/no impact expected	If area is a car park, agri-environment funding is irrelevant
	Wet grassland of low value for wildlife	Likely to increase	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to avoid deterioration in provision of ecosystem service by this feature. Improved habitat condition may even lead to better service provision
	Swamp and fen	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to avoid deterioration in provision of ecosystem service by this feature
	Reedbeds	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to avoid deterioration in provision of ecosystem service by this feature (there may even be some increase in provision where reedbeds are young)

Table A1-4: Ecosystem service provision under the Decreased funding baseline for Catcott			
Service	**Feature**	**Anticipated change in provision**	**Justification/assumptions**
	Wet grassland of high value for wildlife	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to avoid deterioration in provision of ecosystem service by this feature
	Woodland/hedgerow /line of trees/scrub/bracken	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to avoid deterioration in provision of ecosystem service by this feature
Water purification	Swamp and fen	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to avoid deterioration in provision of ecosystem service by this feature
	Reedbeds	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to avoid deterioration in provision of ecosystem service by this feature
Water regulation (small-scale)	Wet grassland of high value for wildlife	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to avoid deterioration in provision of ecosystem service by this feature
	Wet heath & purple moor grass habitats	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to avoid deterioration in provision of ecosystem service by this feature
	Rivers, streams, ditches, rhynes	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to avoid deterioration in provision of ecosystem service by this feature
	Wet grassland of low value for wildlife	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to avoid deterioration in provision of ecosystem service by this feature (but note that funding may be prioritised towards areas currently of high value for wildlife)
	Swamp and fen	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to avoid deterioration in provision of ecosystem service by this feature
	Reedbeds	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to avoid deterioration in provision of ecosystem service by this feature
Erosion regulation	Reedbeds	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to avoid deterioration in provision of ecosystem service by this feature
	Woodland/hedgerow /line of trees/scrub/bracken	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to avoid deterioration in provision of ecosystem service by this feature
Aesthetics	Dry grassland of low value for wildlife	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so funding and management are assumed to be maintained at current levels (but note that habitat is of low value for wildlife)
	Rivers, streams, ditches, rhynes	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to enable current management to continue and provide aesthetic benefits

Table A1-4: Ecosystem service provision under the Decreased funding baseline for Catcott			
Service	**Feature**	**Anticipated change in provision**	**Justification/assumptions**
	Swamp and fen	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to enable current management to continue and provide aesthetic benefits
	Reedbeds	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to enable current management to continue and provide aesthetic benefits
	Wet grassland of high value for wildlife	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to enable current management to continue and provide aesthetic benefits
	Wet grassland of low value for wildlife	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so funding and management are assumed to be maintained at current levels (but note that habitat is of low value for wildlife)
	Wet heath & purple moor grass habitats	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to enable current management to continue and provide aesthetic benefits
Educational value	Rivers, streams, ditches, rhynes	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to enable current management to continue and provide educational benefits
	Swamp and fen	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to enable current management to continue and provide educational benefits
	Reedbeds	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to enable current management to continue and provide educational benefits
	Wet grassland of high value for wildlife	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to enable current management to continue and provide educational benefits
	Wet heath & purple moor grass habitats	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to enable current management to continue and provide educational benefits
Cultural heritage	Dry grassland of low value for wildlife	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so funding and management are assumed to be maintained at current levels (but note that habitat is of low value for wildlife)
	Rivers, streams, ditches, rhynes	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to enable current management to continue so that the feature is retained as part of the cultural heritage of the area
	Swamp and fen	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to enable current management to continue so that the feature is retained as part of the cultural heritage of the area
	Reedbeds	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to enable current management to continue so that the feature is retained as part of the cultural heritage of the area

Table A1-4: Ecosystem service provision under the Decreased funding baseline for Catcott			
Service	**Feature**	**Anticipated change in provision**	**Justification/assumptions**
	Wet grassland of high value for wildlife	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to enable current management to continue so that the feature is retained as part of the cultural heritage of the area
	Wet grassland of low value for wildlife	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to enable current management to continue so that the feature is retained as part of the cultural heritage of the area
	Wet heath & purple moor grass habitats	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to enable current management to continue so that the feature is retained as part of the cultural heritage of the area
Recreation and tourism	Rivers, streams, ditches, rhynes	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to enable current management to continue so that the area attracts visitors
	Swamp and fen	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to enable current management to continue so that the area attracts visitors
	Reedbeds	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to enable current management to continue so that the area attracts visitors
	Wet grassland of high value for wildlife	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to enable current management to continue so that the area attracts visitors
	Wet heath & purple moor grass habitats	Likely to stay the same/no impact expected	Area is designated as SSSI, SPA and RAMSAR so is assumed to retain sufficient funding to enable current management to continue so that the area attracts visitors

