CASCADE

Welsh Government

Assessing the Potential for Payments for Ecosystems Market Mechanisms

Phase 2 - Evaluation and Recommendations

Final Report

May 2014

In association with

eftec

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1 INTRODUCTION

1.1 PROJECT OVERVIEW

Previous studies have identified the potential to develop ecosystems markets in Wales, with estimates that the environment contributes in excess of £8.8billion of goods and services annually to the Welsh economy (9% of GDP)[1]. This study reviews the various market based instruments (MBIs), focussing particularly on Payments for Ecosystems Services (PES), that may contribute to realisation of economic benefits from these services. Introduction of this approach will also ensure that the value of ecosystems is considered when decisions are made. The study recommends actions for further development to promote these markets into the mainstream economy. This document does not represent Welsh Government policy, but is intended to inform policy development.

1.2 RESEARCH OBJECTIVES AND PURPOSE OF THIS REPORT

The study has been undertaken in two phases. The principal objective of Phase 1 has been to collate evidence through:

- **Review of the available literature and evidence.** Focussing on the assessment of ecosystem services and integration into policy approaches internationally and within the UK, as well as specifically within Wales.

- **Review of the relevant legislative, regulatory and policy developments at the EU, UK and Welsh levels.** We have considered the relevant mandatory environmental quality obligations along with the strategic policy context in Wales, covering the ongoing development of the Environment, Planning and Future Generation Bills.

- **Identification of current examples of PES or other related market approaches relevant to Wales.** We have compiled a database of current schemes to identify the spread of approaches being developed or piloted with a focus on those operating within Wales, and have drawn out the key learning experiences to inform the research.

- **One to one interviews and wider workshops with individuals** involved in the current policy development, management and operation of natural resources in Wales.

1 National Trust (2001). Valuing our Environment: Economic Impact of the Environment of Wales. The Valuing Our Environment Partnership, July 2001.

Phase 2 has provided focussed evaluation of the MBIs identified as appropriate and relevant to the Welsh context in Phase 1. On the basis of this evaluation, recommendations are made on the potential role for Government, key delivery bodies and other stakeholders in the testing and establishment of the identified MBIs. Key messages are provided to inform development of the Environment Bill and the Rural Development Programme. Phase 2 also specifies requirements for further development, testing and piloting of PES.

This is the final report for the study. It summarises and reviews the findings of Phase 1 and reports on analysis and recommendations for Phase 2. It is intended that it can be read as a stand-alone report of the study as a whole.

1.3 INCORPORATION OF ECOSYSTEMS SERVICES INTO POLICY

The United Nations Millennium Ecosystem Assessment (MEA 2003, 2005) established and refined the overall framework in which multiple contributions of ecosystems can be consistently assessed for the purposes of policy-making. It organised ecosystems services into the following four categories:

- Supporting
- Provisioning
- Cultural
- Regulating.

There have since been a number of national and international responses to the need to address the degradation of ecosystems through policies and strategies developed by actors from government, civil society, private sector and increased coordination in multilateral environmental agreements.

At the international level, a consortium of the G8+5[2] Environmental Ministers initiated The Economics of Ecosystems and Biodiversity (TEEB) in 2007 to provide policy makers with the tools needed to incorporate the true value of ecosystem services into decision making. Throughout the first and second phases of the TEEB work, particular attention was paid to the use of instruments such as PES, habitat banking and biodiversity offsetting as mechanisms for ensuring that those who benefit from particular ecosystem services provide remuneration to those who provide them.

In the UK, the landmark National Ecosystem Assessment (UK NEA, 2011) provided

2 Refers to the G8 nations (Canada, France, Germany, Italy, Japan, Russia, UK, USA) and the five leading emerging economies (Brazil, China, India, Mexico, South Africa)

the first detailed analysis of the benefits that the natural environment provides to society to directly address the MEA recommendations. The assessment of the current state of ecosystem services across Wales, England, Scotland and Ireland produced a comprehensive evidence base to support environmental decision-making and long term planning.

Concurrently, in England a Natural Environment White Paper was published (Defra. 2011), which committed to establishing the *'Natural Capital Committee'* (NCC) to better understand how the economy and individual welfare depends on the state of the natural environment. The NCC published its first report in April 2013 *'The State of Natural Capital'*, outlining that there is inadequate investment in natural capital and that conservation failure is widespread. The report recommended that the decline of natural capital assets should be measured and properly valued to enable more effective decisions that recognise the multiple objectives, trade-offs and synergies that exist in environmental, economic and social policy.

The '*Ecosystem Market Task Force'* (EMTF) was also set up by the UK government to provide a business-led review of the opportunities for UK business from expanding green goods, services, products, investment vehicles and markets which value and protect the natural environment. The EMTF reported in April 2013, outlining priority areas where opportunities for businesses and green growth exist, including the potential for biodiversity offsetting, water cycle catchment management, carbon markets and environmental performance bonds which could protect and enhance the natural environment. The report provided a clear message that economic growth and environmental protection and improvement are not mutually exclusive, but need to be integrated, and that there are a number of markets which could be developed or created to realise these opportunities.

The UK government has recently provided a number of responses to these reports; the final response was published in September 2013[3]. This outlines the following specific responses:

- Launch of the **Catchment Based Approach Framework** in June 2013 and **Water Bill** (the **Water Act** gained Royal assent in May 2014) to integrate consideration of biodiversity and ecosystems services into water, wastewater and flood management.

- Launch of the **Peatland Carbon Code** in September 2013, following the creation and implementation of the Woodland Carbon Code. Work towards this

3 Defra (2013) 'Realising nature's value; The final report of the Ecosystems Markets Task Force. Accessed at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/236879/pb13963-government-response-emtf-report.pdf

will involve market research to provide insight as to the types of businesses interested in investing in such a scheme, including looking at feasibility of including greenhouse gas emission reductions from peatland restoration in the UK Greenhouse Gas Reporting Guidelines.

- Publication of the **Green Paper on Biodiversity Offsetting** in November 2013. The Green Paper:
    - Explains what biodiversity offsetting is
    - Sets out the Government's objectives to avoid additional costs to developers and achieve better environmental outcomes and explores how offsetting could help achieve these objectives
    - Sets out the options for biodiversity offsetting and the Government's preference to give developers the choice to use offsetting and seeks comments
    - Seeks evidence to improve Government's understanding of the costs and benefits of biodiversity offsetting compared to existing approaches
    - Asks questions how detailed design of an offsetting systems should be approached.

A number of guidance documents have also been produced by Defra[4], providing information on valuing ecosystem services, best practice guidance for designing and implementing PES schemes, and developing place-based approaches for PES. We refer to many of these guidance documents in this report, noting that although these are useful, in Wales different policy drivers and legislative tools apply, and Welsh Government are not obliged to follow approaches taken by the UK Government for England.

1.4 POLICY DEVELOPMENT IN WALES

Management and protection of the natural environment in Wales takes place within a framework of both European and UK legislation. The Welsh Government has devolved responsibilities for twenty subject areas, including agriculture, fisheries, forestry and rural development, environment, and water and flood defence. The Welsh Government therefore produces its own policies and strategies for development, management and regulation of the natural environment.

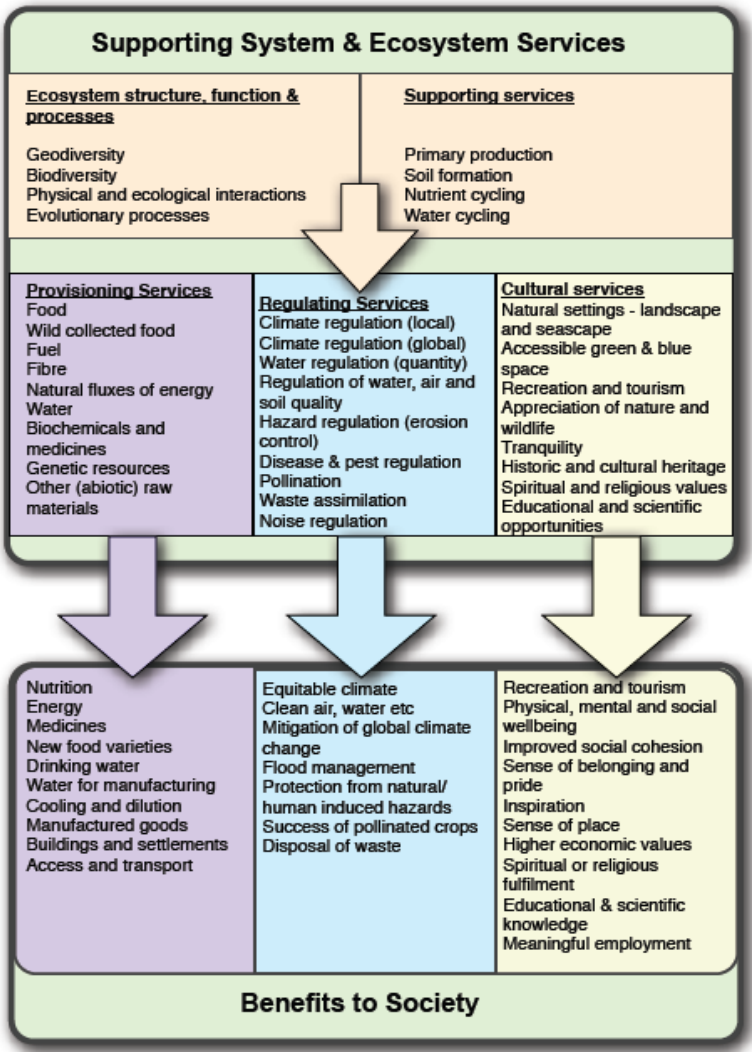
An Environment Strategy for Wales was published in 2006, setting out a vision for

4 Accessible at https://www.gov.uk/ecosystems-services

the environment for the next 20 years, along with an action plan to deliver on five key environmental themes: climate change; sustainable resource use; biodiversity; landscapes and seascapes; local environment; and environmental hazards. A '*State of the Environment*' report is published annually to track the progress of the strategy against a range of indicators.

As part of the Action Plan, the Natural Environment Framework, *'A Living Wales*' was launched in 2011, proposing a more integrated and joined up approach to environmental policy, to ensure natural resource issues are not considered in isolation, but integrated into wider social and economic policies. Figure 1.1 illustrates the service typology developed by the Living Wales Programme (2013). This builds on the MEA and NEA ecosystem services definitions, and links these to the specific benefits provided to society in Wales.

Figure 1.1 Ecosystem supporting systems and services typology (Living Wales)



In 2012, the '*Sustaining a Living Wales*' Green Paper was published, proposing the

adoption of an ecosystem approach to the management of natural resources, placing environmental objectives alongside those of the economy and society. The Green Paper set the context for ensuring a single consistent approach to natural resource management across Wales through the creation of Cyfoeth Naturiol Cymru/Natural Resources Wales (NRW). A Natural Resources Management Programme has also been developed to sit alongside the new Wales Infrastructure Investment Plan and inform infrastructure planning as well as setting the framework for investment in positive environmental improvement, such as habitat creation and financial incentives for more sustainable land management.

A White Paper for the Future Generations Bill (previously the Sustainable Development Bill) was published in 2012 for consultation, with the Bill anticipated in summer 2014, and set out sustainable development as the central organising principle for the devolved public services of Wales. The Future Generations Bill highlights the need for greater cross-sectoral involvement across legislation and policies to ensure that a long term, integrated approach is taken to the environmental, social and economic challenges in Wales.

Similarly, the draft Planning (Wales) Bill, published for consultation in early December 2013, sets out the need for a more integrated and streamlined approach to planning, through the creation of a national land use plan (known as the National Development Framework, NDF), and a more active stewardship role for the Welsh Government to reduce duplication, increase consistency and improve performance. The NDF will provide justification for any policies and proposals on land use of national significance, and will identify strategic environmental opportunities. The framework will be evidence based and accompanied by a Sustainability Appraisal (SA) including a Strategic Environmental Assessment (SEA) and a Habitat Regulations Assessment (HRA), and informed by the Welsh National Natural Resources Policy.

1.5 ENVIRONMENT BILL

The Environment Bill White Paper '*Towards the Sustainable Management of Wales' Natural Resources'* was published for consultation in October 2013. It is explicitly based on an ecosystems approach to ensure a joined up approach to the management of Wales' natural resources and to deliver long term environmental, economic and social benefits. The White Paper recognises that maintaining, enhancing and restoring ecosystem services is essential for sustainable economic growth, prosperous communities and promotion of well-being in Wales.