Table A1-5: Ecosystem service provision under the current baseline for Meare Pool			
Service	**Feature**	**Area/location of feature**	**Likely current level of service provision**
Ecosystem goods (food/fibre/peat/etc.)	Dry grassland of low value for wildlife	Large areas making up more than 1/4 of the unit	Service provision is assumed to be good since land is likely to be managed currently for agricultural production
	Wet grassland of low value for wildlife	Makes up a significant areas of the total unit	Service provision is assumed to be good since land is likely to be managed currently for agricultural production
	Woodland/hedgerow/line of trees/scrub/bracken	A few hedgerows and a line of trees are within the unit	Service provision is assumed to be insignificant due to minimal area of habitat
Provision of freshwater	Rivers, streams, ditches,	Numerous ditches cross	Service provision is assumed to be moderate due to extent of ditches/rhynes

Table A1-5: Ecosystem service provision under the current baseline for Meare Pool			
Service	**Feature**	**Area/location of feature**	**Likely current level of service provision**
(and availability of freshwater)	rhynes	the unit	across the unit
Biodiversity	Rivers, streams, ditches, rhynes	Numerous ditches cross the unit	Moderate – focus is on agricultural production; management for biodiversity is only likely to occur where required to obtain agri-environment funding
Biodiversity	Woodland/hedgerow/line of trees/scrub/bracken	A few hedgerows and a line of trees are within the unit	Moderate – focus is on agricultural production; management for biodiversity is only likely to occur where required to obtain agri-environment funding
Climate regulation (avoiding mineralisation and so loss of carbon from soils s)	Rivers, streams, ditches, rhynes	Numerous ditches cross the unit	Service provision assumed to be moderate due to the extent of the habitat. But note that provision is also dependent on the way the ditches are managed. Carbon sequestration is typically greatest in wetland areas which are saturated and so prevent decomposition of vegetation (NE, 2012)
	Wet grassland of low value for wildlife	Makes up a significant areas of the total unit	Service provision assumed to be low (provision is partly dependent on the way the ditches are managed). Carbon sequestration is typically greatest in wetland areas which are saturated and so prevent decomposition of vegetation (NE, 2012)
	Woodland/hedgerow/line of trees/scrub/bracken	A few hedgerows and a line of trees are within the unit	Service provision is assumed to be insignificant due to minimal area of habitat
Water regulation (small-scale)	Rivers, streams, ditches, rhynes	Numerous ditches cross the unit	Service provision assumed to be moderate (with ditches potentially managed as wet fences to enable surrounding land to be used for grazing)
	Wet grassland of low value for wildlife	Makes up a significant area of the total unit	Service provision is assumed to be good since land is likely to be managed for agricultural production
Erosion regulation	Woodland/hedgerow/line of trees/scrub/bracken	A few hedgerows and a line of trees are within the unit	Service provision is assumed to be insignificant due to minimal area of habitat
Aesthetics	Dry grassland of low value for wildlife	Large areas making up more than 1/4 of the unit	Service provision assumed to be moderate because habitat covers a significant area and so contributes to the appearance of the wider Levels and Moors landscape, but is of low value for wildlife (so may be less aesthetically pleasing than habitats of high wildlife value)
	Rivers, streams, ditches, rhynes	Numerous ditches cross the unit	Service provision assumed to be moderate due to uncertainty over feature condition, but feature is contributing to overall appearance of the landscape
	Wet grassland of low value for	Makes up a significant	Service provision assumed to be moderate because habitat covers a

Table A1-5: Ecosystem service provision under the current baseline for Meare Pool			
Service	**Feature**	**Area/location of feature**	**Likely current level of service provision**
	wildlife	area of the total unit	significant area and so contributes to the appearance of the wider Levels and Moors landscape, but is of low value for wildlife (so may be less aesthetically pleasing than habitats of high wildlife value)
Educational value	Rivers, streams, ditches, rhynes	Numerous ditches cross the unit	Service provision assumed to be low due to uncertainty over feature condition, and lack of access/facilities for educational visits (although there are public footpaths across the site)
Cultural heritage	Dry grassland of low value for wildlife	Large areas making up more than 1/4 of the unit	Service provision assumed to be moderate because habitat covers a significant area and so contributes to the cultural heritage of the wider Levels and Moors landscape, but is of low value for wildlife (so may be less significant than habitats of high wildlife value)
	Rivers, streams, ditches, rhynes	Numerous ditches cross the unit	Service provision assumed to be moderate due to uncertainty over feature condition. However, feature is contributing to the overall cultural heritage of the area
	Wet grassland of low value for wildlife	Makes up a significant area of the total unit	Service provision assumed to be moderate because habitat covers a significant area and so contributes to the cultural heritage of the wider Levels and Moors landscape, but is of low value for wildlife (so may be less significant than habitats of high wildlife value)
Recreation and tourism	Rivers, streams, ditches, rhynes	Numerous ditches cross the unit	Service provision assumed to be moderate due to uncertainty over feature condition. Access to the area is possible with several public footpaths crossing the unit between Meare and Lower Godney
Notes: full references where used are as provided in the associated spreadsheet on the 'References' tab			

Table A1-6: Ecosystem service provision under the Decreased funding baseline for Meare Pool			
Service	**Feature**	**Anticipated change in provision under new agri-environment scheme**	**Justification/assumptions**
Ecosystem goods (food/fibre/peat/etc.)	Dry grassland of low value for wildlife	Likely to increase	Decreased availability of agri-environment funding means that focus on agricultural production will intensify
	Wet grassland of low value for wildlife	Likely to increase	Decreased availability of agri-environment funding means that focus on agricultural production will intensify
	Woodland/hedgerow/line of trees/scrub/bracken	Likely to stay the same/no impact expected	Area of habitat is very small (line of trees, isolated strips of hedging), thus is not expected to be affected by changes in agri-environment funding

Table A1-6: Ecosystem service provision under the Decreased funding baseline for Meare Pool			
Service	**Feature**	**Anticipated change in provision under new agri-environment scheme**	**Justification/assumptions**
Provision of freshwater (and availability of freshwater)	Rivers, streams, ditches, rhynes	Likely to decrease	Focus on agricultural intensification is likely to lead to increased nutrient levels in ditches and rhynes, thus decreasing water quality
Biodiversity	Rivers, streams, ditches, rhynes	Likely to decrease	Focus on agricultural intensification is likely to lead to increased nutrient levels in ditches and rhynes, thus decreasing habitat condition and so affecting biodiversity
	Woodland/hedgerow/line of trees/scrub/bracken	Likely to stay the same/no impact expected	Area of habitat is very small (line of trees, isolated strips of hedging), thus is not expected to be affected by changes in agri-environment funding. No changes to biodiversity provision are expected
Climate regulation (avoiding mineralisation and so loss of carbon from soils)	Rivers, streams, ditches, rhynes	Likely to decrease	Agricultural intensification (following decrease in agri-environment funding) will likely lead to increased maintenance of ditches to act as wet fences/increase drainage (thus removing any vegetation from the ditches and potentially leading to mineralisation in other areas as soils are drained)
	Wet grassland of low value for wildlife	Likely to decrease	Decreased agri-environment funding is likely to lead to increased need for drainage of grassland to enable more grazing and hay/silage production
	Woodland/hedgerow/line of trees/scrub/bracken	Likely to stay the same/no impact expected	Area of habitat is very small (line of trees, isolated strips of hedging), thus is not expected to be affected by changes in agri-environment funding
Water regulation (small-scale)	Rivers, streams, ditches, rhynes	Likely to increase	With reduced agri-environment funding, the need to use ditches and rhynes for water regulation is likely to increase to enable agricultural productivity to be maximised
	Wet grassland of low value for wildlife	Likely to decrease	With reduced agri-environment funding, wetter habitats may be drained to maximise productivity, thus decreasing their ability to help regulate water levels
Erosion regulation	Woodland/hedgerow/line of trees/scrub/bracken	Likely to stay the same/no impact expected	Area of habitat is very small (line of trees, isolated strips of hedging), thus is not expected to be affected by changes in agri-environment funding
Aesthetics	Dry grassland of low value for wildlife	Likely to stay the same/no impact expected	Habitat will still form part of the Levels and Moors landscape even if further agricultural intensification occurs