The Environment Bill White Paper focuses on four key themes:

- **Theme 1** - looks at joining-up the existing statutory frameworks for natural

resource planning and management, including setting out an area-based approach for natural resource management to provide clarity to stakeholders and delivery bodies for opportunities and challenges.

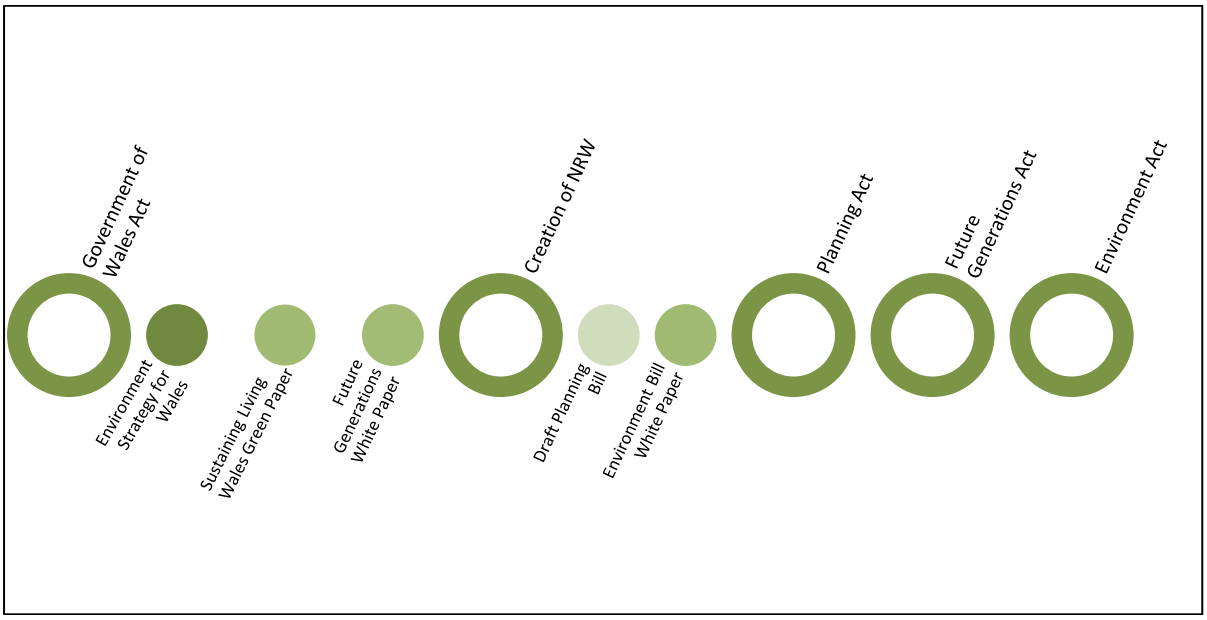
- **Theme 2** - considers proposals to ensure NRW has the right legislative tools, including stimulating the use of market mechanisms for ecosystem services and experimental power for Natural Resources Wales to test innovative approaches.

- **Theme 3** - sets out actions to ensure natural resources are used to the best effect, particularly in relation to waste management.

- **Theme 4** - sets out proposals to simplify and streamline legislation for existing environmental regulatory regimes, particularly in relation to marine licensing management, shellfisheries management, flood and water management, land drainage management.

In a statement by the Minister for Natural Resources and Food ('*Shaping a More Prosperous and Resilient Future'*) in 2013, 'green growth' was highlighted as a fundamental priority for the long term environmental and economic development of Wales. The statement set out the timeline for reform of one of the key policy tools for land management, the Common Agriculture Policy (CAP), which includes both direct income support for farmers to maintain land in good condition, and significant funding for the Wales Rural Development Plan (RDP). Both the CAP and RDP are undergoing reform, with the revised RDP and associated Glastir agri-environment scheme due to be submitted to the European Commission in summer 2014. These instruments will be prioritised to support farming and land management for long term resilience, enabling a viable food production sector while maintaining rural communities, within an overall framework of sustainable natural resource management and climate change adaptation and migration.

Figure 1.2 Time-line of legislative and policy developments



The recent and planned developments in Welsh legislation and policy (Figure 1.2) provide a basis for integrating the consideration of ecosystems and the benefits they provide across the interlinked areas of environmental management, planning and longer term development, to promote 'green growth' for Wales. The proposals for considering market mechanisms and payments for ecosystem services, along with experimental powers for NRW presented in the Environment White Paper, provide a significant opportunity for expanding the delivery of natural resources management in Wales through alternative commercially driven approaches.

2 REVIEW OF PHASE 1

2.1 PHASE 1 OBJECTIVES

Phase 1 of the study focussed on collecting evidence on the extent to which ecosystems services and market based instruments (MBIs) are currently considered in the wider economy. The Phase 1 report incorporated a review of MBIs for application in Wales. The study also identifies the ecosystem services in Wales that require support or are in decline. These ecosystem services data could act as a preliminary filter to identify where PES markets could be usefully facilitated by Welsh Government.

2.2 CURRENT ECOSYSTEMS SERVICES PROVISION IN WALES

Wales has a varied and diverse environment, with just under a quarter of its land area encompassed within three National Parks and five Areas of Outstanding Natural Beauty. There are three substantial mountainous regions (Snowdonia in the north-west; the Cambrian Mountains in mid Wales; the Brecon Beacons in the south), all of which provide Wales with key supporting, regulating, provisioning and cultural ecosystem services. The extensive coastline stretches for over 2,400 km, and no part of Wales is more than 75km from the coast. There are 398 natural lakes and 20 major river systems flowing in a distinctive eastward or westward biogeography which drain the 2 million hectares of surface area in Wales.

The National Trust estimated that the environment contributes 9% (£8.8 billion) of Welsh GDP annually[1]. Other studies have assessed the value and contribution for specific components of the 'natural environment' including:

- Estimated total value of agricultural production in Wales at £1,393 million in 2011 and providing £275.3 million of Gross Value Added (GVA)[5],
- Forest resources in Wales estimated at £429 million with social and environmental benefits of forestry estimated at £34million in 2009[6]
- Absorption of air pollution by trees in Wales has been estimated to provide benefits of £124,998 for each death avoided by one year (as a result of PM10 and sulphur dioxide absorption)[7]

5 StatsWales (2012). Aggregate Agricultural Output and Income, 2011. Statistics for Wales - SDR 28/2012 28 February 2012.

6 Read, D.J., Freer-Smith, P.H., Morison, J.I.L., Hanley, N., West, C.C. & Snowdon, P.R. (eds) (2009). Combating climate change – a role for UK forests. The Stationery Office, Edinburgh.

7 Willis, K.G., Garrod, G., Scarpa, R., Powe, N., Lovett, A. Bateman, I.J., Hanley, N. & Macmillan, D.C. (2003) The social and environmental benefits of forests in Great Britain. Forestry Commission, Edinburgh.

- The contribution of walking in terms of direct spending has been estimated at £632 million[8]
- Wildlife related activity (i.e. relating to conservation and enhancement, wildlife based tourism and recreation) in Wales has been valued at £1.9 billion per year[9]
- The economic impact of Welsh National Parks has been estimated to generate £205 million of GDP per year[10].

The UK National Ecosystem Assessment[11] (UK NEA) presents an assessment of the condition of ecosystem services in Wales. Figure 2.1, taken from the UK NEA Synthesis Report, shows the proportion of Wales covered by the eight broad habitat categories used in the NEA as a starting point for the ecosystems services assessment.

Figure 2.1 Landcover in Wales by UK NEA Broad Habitat type

	Wales	
UK NEA Broad Habitat	Area ('000 ha)	%
Mountains, Moorlands & Heaths	246	11.8
Semi-natural Grasslands	474	22.8
Enclosed Farmland	851	40.9
Woodlands	280	13.4
Freshwaters- Openwaters, Wetlands & Floodplains	26	1.2
Urban	87	4.2
Coastal Margins	49	2.3
Marine	1,570	-
Total Land Area	2,081	-
Total Land + Marine Area	3,651	-

Figure 2.2, also taken from the UK NEA, examines specific ecosystems services in terms of the direction of change in their delivery over the past 20 years. While the UK NEA acknowledges a level of subjectivity in this assessment, it provides an

8 Ramblers Cymru (2011). The Economic Impact of Walking and Hill-walking in Wales. Joint report of Ramblers Cymru, Visit Wales, the British Mountaineering Council and the Countryside Council for Wales, June 2011.

9 Environment Agency Wales (2007) Wildlife Economy Wales: An Economic Evaluation Scoping Study. Available at http://www.environment-agency.gov.uk/static/documents/Research/wildlifewales_wb_1823119.pdf

10 National Trust (2006). Valuing our Environment: the Economic Impact of the National Parks of Wales. The Valuing Our Environment Partnership, Wales.

11 UK NEA (UK National Ecosystem Assessment) (2011) The UK National Ecosystem Assessment: Synthesis of Key Findings. UNEP-WCMC, Cambridge (Chapter 20 - Status and Changes in the UK's Ecosystems and their Services to Society: Wales)

indication of where ecosystems service delivery could be improved in the future.

Figure 2.2 Relative importance of broad habitat types in delivering ecosystem services in Wales

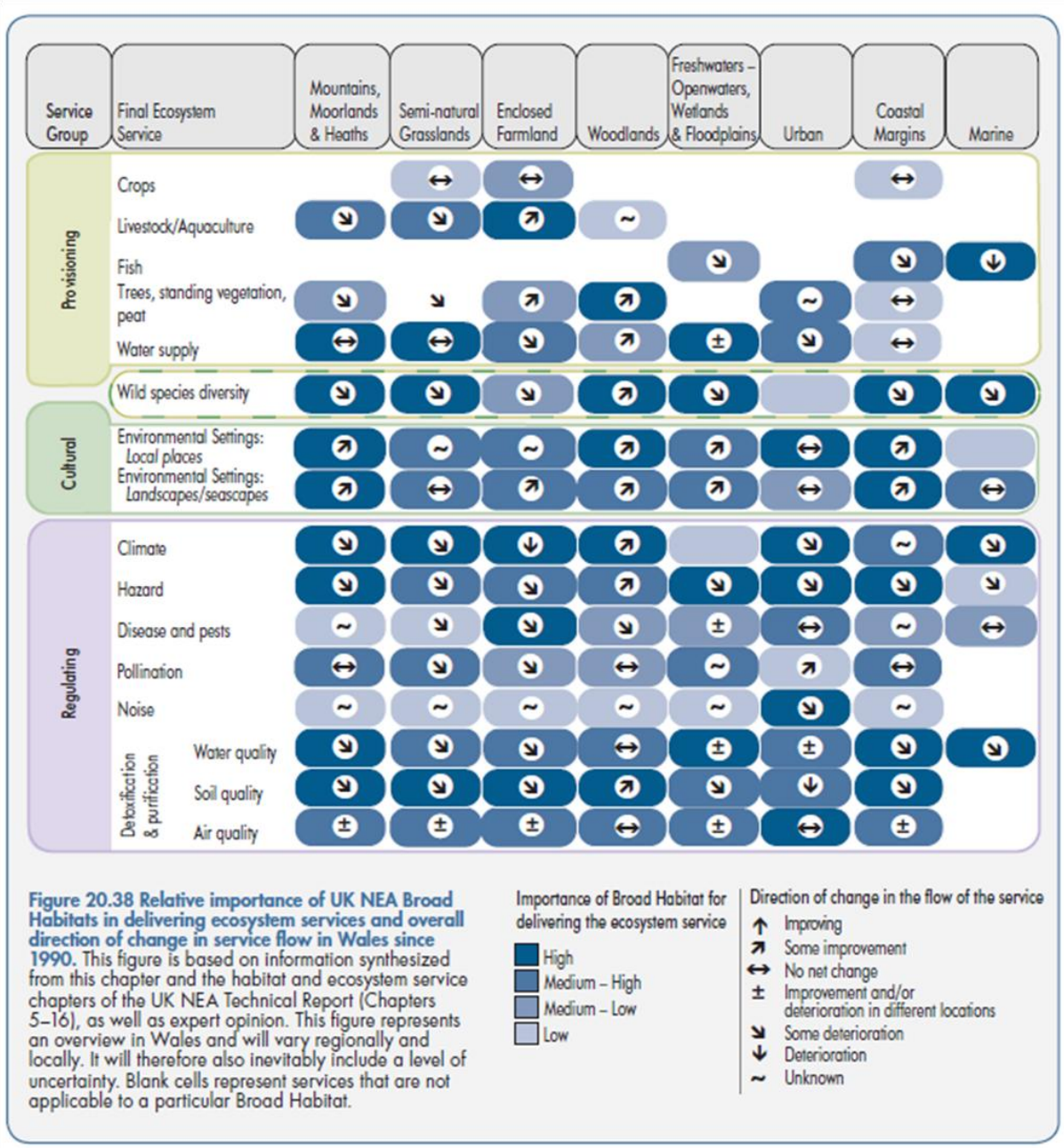


Figure 20.38 Relative importance of UK NEA Broad Habitats in delivering ecosystem services and overall direction of change in service flow in Wales since 1990. This figure is based on information synthesized from this chapter and the habitat and ecosystem service chapters of the UK NEA Technical Report (Chapters 5–16), as well as expert opinion. This figure represents an overview in Wales and will vary regionally and locally. It will therefore also inevitably include a level of uncertainty. Blank cells represent services that are not applicable to a particular Broad Habitat.