Table A1-6: Ecosystem service provision under the Decreased funding baseline for Meare Pool			
Service	**Feature**	**Anticipated change in provision under new agri-environment scheme**	**Justification/assumptions**
	Rivers, streams, ditches, rhynes	Likely to decrease	Lack of agri-environment funding may lead to increased maintenance, with ditches regularly cleaned and dredged, with the removal of all vegetation. This could affect the appearance of the area.
	Wet grassland of low value for wildlife	Likely to stay the same/no impact expected	Habitat will still form part of the Levels and Moors landscape even if further agricultural intensification occurs
Educational value	Rivers, streams, ditches, rhynes	Likely to decrease	Lack of agri-environment funding may lead to increased maintenance, with ditches regularly cleaned and dredged, with the removal of all vegetation. This would decrease the educational value of the feature
Cultural heritage	Dry grassland of low value for wildlife	Likely to stay the same/no impact expected	Habitat will still contribute to the cultural heritage of the area even if further agricultural intensification occurs
	Rivers, streams, ditches, rhynes	Likely to decrease	Lack of agri-environment funding may lead to increased maintenance, with ditches regularly cleaned and dredged, with the removal of all vegetation. This could negatively impact the ditches and rhynes when seen as part of the cultural heritage and history of agriculture in the area
	Wet grassland of low value for wildlife	Likely to stay the same/no impact expected	Habitat will still contribute to the cultural heritage of the area even if further agricultural intensification occurs
Recreation and tourism	Rivers, streams, ditches, rhynes	Likely to decrease	Excessive maintenance in response to decreased agri-environment payments and need to intensify agricultural production could decrease the attractiveness of the area for recreation and tourism

Annex 2 Funding Sources

A2.1 Criteria to Assess Funding Sources

Table A2-1 provides the criteria used to assess the long list of funding sources.

Table A2-1: Criteria used to assess the potential funding sources	
Main category	**Sub-category**
Objectives	Key objectives of funding
	Does funding relate to more than one ecosystem service?
Timing	Period of availability
	Lead-in time required to set up funding stream
Support	Level of support required from public bodies/NGOs for landowners/managers to obtain funding
	Level of support required from local community (if any)
Responsibility	Who is able to apply for the funding?
	Who needs to be involved in accessing/setting up funding?
	Is partnership working likely to be required?
	Who needs to be involved in managing funding?
Amount	Amount of money available
	Any match funding required?
	Any restrictions on obtaining other funding at the same time?
	One-off or ongoing source of funding (to capture whether funds are available for capital or maintenance expenditure)?
Scale	Does the funding/income source need to cover several habitats or types of habitat?
	Is the funding source likely to require several landowners/land managers to work together?
Management for funding	Does the funding/ income source specify the type of management measures required?
Other	Any other key points?

A2.2 Short-listed Funding Sources

Table A2-2 provides a summary of the shortlisted funding sources which may be relevant to the Brue Valley.

Table A2-1: Potential revenue streams and their objectives		
Funding source	**Funding provider**	**Objectives of funding**
Awards for All Lottery Fund	Big Lottery Fund	To develop skills, improve health, revitalise the local environment and enable people to become more active citizens
Corporate Social Responsibility (CSR)	Provider likely to vary; dependent on businesses involved	To express a company's sense of responsibility towards the community and environment (both ecological and social) in which it operates
Countryside Stewardship	Defra has policy responsibility, with scheme delivered by Natural England, the Forestry Commission and the Rural Payments Agency	To help rural businesses improve the countryside environment.

Table A2-1: Potential revenue streams and their objectives		
Funding source	**Funding provider**	**Objectives of funding**
Defra Partnership Funding (Grant in Aid or GiA)	Defra sets policy, Environment Agency provides detailed guidance	To contribute to a flood and coastal erosion risk management (FCERM) scheme that is assessed as being beneficial.
European Agricultural Fund for Rural Development (EAFRD)	Delivered through the Heart of SouthWest Local Enterprise Partnership (LEP)	General objectives - to improve the competitiveness of agriculture and forestry, the environment and countryside, the quality of life and the management of economic activity in rural areas. Specifically in Heart of SouthWest LEP to boost growth and create jobs throughout the area
Entry fees	Varies; funds collected by businesses and other organisations providing a visitor attraction	To encourage people to visit the location and to make the location desirable enough to encourage payments
Esmeé Fairbairn Foundation	Funding is provided by the organisation	To improve the quality of life throughout the UK
Farming and Forestry Productivity Scheme (now Countryside Productivity Scheme)	Rural Development Programme for England (RDPE), policy managed by Defra	To encourage: innovation, technology diffusion and knowledge transfer, farm competitiveness and supply chain relationships, woodland enterprise and supply chain, resource efficiency and management, animal health and welfare
GHG emission offsets	Varies; likely to involve businesses	To offset greenhouse gas emissions through funding carbon sequestration projects. Note that this could cover two distinct activities: • Paying for habitats to sequester carbon; • Paying for habitats to be maintained in a condition which means that they do not release carbon (for wetland habitats, this means retaining adequate water levels so that the wetland does not dry out). The latter is likely to be more important within the Brue Valley, given the types of habitat present and their condition
Heritage Lottery Fund	Heritage Lottery Fund	To make a lasting difference for heritage, people and communities
Higher Level Stewardship	Managed by Natural England on behalf of Defra	To conserve and enhance biodiversity, heritage, landscape and resource protection
Interreg Europe	European Commission; financed by the European Regional Development Fund (ERDF)	To improve the implementation of regional development policies and programmes, in particular programmes for Investment for Growth and Jobs, and European Territorial Cooperation (ETC) programmes. Interreg Europe covers 4 themes: research and innovation; SME competitiveness; low-carbon economy; environment and resource efficiency
Landfill Communities Fund	Landfill operators	To enhance the environment of communities surrounding landfill sites by providing funds for heritage, biodiversity and community projects
LEADER Programme	Defra and EAFRD through Local Action Groups (LAGs)	To provide funds to businesses which: • were engaged in a rural industry (or directly