Based on Figure 2.2, those ecosystem services that are declining across most habitat types comprise:

- fish from freshwater and marine systems
- wild species diversity
- climate regulation

- hazard regulation
- pests and disease regulation
- pollination
- water quality
- soil quality.

Many of the above-listed ecosystem services are linked. For example, improvements in water quality will improve inland fisheries and wild species diversity, and improved soil quality will aid climate regulation through carbon sequestration. Informed by the findings of the UK NEA, discussions over the course of the project have indicated that the most appropriate areas for improving ecosystems service provision in the short-term are likely to include:

- enabling carbon sequestration, through preservation of organic soils such as peatlands or through forestation and management of grasslands
- catchment management to reduce flood risk hazard and promote river and lake water quality improvements
- land management to improve wild species diversity, fisheries and pollination.

It is worth noting that Defra's PES Action Plan[12], which is based on a significant body of research into PES, lists water quality, flood risk management, linking environmental stewardship and PES, forestry and woodlands, peatland restoration and place based partnership initiatives as specific areas of opportunity for PES in the UK.

12 Defra (2013) Developing the potential for Payments for Ecosystems Services: an Action Plan. May 2013

Box 2.1 Mapping ecosystems services at a national and local scale – examples from the SCCAN Project[13] and the Tamar Catchment Management Plan[14]

SCCAN - Natural Resources Planning Support System

When started by the Countryside Council for Wales in 2010, the SCCAN Project originally aimed to determine to what extent the ecosystems services identified by the National Ecosystem Assessment could be mapped on a regional and national level. It is recommended that this work is continued in order to set the baseline for ecosystem services provision for Wales as a national inventory, from which future PES schemes can draw data and evidence.

At a local level, the SCCAN Project has to date been primarily aimed at ensuring sustainable decision making, for example to enable planning decisions to enhance habitat connectivity. The Project concluded that by helping to set out different scenarios, the system provides a starting point for engaging a wide range of stakeholders. Mapping of ecosystems service at a local level through a system such as SCCAN would help to identify the range of ecosystems services and where they are in good or degraded condition, and where those services could be enhanced through place based PES schemes. PES schemes can then be focussed on improving delivery of these services.

Tamar Catchment Management Plan

A system has been developed in England by the West Country Rivers Trust at a river catchment scale. Individual ecosystem service prioritisation maps were generated by Working Groups to target interventions designed to enhance service provision at a whole catchment and in some cases finer resolution. These maps were then overlaid to reveal multi-functional areas of land that play a key role in the delivery of multiple ecosystem services. Identification of these multi-functional areas shows where delivery of ecosystems services might come into conflict with intensive agriculture or other activities, but also shows where improved land management could provide the most significant benefits in ecosystems service provision.

Mapping and further development of GIS based systems such as the existing SCCAN Project, started by CCW in 2010 and currently being run by NRW, could provide an opportunity for Wales to streamline development of effective PES schemes.

2.3 PURPOSE OF MARKET BASED INSTRUMENTS

In the context of ecosystems services, market based instruments (MBIs) are developed to include externalities in the price paid for ecosystems services, where externalities are those costs which have often not been recognised or paid for by the direct beneficiaries, but by wider society. For example, if a company which makes and sells a product also discharges to a watercourse to dispose of waste, and is not

13 Environment Systems (2012). System Cynorthwyo Cynllunio Adnoddau Naturiol (SCCAN) Natural Resources Planning Support System. A Practical application of SCCAN in Bridgend. September 2012.

14 The Tamar Plan Phase 1: Developing a shared catchment vision. Accessed at http://river-gateway.org.uk/catchments/tamar.html April 2014

forced to pay for this waste disposal service, this cost will be borne by wider society. The price of the company's product will therefore not reflect the full cost of its production, and this is an example of 'market failure'. MBIs are used in the following situations:

- To correct a market failure, so that ecosystem services are taken into account like other inputs when making consumption and production decisions. This is based on the premise that the more expensive a service, the more attractive it will be for providers to provide and the more likely that the users are to use it efficiently
- To correct an information failure, so that management practices or products that are more environmental friendly can be financially supported and a price premium can be charged for this
- To raise revenue for investment in environmental protection, compliance, awareness and enhancement.

If the purpose is to change behaviours (of providers and consumers of ecosystem services) price mechanisms that make pollution or environmental degradation more costly and environmentally-friendly provision more valuable, are preferred. This means prices and tax levels should be kept as high as possible.

If the purpose is to raise revenue, then, for example, tax levels could be kept low so that the taxed activity carries on, the tax is paid and revenue is raised. Similarly, to reduce environmental impact and cost to the public purse, subsidies should be reformed away from production to more environmentally-friendly management of ecosystems. Table 2.1 provides a summary of MBI characteristics, including a definition of how they operate, potentially relevant habitats, and policy areas.

It should be noted that there are certain limits to the fields of application for MBIs. For example, damage to critical, threatened and strictly protected habitats (e.g. designations under the Habitats Directive and Ramsar Convention and ancient woodlands) should not be justified through the provision of biodiversity offsetting or habitat banking[15]. For critical habitats and species, protection and imposition of the mitigation hierarchy should still apply[16].

15 Article 6(4) of the Habitats Directive determines that adverse effects to a European designated site can only be caused as a last resort, for '*imperative reasons of over-riding public interest*' subject. In these cases compensation is required to ensure that the overall coherence of the European network of wildlife sites is protected. This is consistent with the principle of no net loss (NNL).

16 eftec, IEEP et al (2010) The use of market based instruments for biodiversity protection – the case of habitat banking. Summary Report for the EC DG Environment.

Table 2.1 Overview of MBIs – application to habitats and potential policy areas

MBI	Definition	Habitat	Potential Policy Areas
PES	Voluntary payments to land managers and others to undertake actions that maintain / increase the quantity of desired ecosystem services. Payments are made directly by local beneficiaries in return for land use management actions or outcomes, alternatively by distant beneficiaries in terms of credits e.g. as in the Woodland Carbon code. For both systems provision ES needs to be verified and credits need to be legally recognised.	• Mountains, moorland and heaths • Semi natural grassland • Enclosed farmland • Woodland • Freshwater • Urban	Fisheries Water supply (quantity and quality) Agriculture Forestry Flood risk management Conservation Carbon storage and sequestration
Habitat banking	A market where the credits from actions with beneficial biodiversity outcomes can be purchased to offset the (residual) debit from environmental damage. Credits can be produced in advance of, without ex-ante links to, the debits they compensate for, and stored over time.	• Mountains, moorland and heaths • Semi natural grassland • Enclosed farmland • Woodland • Freshwater • Urban	Extractive industries Housing and other development Major infrastructure Other activities that may have statutory obligation or voluntary incentive to buy credits
Biodiversity offsets	Measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts.	• Mountains, moorland and heaths • Semi natural grassland • Woodland • Freshwater • Urban	Extractive industries Housing and other development Major infrastructure Other activities that may have statutory obligation or voluntary incentive to buy offsets
Environmental performance bonds	Bonds can be used for environmental protection, in which case they are known as “environmental assurance” or “environmental performance” bonds. Essentially, before a firm carries out a major infrastructure, construction or extraction development it must purchase these bonds from the appropriate government entity with the promise of maintaining a certain minimal level of environmental impact.	• Freshwaters • Woodland • Mountains, moorland and heaths • Urban	Extractive industries Forestry Agriculture Major infrastructure

MBI	Definition	Habitat	Potential Policy Areas
Trading, including tradable carbon offsets	Three types of trading have been identified: • Pollution trading (e.g. EU ETS) • Carbon offsets (similar to biodiversity offsets) • Water trading	• Mountains, moorland and heaths • Semi natural grassland • Enclosed farmland • Woodland • Freshwater • Urban	Carbon emissions Water supply (quantity and quality)
	Carbon offsets - credits (voluntary as well as regulated) which are created by maintaining storage / sequestration	• Urban • Forests and Peatland	Carbon storage and sequestration

2.4 MARKET BASED INSTRUMENTS IN THE WELSH CONTEXT

The development of appropriate MBIs could help facilitate delivery of a range of objectives and benefits for Wales, for example:

- Through securing private or partnership funding in delivering environmental outcomes, the financial burden on the public sector of delivering environmental improvements could be reduced, allowing public sector investment to be directed elsewhere.
- MBIs provide incentives for delivering both the mandatory legal and regulatory standards of environmental protection, as well as enhancements or improvements to the existing baseline.
- Achievement of No-Net-Loss in Wales (biodiversity and carbon offsets and habitat banks would be favoured instruments for this objective).
- To encourage and support *'Green Growth',* which offers considerable opportunities to Wales in addressing the long-term structural challenges of jobs and poverty. The green economy is an important element of green growth and describes a specific subset of the Welsh economy. Sales in the green economy in Wales contributed £5.5 billion to the Welsh economy in 2011/12, supporting over 41,000 jobs. During the recession between 2009/10 and 2011/12, jobs grew by around 2.4% and sales by around 9.3%[17] representing a potentially considerable growth area which is expected to underpin future EU funding.
- Stakeholder engagement through this study has indicated a requirement for activities in Wales are aligned or integrated with wider UK and EU mechanisms, and that linkages and relationships are clearly explained.
- MBIs can also reduce the costs of providing existing environmental services by incentivising more innovative and efficient delivery through competitive pressures. Water companies, including those in Wales, have been able to demonstrate the business case for catchment management approaches and sustainable drainage systems, which can be more cost effective and cost beneficial in the longer term than traditional 'end of pipe' or 'hard' engineering solutions.
- MBIs can generate new revenue through the creation of new markets for products and services, or 'value added' for environmentally sustainable products.
- Stakeholder engagement through this study has highlighted the importance of maintaining existing markets as well as developing new ones; the linkages between new and existing mechanisms need to be clearly explained.
- MBIs can stimulate regeneration in rural areas, leading to more vibrant local

17 Green Alliance (2012) Green Economy: A UK Success Story. Green Alliance, London

economies and communities and ultimately supporting growth.

2.5 RESULTS OF SCREENING IN PHASE 1

Phase 1 of this project reviewed the main types of MBI as the basis for discussion of which might be most appropriate for further development and promotion in Wales. These included:

- Payments for ecosystems services (PES)
- Small scale resource tax
- Trading (e.g. water abstraction licences, pollution permits)
- Biodiversity offsets
- Habitat banking
- Environmental performance bonds
- Price structures that encourage local supply chains
- Product labelling and other (new) markets
- Subsidies for more environmental friendly management practices (for example, the Welsh Government's Glastir land management schemes).

MBIs should be selected and designed to meet criteria across the social, economic and environmental spectrum, including economic efficiency, environmental effectiveness, potential for impacts on small businesses, social desirability and institutional fit and acceptability. MBIs may be financed and managed privately or by Government.

Conclusions from Phase 1 and subsequent recommendation from the project steering group indicated that PES should be the main focus of further evaluation in Phase 2. It was decided that while consideration of biodiversity offsetting, habitat banking and trading is relevant, these MBIs would not be the primary focus of the study. This is consistent with views from stakeholders who recognise that PES is just one of a variety of MBIs and it will be important for Welsh Government to clarify the relationship with others when developing their approach.

PES constitutes an MBI whereby the provision of a given ecosystem service that is currently not provided, to protect an existing service from a detrimental (but legal) change in land management practice or to secure provision of an enhanced service, is secured by means of a voluntary transaction between the provider of the service and a beneficiary. This security is provided by paying the providers for the ecosystems service, for which they currently receive no payment. In this way they are discouraged from using the land for something else that will pay (for example, maintain a forest for its watershed management services rather than fell its trees for

timber). In other words, PES is based on a '*beneficiary pays*' principle. In comparison, the '*polluter pays*' principle is where damage to an ecosystems service is prevented by or compensated by the entity likely to cause, or which has actually caused, damage to the service. PES payments cannot be made to pay for pollution (or damage) abatement that should be enforced through regulation. There remains some debate in the emerging PES market about this principle, and some PES schemes have sought to introduce land management activities that would otherwise be required under the polluter pays principle, in essence to "pump prime" future land management improvements (e.g. paying farmers to provide adequate slurry storage to avoid polluting activity).