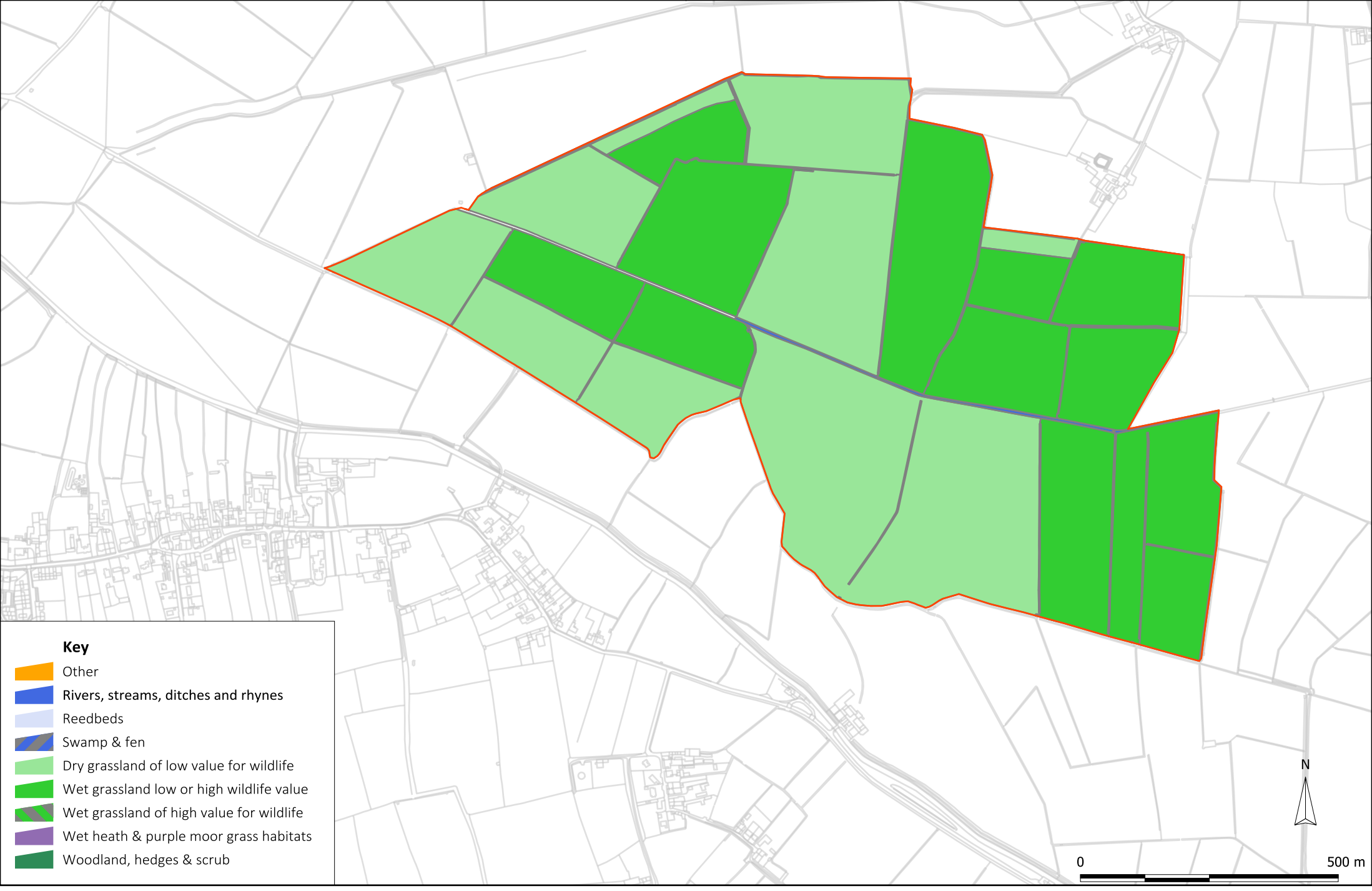
Table A2-1: Potential revenue streams and their objectives		
Funding source	**Funding provider**	**Objectives of funding**
		related to one); • were engaged in the production or retail of local foods; • were tourism or rurally based manufacturing enterprises; • planned to add value to their own production; • had a sound project that was deemed to be both economically and environmentally sustainable for a minimum of 6 years; • had a project fitting both local priorities and the priorities of the Rural Development Programme for England
LIFE+ funds	EU LIFE+ programme	To contribute to the implementation, updating and development of EU environmental and climate policy and legislation by co-financing projects with European added value
Local Growth Fund	Central government through the Local Enterprise Partnerships (LEPs)	To benefit the local area and economy
Market value	Varies (businesses)	To raise money for maintenance and management of land through selling goods produced, e.g. timber, food, etc. This is direct use value (based on extractive use)
Payments for Ecosystem Services	Varies (different service providers and beneficiaries)	To provide an ecosystem good or service or to encourage the conservation of natural resources Note that PES can only be used to provide a service over and above that which is already being provided. The principle of additionality ensures that payments are made for actions beyond those that land managers are typically expected to take (Defra, 2013)
Peatland Code	Not yet known (businesses? Landowners?)	To restore peatlands on the basis of their climate and other benefits
Restoration of ecological network determined using Somerset's habitat evaluation protocol	Developers	To restore and enhance areas of habitat which contribute to the ecological network (as compensation for a development within Somerset)
Somerset District Council Community Grants	Somerset District Council	To benefit the wider community
Somerset Flood Action Plan (FAP)	Central government, Somerset local authorities, other partners	To reduce the frequency, duration and severity of a flood of the nature experienced in 2013/14
Somerset Rivers Authority	Central government, local funding (e.g. local authorities)	To reduce flood risk in Somerset

Table A2-1: Potential revenue streams and their objectives		
Funding source	**Funding provider**	**Objectives of funding**
Tourism charge ("tax")	Varies (businesses, other organisations)	Provision of funds to undertake environmental actions
Wessex Water Partners Programme	Wessex Water provides funding to projects carried out by wildlife organisations	To support projects that meet both the aims of the UKBAP/Biodiversity 2020 and the Water Framework Directive. In particular, biodiversity projects of a river or marine nature

Annex 3 Maps for Current Baseline (Snapshot)

Features in Catcott Unit

British Grid Printed at: 25/02/2015 by KJ.
Version 16 Feb15 (1.1 - updated with SWT data)



Features in Meare Pool Unit

British Grid
Printed at: 25/02/2015 by KJ

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