The remaining MBIs are either about:

i. making sure that sufficient compensation is designed and implemented before or after a given environmental damage occurs (offsets, habitat banking, environment performance bonds), or

ii. avoiding damage by making it more costly, e.g. by taxing pollution…or by increasing price premium for less polluting products (e.g. eco-labelling).

Environmental performance bonds are limited in their field of application and probably not appropriate in the context of Wales' current economy. They are largely applicable to new extractive industries, and not the restoration or mitigation of previous impacts[18].

2.6 STAKEHOLDER COMMENTS AND POTENTIAL BARRIERS

PES is selected as the focus for further development because one of the important objectives of Welsh Government is to find an MBI that can both secure ecosystem service provision, and at least start to shift the funding burden from the public to private sector.

Additional considerations raised by stakeholders through the Phase 1 engagement element of the study include:

- The need to develop and build strong partnerships and communicate effectively across the public, private and third sector.
- The need to develop long term funding and management (e.g. 20 years plus)

18 Some governments have issued 'green bonds' to raise finances for specific environmentally focused infrastructure projects, thus contributing to the green economy. The World Bank was the first entity to issue green bonds and has since issued over $3.5billion in debt designated for issues related to climate change. US municipalities have been issuing green bonds to fund environmental projects for several years (http://bonds.about.com/od/munibonds/a/What-Are-Green-Bonds.htm).

agreements to ensure certainty for investors and land managers and farmers.

- The difficulties associated with getting some stakeholders or sectors involved, such as the insurance industry and developers.
- Concerns regarding potential "free-riders", for example how to deal with beneficiaries who do not pay for services.
- The difficulties associated with the valuation of nature and the lack of evidence and tools to accurately quantify the costs and benefits associated with ecosystem services approaches.
- The risk of creating unintended consequences associated with the potential for transition to treating nature as a "commodity".
- A lack of data and information to support assessment of ecosystems services (baseline, flows, costs, benefits, causes and effects leading to impacts).
- The distributional impacts of developing PES and other MBIs, particularly the risk of adverse impacts on low income groups.

We would recommend consideration of each of these stakeholder concerns prior to implementation of any MBI scheme in Wales, perhaps to explicitly state how they have been addressed in formulation of the preferred approach(es). Key barriers to the use of PES can be defined as set out in Table 2.2. In terms of PES schemes, many of the stakeholder concerns (or perceived barriers) listed above, and acknowledged barriers listed in Table 2.2, would be countered through effective development of the strategy and underlying actions advocated in this report.

Table 2.2 Barriers to the use of PES[19]

Category	Challenges	Potential Solutions
Informational	Lack of awareness among beneficiaries and providers	Effective engagement and outreach – dissemination of the message, and provision of assurance
Technical	Scientific uncertainty	Scientific research and consensus among PES actors, for example on suitable monitoring proxies and their use as indicators of outcomes. Businesses have shown interest in carbon sequestration through peatland restoration. However they want to know the value of their investments per tonne of CO2 sequestered – research is ongoing to clarify this.
	Establishing baselines	Should incorporate present baseline, and future baseline (counterfactual), which is particularly challenging to establish. The OECD monitoring and HM Treasury Magenta Book guidance are advocated in this guidance
	Diffuseness	Diffusion of often multiple (stacked or bundled)

19 Adapted from Defra (2011) Barriers and Opportunities to the Use of Payments for Ecosystems Services. Final Report September 2011. Prepared by URS Scott Wilson, James Hutton Institute, University of Aberdeen.

Category	Challenges	Potential Solutions
		ecosystem benefits among different groups disincentivises any one group or individual paying for them. Pragmatic solutions may involve an agency or NGO stepping in as buyer.
	Appropriate programme size	Large schemes may offer economies of scale. Small schemes may be more flexible and focused, and more able to foster participation. It has been argued that PES schemes should be organised at the least centralised competent level of authority[20]
	Avoiding leakage	Capturing leakage effects may require any monitoring framework to be extended beyond the boundaries of the PES scheme. Leakage from small schemes is less likely than from national scale schemes. Careful design and appropriate monitoring and mitigation are required to reduce leakage effects.
	Ecosystem valuation	Can inform an appropriate payment level and determine if a PES scheme is worth implementing. However reliant on hedonic pricing is contentious in terms of its subjectivity, although reliability is improving with research. Increasingly, private companies such as water companies are considering ecosystem valuations in their decision making.
	Excludability and free riding	Where services are less excludable, with less tangible and defined property rights, schemes featuring buyers from the public sector are favoured. Where rights are better defined, private sector buyers are likely to play a larger role.
	Shortage of skills and experience	Develop a skill base among knowledge providers such as NRW and environmental NGOs, such that they can provide independent consistent advice.
Spatial	Spatial variability	Geographical targeting may be enabled through price-revelation, including reverse auctions (so the most effective delivery is contracted at least cost).
Temporal	Permanence	Depends on continued flow of finance, i.e. contractual compliance on part of both buyer and seller
	Time lags	Many schemes are designed on a payment by intervention system, partly because of the time lag between interventions and results, but also because of uncertainty that outcomes will occur
	Differing time horizons	Enables such as Welsh Government need to consider the time horizons for enabling environmental change, particularly in terms of administrative time horizons (i.e. 50 years compared to 5 years).
Financial	Perceived risks	Buyers may perceive a risk which may hinder schemes moving from traditional grant based funding to self-financing PES systems, as has been the case for the Pumlumon project. Buyers and sellers may engage in self-insurance to reduce risks; sellers produce more services than they have contracted (i.e. to guarantee supply, as in provision of a buffer of carbon credits under the Woodland Carbon Code), and buyers contract for more services than they need.
	High start-up costs	Frontloading payments can help to deal with high start-up costs, for example where land use changes are

20 Wunder, S. and Santiago, C. (2010). Payments for Ecosystem Services: Scaling Up…and Down. In: Forest Trends and the Katoomba Group. Beyond Borders: PES and REDD in the ASEAN Region

Category	Challenges	Potential Solutions
		required such as tree planting.
	High transaction costs	A wide range of activities involved in establishing a PES scheme (identifying ES, interventions, finding buyers and sellers, contract development and negotiations, demonstrations) provides scope for high transaction costs. Standardisation of approaches via a Government led strategy may be able to provide efficiencies.
Institutional	Collective action problems	A supporting institutional environment is essential to ensure collective action, such that PES schemes result in effective delivery.
	Perverse incentives	Less likely from small PES schemes, these have arisen as a result of subsidy based schemes. Monitoring of benefits should be designed to pick up unforeseen effectives, including socio-economic effects.
	Complex policy environment	Government can clarify sometimes conflicting and often overlapping policies (e.g. Nitrates Directive and WFD) through development of a specific strategy, and institutional mechanisms for registry and certification.
Legal	Property rights and other issues	Clearly defined provisions in legal contracts or covenants. An overarching consistent approach as could be provided by Government via some level of standardisation of contracts would reduce costs and provide assurance.
Cultural	Aversion to paying for ecosystems services	Some may object in principle to paying for ecosystem services, though this will usually be for services bought at a national scale.
	Lack of trust among land managers	Well informed and positive knowledge providers can counter a lack of understanding or trust among landowners, particularly if the knowledge providers are from groups which have credibility.
	Terminology	'Ecosystems services' is not a self-explanatory or easily understood term. Knowledge providers and other facilitators should endeavour to explain proposals in language which is tailored to the specific audience.
Equity considerations	Perceived unfairness	Targeting payments to those areas which deliver the greatest range of ecosystem services may result in perceptions of unfairness, as those landowners will receive a greater proportion of payments. The FAO has found that targeted payments are more effective at securing ecosystem service provision, whereas flat payments may be fairer. There is a potential trade-off between efficiency and equality[21]. The Pumlumon Project found that some farmers were already receiving payments under agri-environment schemes. For these farmers the Project negotiated a payment systems with Welsh Government such that payments were received for interventions, ensuring additionality and fairness.

Table 2.3 provides a summary of the potential roles for stakeholders in Wales in enabling marketisation of ecosystems services through each of the selected MBIs. Roles applicable to PES schemes are explored more fully in Section 3.

21 Food and Agricultural Organization of the United Nations (2007). The State of Food and Agriculture 2007: Paying Farmers for Environmental Services

Table 2.3 Summary of the potential roles for key stakeholders in developing selected MBIs

MBI/Stakeholder	Government (Welsh Government) *Overseer, enabler, legal provision*	Government agencies *Implementation, conflict resolution, knowledge provider **	Private sector *Buyers and/or sellers*	Other *NGOs, representing the general public / environment, experts (operational and evidence)*
PES	• Facilitate and instigate markets • Set up and implement legal agreements/ covenants (including property rights, longevity of payments and ES provision, calculation methods, payment methods) • Develop message and strategic policy objectives	• Could be brokers bringing buyers and sellers together • Could be buyers on behalf of the public (e.g. local authority) • Monitor and/or verify/accredit the provision of ecosystem services • Seller, making use of landholding (noting systems may need to be imposed to deal with potential conflicting roles)	• Buyers – private companies • Sellers - land owners / managers • Knowledge providers (e.g. water companies, consultancies)	• Sellers – NGOs if owning / managing land • Experts – providing evidence for ES quantification, costing, monitoring etc. • Brokers – that bring buyers and sellers together • Accreditation (such as UKAS)
Habitat banking	• Establish the legal system that assure the buyers that credits they are buying will be recognised • Establish best practice methods for damage and credit calculations to ensure that banking transactions are consistent within themselves and comparable across transactions • Establish penalties if credits are not provided over the agreed time	• Audit credit sales • Audit monitoring of credit provision over time • Seller, making use of landholding (noting systems may need to be imposed to deal with potential conflicting roles)	• Buyers - Extractive industries, housing and other developers, major infrastructure contractors, other activities that may have statutory obligation or voluntary incentive to buy credits • Sellers – landowners / manager	• Facilitators –"bankers" who have pre-identified asset base, new commercial ventures • Sellers – NGOs if owning / managing land • Experts – definition, measurement of damage (debit), benefits (credit), equivalency between debits and credits •
Biodiversity offsets	• Establish a legal system which enables long term provision of biodiversity credits • Establish a general offsetting policy framework • Set technical standards &	• Collect and publish information about biodiversity account and opportunities • Monitor implementation of offsets • Conflict resolution (e.g. an ombudsman role) • Seller, making use of	• Buyers - Extractive industries, housing and other developers, major infrastructure contractors, other activities that may have statutory obligation or voluntary incentive to buy offsets	• Sellers – NGOs if owning / managing land • Experts – definition, measurement of damage (debit), benefits (credit), equivalency between debits and credits • Accreditation (such as

MBI/Stakeholder	**Government (Welsh Government)** *Overseer, enabler, legal provision*	**Government agencies** *Implementation, conflict resolution, knowledge provider **	**Private sector** *Buyers and/or sellers*	**Other** *NGOs, representing the general public / environment, experts (operational and evidence)*
	best practice for biodiversity metrics so that different offset deals are comparable • Provide incentives for developers to adhere to policies /provision of penalties • Ensure consistency with other legal / policy frameworks	landholding (noting systems may need to be imposed to deal with potential conflicting roles)	• Sellers – land owners / managers	UKAS)
Environmental performance bonds	• Establish the rules for bond market: how to determine the amount for different contexts and activities (not a standard amount) to take account of site / damage specific factors • Establish the rules for long term security of the bond amount	• Control the deposition of bonds at the start of projects • Audit the use of the bond to ensure rehabilitation objectives are met	• Companies that deposit the bond • Extractive industries	• Auditing the use of the bond for rehabilitation at the end of the project could be done by a third party (e.g. NGO) that all parties agree to • Experts would be needed to advise how much the bond should be and how it should be spent
Trading – pollution permits, carbon and water (not currently seen as a viable alternative?)	• Establish the rules for trading that protects baseline ecosystem and allows efficient trading of polluting activities to an acceptable level of resource use • Establish the rules for long term security of the trading market	• Independent body that can manage the trading or at least monitor the compliance. NRW may need to facilitate initial market, but probably would not be long term "regulator" • Regulator to monitor ecosystem baseline to ensure maintenance and improvement	• Private companies in regulated sectors, water companies, agriculture, energy providers	• May need an expert adjudicator set appropriate baseline and limits.

*NRW has stated intentions to participate in PES schemes primarily as a buyer/seller. NRW have advised that in the current situation it would be unwilling to jeopardise active market participation by taking on potentially conflicting brokerage or facilitator roles.

3 IMPLEMENTATION OF PAYMENTS FOR ECOSYSTEMS SERVICES

3.1 INTRODUCTION

PES schemes have become widespread in the international arena over the last two decades[22], and have increasingly attracted attention in the UK, culminating in the Defra-sponsored PES pilots over the last two years[23]. The considerable evidence and learning from these programmes has been used here to set the context and fundamental requirements that Welsh Government will need to consider when facilitating its own PES scheme(s), with specific recommendations for a framework that would facilitate the introduction of PES markets in Wales given in Section 4.

The overall strategy and many individual actions are similar between PES, offsets and habitat banking; the difference between the three lies in their purpose. The main thrust of the policy message, objectives, strategy and governance structures will be common, with specific scheme details and supporting structures requiring some modification.

3.2 OVERVIEW OF PAYMENTS FOR ECOSYSTEMS SERVICES, OFFSETTING AND HABITAT BANKING

The following is a summary of the purposes of PES, biodiversity offsets and habitat banking to highlight the similarities and differences. Any strategy to develop a new market must ensure the market:

- meets the purpose it is designed for
- avoids pitfalls and unintended outcomes
- engenders participation from the stakeholder community of buyers and sellers of particular ecosystem services by facilitating participation and enthusing the players
- is credible and feasible (practical rules, sufficiently low transaction costs and also that there is sufficient habitat / space /species to pay for (in PES) and to generate offsets and credits)
- is regulated sufficiently and transparently to ensure consistent and reliable implementation which encourages participation; and

22 Millennium Ecosystem Assessment (2005) Ecosystems and Human Well-being: Synthesis. Retrieved 29/04/2014 from http://www.millenniumassessment.org/documents/document.356.aspx.pdf

23 Defra Guidance on Ecosystem services: Research and case studies. Retrieved 29/04/2014 from https://www.gov.uk/ecosystems-services

- is not overly regulated so as to discourage participation.

Payments for ecosystem services (PES) is one of the principal ways in which a market for ecosystem services can be established. The term PES is often used to cover a wider suite of economic instruments used to reward and encourage the protection and enhancement of ecosystem services.

Specifically PES can be defined in terms of voluntary payments to land-owners, managers and others to undertake actions that increase the quantity and quality of desired ecosystem services, which benefit specific or general users, often remotely.

Biodiversity offsets are a mechanism to deliver measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development and persisting after appropriate prevention and mitigation measures have been implemented. The goal of biodiversity offsets is to achieve no net loss, or preferably a net gain, of biodiversity on the ground with respect to species composition, habitat structure and ecosystem services, including livelihood aspects.

Habitat banking is a biodiversity compensation mechanism that is based on the concept of biodiversity offsets. Habitat banking schemes, which operate at a different scale to offsetting systems, provide a market where the credits from actions with beneficial biodiversity outcomes can be purchased to offset environmental damage. Credits can be produced in advance of, and without ex-ante links to, the debits for which they compensate, and can be stored over time.

The key commonalities and differences between these mechanisms are summarised in Box 3.1.

Box 3.1 Commonalities and differences between PES, Biodiversity Offsets and Habitat Banking

Commonalities
At the heart of all three lies the principle that a buyer (or a group of buyers) pays a seller (or a group of sellers) to secure the additional flow of one or more ecosystem services.
In all cases, monitoring is required to ensure that the buyer is getting what is expected from the seller. Again in all cases, contractual arrangements need to reflect the long time frames involved, property rights and inherent environmental complexities and uncertainty (especially about how benefits change as management practices change – as paid for by PES, offsets or banking).

Differences
For PES the payment is to either ensure the current ES provision continues (against potential future threats), or to improve the quantity and quality of the ES provided. So the aim is to:

- Maintain or improve current quality and / or quantity of ES
- Ensure that current / improved quality and quantity of ES is sustained over a longer time period than would be possible in the absence of payment
- To generate additional benefits, PES payment must enable ES provision that would not be possible in the absence of the PES payment

For biodiversity offsets the payment is to ensure remediation of a damage that has been or will be caused by the buyer. The offset (habitat or ES) bought is equivalent or greater than the damage.

- To generate additional benefits, offset payment cannot be made for an additional habitat that should have been protected (or its management funded sufficiently) in the absence of the offset payment (rules apply for designated sites (e.g. Natura 2000 to avoid concerns around additionality).
- Offsetting also needs to come after avoiding unnecessary harm and rehabilitation on site, i.e. following the mitigation hierarchy (avoid, reduce, rescue, repair, offset, compensate) which is a tool to help manage biodiversity risk, and is commonly applied in Environmental Impact Assessments (EIAs) (UNEP 2010).
- While the offset credits in habitat banking are created in advance, biodiversity offsetting refers to credits that are created specifically to compensate a given project, programme or policy.

For habitat banking, the payment is also to ensure remediation of damage. But here, different to biodiversity offsets, offsets (or credits) are prepared in advance of damage, without knowing exactly what kind of damage will happen and where. It is up to those providers of HB credit to anticipate what damage will be done to what kind of habitat and to create credits by enhancing that type of (and sufficient quantity of) habitat for any potential future sale.

For both biodiversity offsets and habitat banking:

- To generate additional benefits, the HB credit bought should be for an additional biodiversity impact that would not have been protected anyway in the absence of the credit payment. Purchasing credit cannot be used instead of adhering to the mitigation hierarchy (just as bespoke biodiversity offset cannot be)
- Monitoring is necessary to ensure rules are adhered to in individual transactions, and the systems providing the required outcome for society.

3.3 ROLES AND ACTIVITIES REQUIRED TO SUPPORT DEVELOPMENT OF PAYMENTS FOR ECOSYSTEMS SERVICES AND OTHER MARKET BASED INSTRUMENTS

Table 2.2 identifies potential roles across different MBIs. This section focuses on roles to enable development of PES schemes at differing scales, taking into account the current and likely future state of devolution in Wales, and learning from the wider

UK and international contexts. It is important to consider the different roles in developing MBIs that could be fulfilled across the public (Welsh Government and agencies, local government), private and third or voluntary sectors. Roles and powers for NRW in enabling ecosystems services markets are currently being considered for development of the Environment Bill, for which a White Paper was issued for consultation between October 2013 and January 2014.

Defra's recently published Best Practice Guide[24] identifies four groups of PES actors:

- **Buyers** - beneficiaries of ecosystem services, who are willing to pay for them to be safeguarded, enhanced or restored
- **Sellers** - land and resource managers whose actions can potentially secure supply of the beneficial service
- **Intermediaries** - can serve as agents linking buyers and sellers and can provide guidance on scheme design and implementation, potential for the "honest broker" in negotiation, provision of finance in terms of loans for feasibility and start-up costs, promotion, collecting and transferring payments
- **Knowledge Providers** - include resource management experts, valuation specialists, land use planners, regulators and business and legal advisors who can provide knowledge essential to scheme development, monitoring, evaluation.

Central Government's (Welsh Government) main role would largely sit outside these categories in provision of messaging oversight, direction and reassurance (in terms of scheme endorsement) to actors newly entering the market. Informed by the Environment Bill White Paper and associated consultation, NRW would currently aim to be involved in PES schemes primarily as an active market participant (i.e. as a buyer and/or seller). NRW's role could potentially also extend to facilitation, which may include monitoring and accreditation, and brokering. However, in general it would be advisable to keep market participation (i.e. as buyer/seller) and monitoring, accreditation and other enabling roles separate due to the potential for conflicts of interest to arise.

Provisions similar to *'Chinese Walls'* or other governance structures may be appropriate to resolve conflicts of interest issues – these systems have been used in industry, particularly finance, to create an information barrier within an organisation to prevent exchanges of information that could cause conflicts of interest. As noted in Environment Bill White Paper consultation responses, it is critical to avoid any

24 Smith, S., Rowcroft, P., Everard, M., Couldrick, L., Reed, M., Rogers, H., Quick, T., Eves, C. and White, C. (2013). Payments for Ecosystem Services: A Best Practice Guide. Defra, London.

perception of conflicts of interest that could undermine public confidence in the PES market. Any roles that NRW or other bodies take on in implementing markets may have resource implications in terms of capacity and expertise.

In summary, our analysis has identified main roles for the broad categories of stakeholders in Wales:

1. Welsh Government – an oversight, facilitatory, directional and assurance role (removing barriers and providing a regulatory framework), buyers (in terms of purchase of services on behalf of society), enablers (start-up loans, seed funding).
2. NRW – wants to participate primarily as a seller (noting forestry landholding), and potentially as buyer (in terms of flood risk management). NRW has stated its concern that taking on additional roles as knowledge provider and facilitator (in terms of monitoring, accreditation) could potentially create a conflict of interest and jeopardise its preferred role as a market participant.
3. Local government – potential buyers, sellers, intermediaries in negotiations, potentially in checking compliance with contracts
4. Private sector – as buyers or sellers of ecosystem services (including water companies; land holders (farming, forestry etc.); industry and commerce (CSR etc.); banking and insurance; developers etc.), and as knowledge providers; accountancy firms (i.e. carbon accounting and registry), consultancies and academia
5. Other – includes NGOs (Rivers Trusts, Wildlife Trusts, Groundwork, RSPB, other groups with community leverage), insurers, brokers, traders and technical experts from academia and consultancies who may fulfil roles as buyers, sellers, brokers, facilitators, accreditors or knowledge providers.

Natural England has to date played an advisory and facilitatory role as a knowledge provider informed by research such as the upland ecosystems services pilot projects (Bassenthwaite, SW Uplands and South Pennines), and is undertaking wide ranging research[25] into specific aspects of ecosystems services to better enable schemes. One area of research focus is valuation of ecosystems services[26] – comparing the value of ecosystems services provided under different land use and land management interventions and comparing these with costs, and contributing to natural capital evaluation including that overseen by the Natural Capital Committee. Natural England has considered how to develop place based PES schemes in the English uplands and has used the South Pennines as a case study, building on the evidence

25 Natural England evidence work area. Accessed at http://www.naturalengland.org.uk/ourwork/evidence/ecosystemapproach.aspx

26 Natural England (2011) Economic Valuation of Bassenthwaite Ecosystems Services Pilot Project.

base generated through the ecosystems service pilot project[27].

3.4 FUNDAMENTAL CHARACTERISTICS OF PES

Learning from international and UK PES schemes identifies two characteristics that have to be present for a mechanism to be classified as PES according to a commonly used definition:

- PES involves direct payments from the beneficiaries to the providers of enhanced ecosystem services;
- The nature of the transaction has to be voluntary (i.e. participants are not forced to trade by regulation or in order to meet a mandatory cap).

Schemes can be split into public payment schemes to encourage provision of ecosystem services and privately-organised deals in which individual beneficiaries of ecosystem services contract directly with landowners.

Normally a PES scheme is 'conditional' in the sense that payment takes place only if the desired service or land condition actually occurs, though 'potential' services can also be covered (for example, payments for providing land for flood storage might occur even in a year with no flooding).

There can be different configurations of PES depending on the involvement of single or multiple buyers and sellers (termed *one to one, one to many, many to one etc.)*, and buyers and sellers may be from the public or private sector. Often, an intermediary acts as broker or enabler between the buyer and seller. For example, where a water company wishes to pay farmers in a catchment to deploy farming practices which reduce the likelihood of diffuse pollution, it could be necessary for another entity to enable that transaction and to disseminate best practice to the farmers in the catchment.

Some PES schemes are designed on the basis that payments are made for outputs (i.e. payment on *delivery* of the ecosystem service), and others on the basis that payments are made for actions (i.e. sellers are paid to deliver on the ground interventions that are designed to deliver the ecosystem service in time). This deals with the inherent uncertainty of environmental systems; if all PES schemes were based on payments for outcomes, there would be insufficient certainty for most sellers to take part. For this reason, input-based arrangements are currently more common as they are seen to be more practical and more easily accepted.

27 Quick, T., Reed, M., Smyth, M., Birnie, R., Bain, C., Rowcroft, P and White, A (2013) Developing place-based approaches for Payments for Ecosystem Services, URS London.

Where a PES scheme covers more than one ecosystem service, these services can be 'packaged' in several different ways:

- **Bundling**: a single buyer, or group of buyers, pays for the complete package of ecosystem services from a given habitat.
- **Layering/ stacking:** multiple buyers pay separately for different ecosystem services arising from the same habitat.
- **Piggy-backing**: some (but not all) ecosystem services from a given habitat are paid for by buyers, while the remaining benefits are delivered at no cost to beneficiaries.

In facilitating the development of PES schemes in the Southern Pennines ecosystems service pilot area, Natural England has found that while stakeholders like the idea of a layered service PES scheme, with different beneficiaries paying for distinct services, such systems are difficult to administer in terms of appropriate metrics, who pays, and determining payment amounts. Systems based on bundled services are easier to run[28]. In the early stages of PES market facilitation, it is recommended that systems to bundle complex services or payments should be avoided to ensure that the principles and logic of the mechanisms can be adequately explained and subsequently embedded. This 'learning by doing' can then lead to more complex schemes as evidence and understanding improves. The proposed NRW trials and Nature Action Zones should carefully consider the level of complexity of any PES scheme and how the bundling of services may enhance or make opaque the findings. Careful identification of benefits, co-benefits (to other ecosystem services) and savings (through reductions in capital expenditure, for example for flood prevention or drinking water treatment plant asset construction) in ecosystem service provisions will help to tease out the beneficiaries and successful PES approaches.

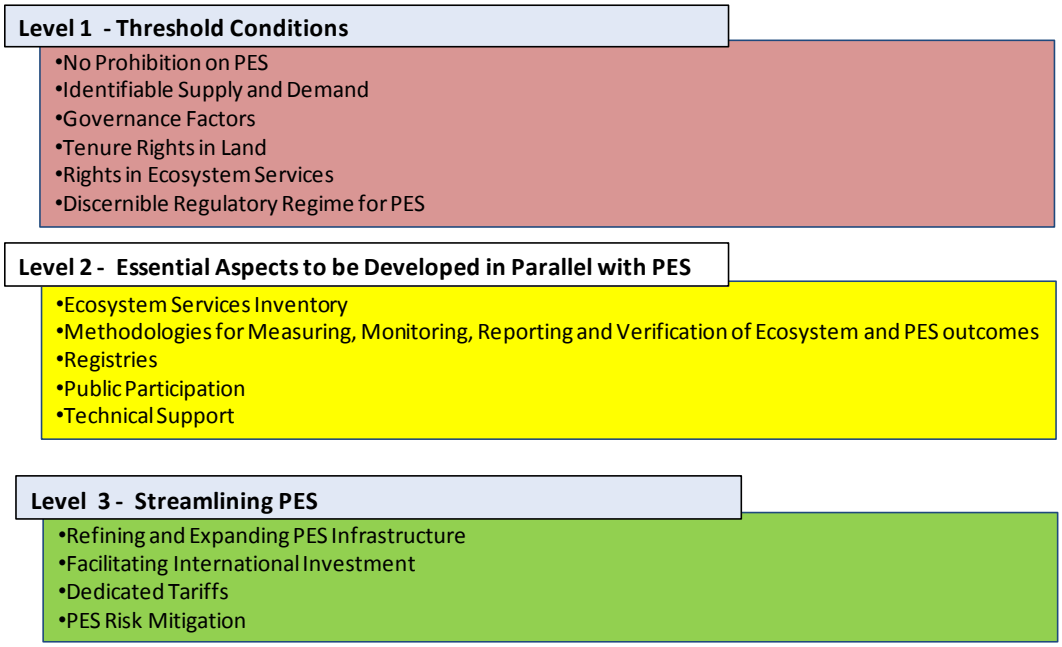
3.5 HOW CAN WELSH GOVERNMENT PROMOTE THE UPTAKE OF PAYMENTS FOR ECOSYSTEMS SERVICES SCHEMES IN WALES?

In order to provide the environment where buyers and sellers are most likely to participate in ecosystems services markets, through PES or other mechanisms, Welsh Government must suitably explain that it will promote and support the approach and provide certainty that it backs its long term implementation. It will also need to provide suitable legal and governance constructs, usually provided by government and, where necessary, monitoring and evaluation processes, usually through a regulatory or intermediary body, to ensure suitable PES scheme implementation.

28 Natural England (2014). Personal communication with Ruth Waters, 17 April 2014.

Cumulated learning from many PES schemes recommends that there are three fundamental stages or levels that government organisations need to establish when preparing the ground for PES agreements (Figure 3.1; Forest Trends Organisation[29]). The levels set out in Figure 3.1 are generic. What is feasible and appropriate in any given national context depends on numerous political, economic as well as environmental factors. These are all critical elements that are largely not yet implemented in Wales.

Figure 3.1 Factors for Assessing Legal and Institutional Readiness for PES Transactions (from Hawkins, 2011)



We have considered the three levels in Figure 3.1, and their underlying requirements, in terms of our understanding of the specific Welsh context, for example in terms of the potential roles to be undertaken by NRW, as well as evidence from elsewhere (for example Sattler and Matzdorf[30]), to develop a framework strategy for development of PES schemes in Wales. This framework strategy is described in Section 4.

29 Hawkins S. (2011). Laying the Foundation - An analytical tool for assessing legal and institutional readiness for PES. The Katoomba Group and Forest Trends. December 2011.

30 Sattler, C., Matzdorf, B., 2013. PES in a nutshell: From definitions and origins to PES in practice—Approaches, design process and innovative aspects. Ecosyst. Serv. 6, 2–11.

4 FRAMEWORK FOR INTRODUCTION OF PAYMENTS FOR ECOSYSTEM SERVICES IN WALES

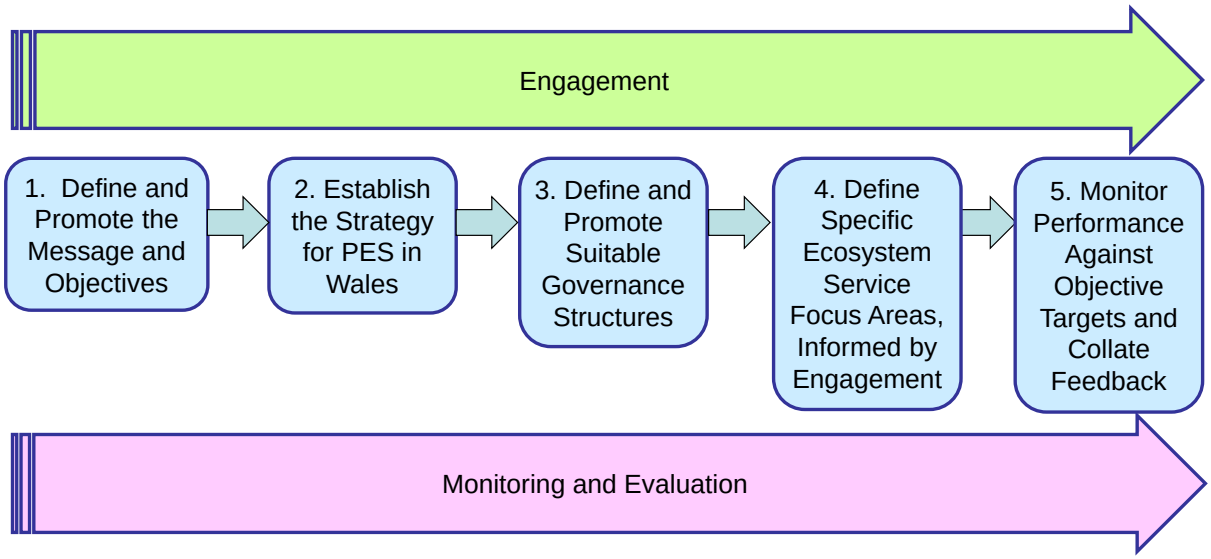
The framework presented in this section provides an overarching strategy for Welsh Government to facilitate development of PES markets in Wales. The framework translates significant evidence and learning from international and UK experience towards the facilitation of PES markets in Wales. Its uptake will engender clear messaging that Welsh Government supports the introduction of voluntary PES, through consistent systems around processes including prioritisation, monitoring and evaluation.

The majority of the work to date on introduction of PES internationally has been on the detail required for an individual scheme, or protections to a specific habitat type. Rarely has an overarching national strategy been developed with supporting infrastructure and governance considerations in terms of specific steps and actions. This section outlines the key facilitating processes that should be considered by Welsh Government during the development and implementation phases of future PES scheme provisions. The initial steps are vital. Experience from previous policy studies suggests that provision of a sense of direction by Government, supporting ground rules and governance structures (not necessarily regulatory), are key to successful implementation of PES – this corresponds to establishing Level 1 threshold conditions in Figure 3.1. The framework (Figure 4.1) seeks to establish a robust approach with all of the key elements included, and as explained in Section 3.5, is based on nearly twenty years of research and experience in market facilitation of ecosystems services.

Development of ecosystems service markets is iterative. Successful PES schemes are the product of extensive engagement with and contribution from stakeholders from the outset. The overwhelming advice from practitioners is that PES schemes should be established and subsequently developed into maturity through 'learning by doing'. This requires concerted effort by the facilitators (can be the Government) with professionally facilitated stakeholder engagement. This should include learning events for different interested participants to improve uptake, with monitoring and evaluation of the process to ensure that it delivers the desired outcomes or to allow modification when unforeseen and unwelcome outcomes become evident. Welsh Government is embarking on this process though facilitation of delivery partnership across the seven Nature Action Zones.

We would recommend that significant early effort is placed on generating momentum in the stakeholder community in Wales for a system to be successfully implemented.

Figure 4.1 Framework for development of Payments for Ecosystems Services Schemes in Wales



The framework we recommend is designed to allow iteration and feedback, with monitoring, evaluation and engagement with stakeholders undertaken throughout. Effective engagement and the need to modify established cultures, change minds and engender the trust of organisation and individuals takes time. Experience from many PES scheme implementations acknowledges that this approach will take time. We would expect it would take at least a year and probably more to develop the messaging, governance, monitoring and engagement processes, based on findings from similar exercises[31]. Step 4 can be developed in parallel through the emerging catchment trials and pilots that are starting to be discussed - it is this step that incorporates the implementation of pilot schemes. We have suggested that two PES pilots be trialled, utilising a national scheme (linked primarily to carbon sequestration using pre-existing carbon codes to facilitate implementation), and a bottom up catchment scale scheme (possibly to integrate water quality, flooding and biodiversity ecosystem services). Both schemes could draw on international experience and learning to usefully speed up the process of implementation in Wales.

At each step in the framework we have used case studies from schemes already under way in Wales, the wider UK and beyond. These now include the three emerging NRW Natural Resource Management Trial Areas, and a further seven area based trials to be run by Welsh Government across specific Nature Action Zones. At present the main thrust of these pilots and trials is unknown and our recommendations are based on experience of catchment pilots in the wider context (e.g. catchment based approach pilots, nature improvement area pilots). We have

31 Cascade Consulting, Collingwood Environmental Planning, eftec and YJ Rees Consulting (2013) Guide to Collaborative Catchment Management, report for Defra.

identified specific actions for Welsh Government to undertake to implement pilots based on the three areas in which ecosystems services provision could be most effectively enhanced in the short term (as explained in Section 2.2), noting that in terms of carbon sequestration, afforestation would appear to have more potential than peatland restoration due to the habitats available in Wales. These specific pilots are identified in Section 4.6, and could potentially be aligned with the planned NRW trial areas and Welsh Government Nature Action Zones.

We have also developed recommendations at each step of the framework from which a roadmap can be developed by Welsh Government for the implementation of the management structures and required processes. This will require a number of strategic decisions which have yet to be agreed and disseminated. In effect these become the top down processes that set the boundaries and provide the policy impetus. We have also sought to ingrain an element of flexibility into the recommendations that will allow bottom up development of the actual PES schemes, many of which should be established voluntarily between partner buyers and sellers. There is a balance to be struck such that Government provides the correct structures, rules and governance to encourage voluntary participation of potential buyers and sellers, without the same actions being too prescriptive and stifling participation.

From a legal perspective, it is important that appropriate legal frameworks for the development of PES schemes recognises the varying scales of potential schemes. Water related PES schemes are usually developed at catchment or more local levels; they require less guidance from the outset, but by taking a 'learning by doing' approach these local schemes can trigger development of policies and laws at national level. This was exemplified in Bolivia where PES initiatives were first developed at the local level involving local communities, municipal authorities and NGOs. These were then replicated and expanded geographically involving more actors, eventually resulting in the issuance of a departmental PES policy in Santa Cruz, the 2007 Policy for the Recognition of Ecosystems Services, followed by development of a national policy[32]. The emerging UK experience on catchment PES uptake (e.g. Upstream Thinking by South West Water) has reflected this regional/local scale application. We have recommended a catchment scale pilot for Wales to facilitate PES uptake that should consider these constructs.

In contrast, the REDD (Reducing Emissions from Deforestation and Forest Degradation) programme can be described as a top down multiple level PES scheme. Investment flows from international public funds, requiring a more complex legal and financial structure. Again, we have recommended a national scale pilot to test

32 Wichtendahl CG (2009) Annex II: Bolivia Report. In T. Greiber, ed. Payments for ecosystems services. Legal and institutional frameworks. Gland, IUCN – The World Conservation Union

such an approach. A mixture of a centralised approach through framework legislation and a decentralised approach through implementing regulations at the provincial and local level has the greatest potential to enable PES development[33].

The following sections define the 6 steps required to implement a facilitation process to encourage the uptake of PES schemes in Wales. The numbered actions in the blue boxes identify key activities to support implementation, with suggested responsibility for the activities noted in square brackets.

4.1 STEP 1 – DEFINE AND PROMOTE THE MESSAGE AND OBJECTIVES

The key to successful facilitation of PES schemes in Wales will revolve around the initial level of support provided by Welsh Government, and subsequent monitoring, audit and feedback. Welsh Government should provide clarity on its intentions for PES (and possibly other MBIs) through publication of an overarching message and supporting objectives; clarifying why PES schemes are required, the long term nature of the programme and the benefits that can be achieved. Consideration should be given to involving the stakeholder community in development of the message and objectives.

Box 4.1 explains the intentions Welsh Government currently has for its national Natural Resources Policy. This policy should be used to support and develop the Government's intentions, aims and approach to PES, and the ways in which a PES approach could operate in Wales to support the delivery of the national objectives towards 'green growth', with links to the identified key opportunities, trends and priorities for sustainable management of natural resources in Wales. The message could also reflect themes included in the autumn Statement from the Minister, such as recognition of the value of Wales' natural resources, and development of 'green growth' through use of natural resources to create jobs and tackle poverty[34].

33 Greiber T in FAO (2011) Payments for Ecosystems Services and Food Security. Accessed at http://www.fao.org/docrep/014/i2100e/i2100e.PDF April 2014

34 Statement from Minister for Natural Resources and Food (2013). Accessed at http://wales.gov.uk/topics/environmentcountryside/consmanagement/natural-resources-management/policy-statement/?lang=en April 2014.

Box 4.1 Welsh Government Natural Resources Policy[35]

"The policy will identify the key opportunities, trends and priorities for the sustainable management of natural resources on a national basis. It will identify the ways in which we must manage our natural resources, including those in the marine environment, to deliver for the long-term benefit of Wales, as well as the contribution they make at an international level. It will also set out the actions required by the Welsh Government, NRW and other public bodies, including statutory undertakers, to ensure the management of the natural resources of Wales can support the national outcomes. It will form the high-level direction of travel for all natural resources policy in Wales, including the social, environmental and economic impacts and opportunities from natural resources and link to national outcomes and indicators."

The message should support the strategic objective of no net loss (of biodiversity) as indicated in the EU post-2010 Biodiversity Strategy, which includes six sub-targets and 20 related actions, including Action 7; *'ensure no net loss (NNL) of biodiversity and ecosystem services'*, in support of Target 2: '*By 2020, ecosystems and their services are maintained and enhanced by establishing Green Infrastructure and restoring at least 15% of degraded ecosystems'*. There are no sanctions applicable if the NNL objective is not achieved, but it is recommended that it should underpin all MBIs.

1. Include a policy statement on the Welsh Government approach to facilitation of PES markets in Wales in the Environment Bill and other supporting texts as appropriate [Welsh Government].

Establishing PES schemes is a complex undertaking, one that requires the consideration of scientific but also social, economic, political, institutional, and legal relationships. For example, the ability to maintain farmer income levels at all times and finance all technological changes has been an important element of success, but usually the primary reasons for success have not been financial. Trust-building through the creation of an intermediary institution (locally based and led by a 'champion' sympathetic to the buyers, e.g. farmers, water company etc.); the development of a long-term participatory process to identify alternative practices and a mutually acceptable set of incentives; the ability to link incentives to land tenure and debt cycle issues and to substitute the old technical and social support networks with new ones, are all fundamental conditions of success[36].

35 Welsh Government (2014). Personal communication from Zowie Hay.
36 WATER Partnership (2012) Restoring river catchment function through Payments for Ecosystems Services. Westcountry Rivers Trust

Box 4.2 Expectations Management When Promoting Individual PES Schemes

Development and mainstreaming of PES will take time mainly because of the importance of engagement, changing minds, cultures and engendering the trust of organisations and individuals. This is more important than lack of scientific evidence, because if all parties are ready to take risks, evidence gaps can be incorporated into agreements.

Regardless of the time it will take to build momentum in the PES schemes implementation processes, WG should not expect significant economic activity at first. It has taken over 3 years in England since the pilot PES schemes were introduced and there is still relatively little activity, only recently picking up pace. Lessons from these and other pilots include the development of the stepwise approach advocated here, with greater transparency on governance and governmental support. Experience to date would suggest that government support to the programme will need to extend beyond 5 years to ensure promotion and uptake by the stakeholder community.

Funding approaches, both in terms of short term "seed corn" to get schemes up and running and longer term Governmental support are very important considerations that stakeholders constantly return to. Implementation of ecosystems markets needs to be made in the context of existing initiatives such as Glastir, to ensure that the new approach is integrated and that perverse or confusing incentives are not created. Terminology should be chosen carefully to avoid confusion, particularly in light of recent changes to the Glastir scheme and the impending new RDP. There is an important role, probably for environmental NGOs (and possibly NRW subject to provisions around conflicts of interest and resource constraints), in providing advice to land managers and other stakeholders to facilitate the smooth roll out of suitable PES schemes. The transition from the five agri-environment schemes (Tir Gofal, Tir Cynnal, Tir Mynydd, Organic Farming Scheme, and Better Woodlands for Wales), to the Glastir 'All Wales' schemes, and subsequent refinements in 2010 to the Entry Level and Advanced Level elements, created confusion which resulted in a much lower rate of uptake than had been anticipated. Further amendments must therefore be clearly communicated and tried and tested before they are integrated into policies and practices. Our proposed catchment PES pilot could usefully test the emerging approach.

2. Identify a suite of SMART objectives that define the strategic outcomes required for successful application of PES schemes in Wales. It is likely that these will embed within the broader objectives being considered to support the Environment Bill [Welsh Government and NRW]

The PES strategy message should be underpinned by a suite of supporting objectives that define the outcomes required of PES schemes in Wales. Key outcomes will need to be defined through government and stakeholder engagement. It is beyond the

scope of this study to define these objectives, but over-arching objectives may include:

- Deliver environmental benefits and increase the natural capital of Wales, and potentially supporting the Welsh 'green growth' agenda
- Deliver co-funding for public investment to meet legal requirements/ public service delivery requirements - for example funding to help deliver flood risk and coastal defence schemes
- Increase the delivery of ecosystems services
- Achieve no net loss of biodiversity in Wales.

As discussed in the Phase 1 report, the desired outcomes and indicators of success, be they changed behaviours, environmental outcomes or increased revenue, will influence the design of the PES schemes. The objectives should be SMART and supported by a suite of strategic targets to measure and audit that the objectives are being met over time.

3. Establish a national PES stakeholder engagement forum, ensuring that its membership is representative of the actors likely to promote and become active in the PES markets [Welsh Government]

A national PES stakeholder engagement forum, potentially as a sub-group of the existing Natural Resources and Food Reference Group, would provide a platform for stakeholders to contribute to the development and roll out of the national PES strategy. The current membership of the Group should be assessed in terms of how representative it is of the potential PES community of the future. Membership must include buyers and sellers representatives, for example those from the business, insurance and banking community. The user communities involved with the Natural Capital Coalition (ex TEEB), Globe UK and the Association of Rivers Trusts would be useful starting points.

Terms of reference should be developed and be flexible enough for the role of the group to evolve as the broad action areas are progressed. For example the group could have a role in defining the principles for PES / offsetting / habitat banking schemes and in developing and supporting rules or standards (e.g. monitoring or regulating rules). There will also be the need to develop peer review, certification, quality control and arbitration mechanisms as markets become established (e.g. at the “Go Live” stage) and there could be the potential for such a group to have a key role.

4. Develop a communications plan specifically for how Welsh Government intends to communicate PES scheme facilitation in Wales and its long term intentions for wider market uptake. This should consider multiple scales (national to local) and how to engage the different communities of potential actors [Welsh Government and NRW]

It will be important to develop a communications strategy for early engagement with the stakeholder community and, subsequently, continued dialogue to embed and then mature the various PES schemes and processes. For example, the relatively quick uptake of catchment based approach in England was predicated on considerable effort with stakeholder communication, from setting up a national forum and technical expert panel, to regular national, regional and local conferences, and a significant budget for facilitated learning between pilots. The nationally available web-based communication approach has also been developed for stakeholder engagement, including the Demonstration Test Catchment website[37], the Catchment Change Network[38] and Catchment Change Management Hub[39], and most recently the Catchment Based Approach (CaBA) Knowledgebase[40].

Box 4.3 summarises some examples of established schemes to illustrate the importance of early engagement - it should be much more facilitatory, and avoid unnecessary prescription.

The success of PES schemes in Wales will be reliant on this step being performed consistently well over time. Detailed consideration should be given to relevant support structures (linked to governance), and dissemination vehicles (groups, meeting, conferences, web-based support, codes etc.).

Welsh Government should develop its overarching message around PES scheme facilitation for delivery at stakeholder events, including those planned to roll out the seven Nature Action Zones and the three NRW NRM trial areas. The Welsh Government plans to encourage formation of delivery partnerships should become stakeholder led as soon as possible. Experience on similar initiatives demonstrates that community leadership tends to have better resonance regionally and locally. Stakeholder mapping should be undertaken to identify potential partners and should consider businesses and the wider community as well as landowners and environmental groups. Linked events should be held in each of the Nature Action Zones to roll out the Welsh Government's message and objectives.

37 Accessed at http://www.demonstratingcatchmentmanagement.net/
38 Accessed at http://www.catchmentchange.net/
39 Accessed at http://ccmhub.net/
40 Accessed at http://www.catchmentbasedapproach.net/

It is equally important to ensure that outputs from stakeholder events are collated to facilitate wider learning and exported to promote PES and other schemes more widely. Having this in place will enable 'early wins' to be communicated, as well as lessons learned from 'early losses'. Evaluation of Defra's Catchment Based Approach pilot phase culminated in production of a detailed report and a Catchment Handbook designed to provide guidance to organisations wanting to participate in further adoption of the approach[41]. An interim evaluation was also undertaken to ensure appropriate steer throughout the pilot phase.

41 Cascade Consulting, Collingwood Environmental Planning, eftec and YJRees Consulting (2013) Evaluation of the Catchment based Approach – Pilot Stage. May 2013.

Box 4.3 Case studies demonstrating local area based stakeholder engagement - Natural England Pilots[42] and Catchment Based Approach Pilots[43]

Natural England PES Pilots

Among the key findings related to people were:

- Different partnerships will make different decisions about how to apply the ecosystems approach
- At initial workshops, all participants contributed to scoping the full range of ecosystems services provided by the pilot area
- Effective engagement with farmers and land managers needs to be undertaken in the formative stages of a scheme
- Community engagement, although challenging and time consuming is worthwhile; people want to be engaged and when they are, their enthusiasm for environmental projects increases
- Further engagement is required with wider beneficiaries
- Although aware of the benefits provided by the natural environment, many people are not familiar with the term 'ecosystems services'. Language is important.
- Taking a fully participatory approach can feel uncomfortable as the outcomes are unpredictable, but it led to a co-created delivery plan which is more resilient because of the high level of engagement.

Findings from Catchment Based Approach (CaBA) Pilots

Relationships can be established across sectors, but they need time to mature and to build trust. Greater emphasis on partnership working is likely to be required at a local level, particularly in urban catchments.

Broader stakeholder engagement and planning will lead to actions that are better value for money, securing funds to pay for additional measures, increased awareness and greater social capital for the environment. Engagement also helps to establish a wider pool of expertise and helps with delivery of actions on the ground.

The Guide to Collaborative Management developed to enable catchment partnerships suggests stakeholder analysis may identify people who:

- Are likely to be interested in getting actively involved in local ecosystem service delivery, either because they work, live or play in the natural environment
- Will benefit from improvements in the local environment
- Are already working to improve it
- Are contributing to problems
- Have legal responsibilities relevant to the environment

4.2 STEP 2 - ESTABLISH THE STRATEGY FOR PES UPTAKE IN WALES

The message and objectives will need to be embedded through a strategy for PES implementation. This should define overall and specific objectives and results, with

42 Waters, R. D., Lusardi, J., & Clarke, S. (2012) Delivering the ecosystem approach on the ground – an evaluation of the upland ecosystem service pilots. Natural England Research Reports, Number 046.

43 Cascade Consulting, Collingwood Environmental Planning, eftec and YJ Rees Consulting (2013) Guide to Collaborative Catchment Management.

indicators and means of verification. A generic logical framework structure is provided in Appendix A.

5. Establish the PES implementation strategy for Wales. This will require identification of which ecosystems services are strategic priorities for PES in Wales through development of a national ecosystems inventory. [Welsh Government and NRW with support from the national PES forum]

The strategy should identify which ecosystem services are currently at risk and which ones Welsh Government particularly wants to focus on, with understanding of this gained from stakeholder engagement and consultation as well as technical research. This should not however prohibit schemes that may benefit other ecosystems services, and should seek to actively encourage other PES where they are relevant to wider natural capital improvements in Wales. It will require a clear analysis of the existing Wales natural capital account, including ecosystems range and value, to act as a baseline for future ecosystem services activities and markets. It should focus on delivery of PES. We are led to understand that this process is underway in Welsh Government.

The recent NCC second report (March 2014) has identified seven natural capital related ecosystem services currently at high or very high risk for England[44]. It is recommended that Welsh Government should continue the SCCAN work referred to in Section 2 to establish an ecosystems services inventory for Wales, to provide a similar function to the NCC's work in England. This will provide a strategic baseline against which to measure ecosystems service provision, and will inform strategic prioritisation and planning at national scale. It can be aligned with economic zoning systems towards delivering socio-economic as well as environmental benefits. The strategy would describe how the overarching Welsh Government policy and supporting objectives are to be delivered. Identified processes to deliver the strategy should be sufficiently flexible that they can adapt to ensure outcomes are achieved.

There will be subsets of these overarching services (e.g. peatland, coastal wetlands etc.) that may be specifically identified. We would recommend starting at a more simple level for a small number of individual ecosystem services, such as peatland carbon, woodland carbon and/or river water quality to establish momentum in the system prior to wider multi-beneficiary schemes incorporating the wider ecosystem benefits of a natural capital 'accounting unit' such as clean water. The strategy could

44 NCC (2014) The State of Natural Capital: Restoring our Natural Assets. Second Report to the Economic Affairs Committee. March 2014. Accessed at http://www.naturalcapitalcommittee.org/publications.html March 2014.

be carried forward by specific champions, for example drawn from the environmental NGO community (Rivers Trusts, Wildlife Trusts etc).

At present there are a limited number of codes for delivery of ecosystem services, which are proving to be useful facilitators of market activity. Examples include i) the Peatland Code[45], which has grown out of a pilot scheme and is governed by a Steering Group made up of members of the four UK devolved governments and relevant agencies, IUCN UK, scientific experts and stakeholders; and ii) the Woodland Carbon Code[46], which aims to provide independent certification for forestry schemes such that they can make claims regarding carbon sequestration, providing assurance and clarity about the carbon savings of sustainably managed woodlands.

6. With stakeholders consider whether there is a need to establish an approach or code for Welsh priority ecosystems to facilitate market development and provide market certainty [Welsh Government and stakeholder forum]

The current codes have similar fundamental design elements, shown in Box 4.4. We would recommend, for those ecosystem services at risk or where Welsh Government wants to promote national scale market activity (as determined through stakeholder engagement, ecosystem service mapping etc.), that approaches or codes may be developed to stimulate and enable the emergence of suitable markets.

However, it should be noted that the most robust markets are generally encouraged from bottom-up stakeholder activity, and therefore the level of prescription should be carefully considered. National rules or codes are likely to be more appropriate for national scale initiatives, with local schemes having lower levels of regulation.

45 IUCN (2014) Pilot UK Peatland Code. Accessed at http://www.iucn-uk-peatlandprogramme.org/peatland-gateway/uk/peatland-code March 2014.

46 Forestry Commission (2014) UK Woodland Carbon Code. Accessed at http://www.forestry.gov.uk/carboncode March 2014.

Box 4.4 Elements to consider when developing PES Approaches[47]

1. **Definition of compliance.**
   If a project is registered, define the responsibilities to comply with the approach or code.

2. **Develop a set of rules to define what makes a project eligible & provide supporting guidance documentation.**
   Define rules for examples over;
   - Timings of the Projects - including start date, duration and contracts.
     - *e.g. project to register within 2 years of project start date/ projects to have clearly defined durations.*
   - Ownership and tenure rights
     - *e.g. Land owner to prove eligibility over land which should be verified through copy of lease certified by solicitor.*
   - Compliance with all relevant legislation
     - *e.g. Projects need to make a declaration that they will comply with the law*

3. **Develop mechanism that will allow projects to publically register, and define necessary supporting documentation.**
   A form of registration is needed, where details of the project can be held. Upon registering project, location and long-term objectives need to be stated.
   The goal of the IUCN UK Peatland Programme is to initially store the details of the projects on the *Register of UK Peatland Code Projects* but in later phases of the Code, a credit registry will also be created, which will probably be held by a private sector registry supplier.
   When registering a project, relevant supporting documentation also need presenting e.g. legal land owner docs. Therefore these documents need defining too.

4. **Independently verify the project**

5. **Develop a governance system**
   Create set of standards that define what compliance with the approach or code means and what needs to be adhered to throughout the project.
   Project support.

6. **Documentation Repository**
   Central repository is needed for project documentation.

7. **Evaluation of System**
   Effective monitoring giving up to date information on the projects progress against its goals.

As described in Section 2, the most appropriate areas for improving ecosystems service provision in the short-term would appear to include:

- enabling carbon sequestration, either through preservation of organic soils such as peatlands or through forestation and management of grasslands, management
- water management in terms of flood risk management and water quality/quantity

47 Steps have been based on IUCN Peatland Code Programme & Woodland Carbon Code (referenced previously)

improvements

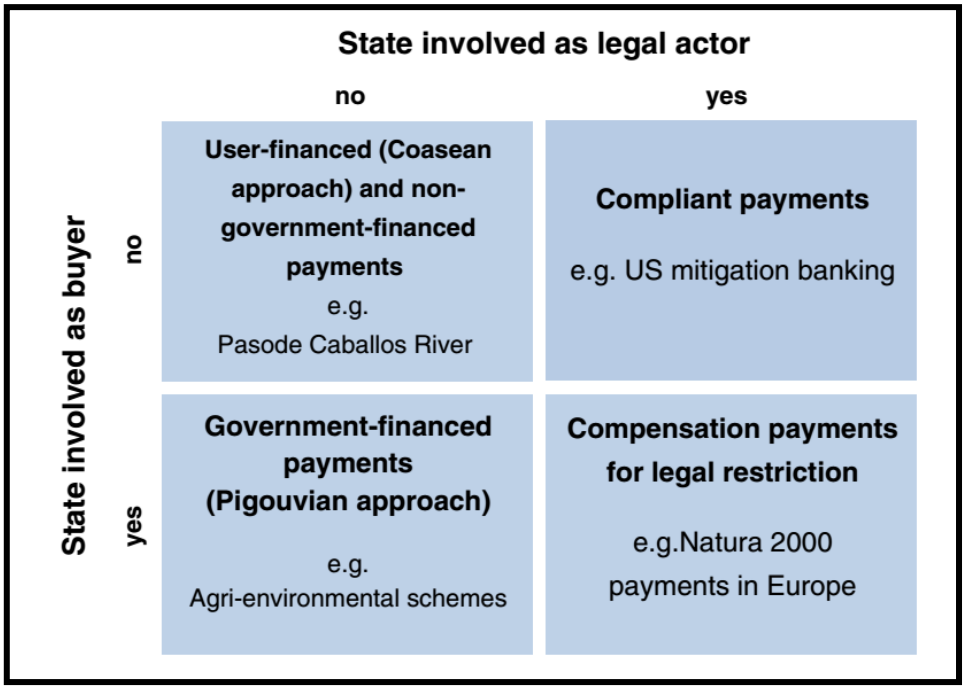
- land management to improve wild species diversity, fisheries and pollination.

4.3 STEP 3 - DEFINE AND PROMOTE SUITABLE GOVERNANCE STRUCTURES

For the PES policy to work efficiently in Wales there will need to be suitable governance structures and considerations within Welsh Government, respective regulators and the recipient stakeholder communities. To some extent this will be predicated on the strategy that Welsh Government wishes to adopt in taking PES forward in Wales, as there are many different types of governance arrangements that can be considered and that are viable in different situations. Experience dictates that a new policy area of this nature may require changes to management arrangements within the accountable and responsible organisations and individuals to promote successful uptake and continued momentum, as well as definition of experimental powers and regulatory flexibility.

The following table (Figure 4.3) demonstrates the varying governance models that are currently in place internationally and that Welsh Government will need to consider in terms of its future involvement, or not, in the emerging markets.

Figure 4.3 PES Governance Models Depending on the Role of the State and the Influence of Hierarchical Institutions[48]



Under the user financed (Coasean approach) the Government has a relatively modest role limited to enforcement of laws and provision of an institutional framework, including the definition of rights on which buyers and sellers can form a contract. The Government financed approach includes agri-environment schemes. Evidence suggests that such schemes struggle to enforce conditionality due to problems targeting uptake to appropriate geographic areas. Under the Compliant Payments model, which includes biodiversity offsetting systems, payment providers (i.e. development firms) are generally motivated only to comply with legal requirement. There is therefore an important role for intermediaries in ensuring compliance and conditionality. Similarly for compensation payments for legal restriction, conditionality is enforced through legal requirement – financial incentive does not drive the change in behaviour, with consequences in relation to additionality.

7. Establish the governance structures required to implement national and local PES schemes. This should include defining roles and responsibilities within Welsh Government and its agencies, including NRW, noting roles may change over time [Welsh Government and NRW]

A critical factor will be to align responsibilities across the relevant policy areas in

48 Matzdorf B, Sattler C, Engel S (2013) Institutional frameworks and governance structures of PES schemes. Forest Policy and Economics 37, 57-64

Welsh Government and NRW, which can be facilitated by development of appropriate key performance indicators (KPIs) for key individuals that explicitly require cross-functional working. Recent work with Defra suggests that greater levels of alignment across policy areas, linked to specification of key individual accountabilities (including individual KPIs that seek to allot responsibility for strategy implementation) can greatly enhance the likelihood of success. Roles are also likely to require specific personnel to drive the initiative(s) in these organisations. From previous experience we would recommend personnel with good social science and/or stakeholder engagement skills as a core requirement, noting it may be necessary to recruit specifically to meet these requirements. Other organisations such as environmental NGOs, contractors and NRW will be able to provide specialist engagement, economic, legal and scientific expertise, as well as local knowledge.

In England, the Catchment Based Approach (CaBA) and catchment partnership pilots are working well and this is attributable partly due to flexible local governance structures[31]. Governance structures for these catchment groups have varied according to their needs, history and the objectives set. These ranged from a large core group (more than 15 members) with working subgroups and smaller core groups (less than five members) and more meetings, to a host and co-ordinator managing a network of organisations. All structures were shown to be able to successfully deliver a catchment plan. The avoidance of detailed prescription by Defra, which some initially viewed as problematic, proved a distinct advantage as Defra intended, giving groups the freedom to adopt their own catchment-specific ways of working. Governance structures for PES schemes should consider top down policy requirement and bottom up structural delivery requirements. This is likely to require consideration of integration or alignment with other area-based initiatives and Welsh Government policy areas.

8. Implement a technical committee to support the development of strategy and evidence on PES schemes for Wales. [Welsh Government and NRW]

As demonstrated, there are many technical issues that will need to be resolved as PES schemes are developed and implemented in Wales. A technical committee to support Welsh Government and the national forum is recommended that has the required expertise to advise on ecosystem services, economic and legal provisions, stakeholder matters etc. The technical committee will probably be constituted from academics, consultants and practitioners with direct experience of PES scheme technical requirements and outputs. Although with a wider remit than that envisaged here, the construct of the NCC could be viewed as a starting point.

9. Define experimental powers to allow piloting of PES schemes, and to allow flexibility or suitable timescales for compliance [Welsh Government]

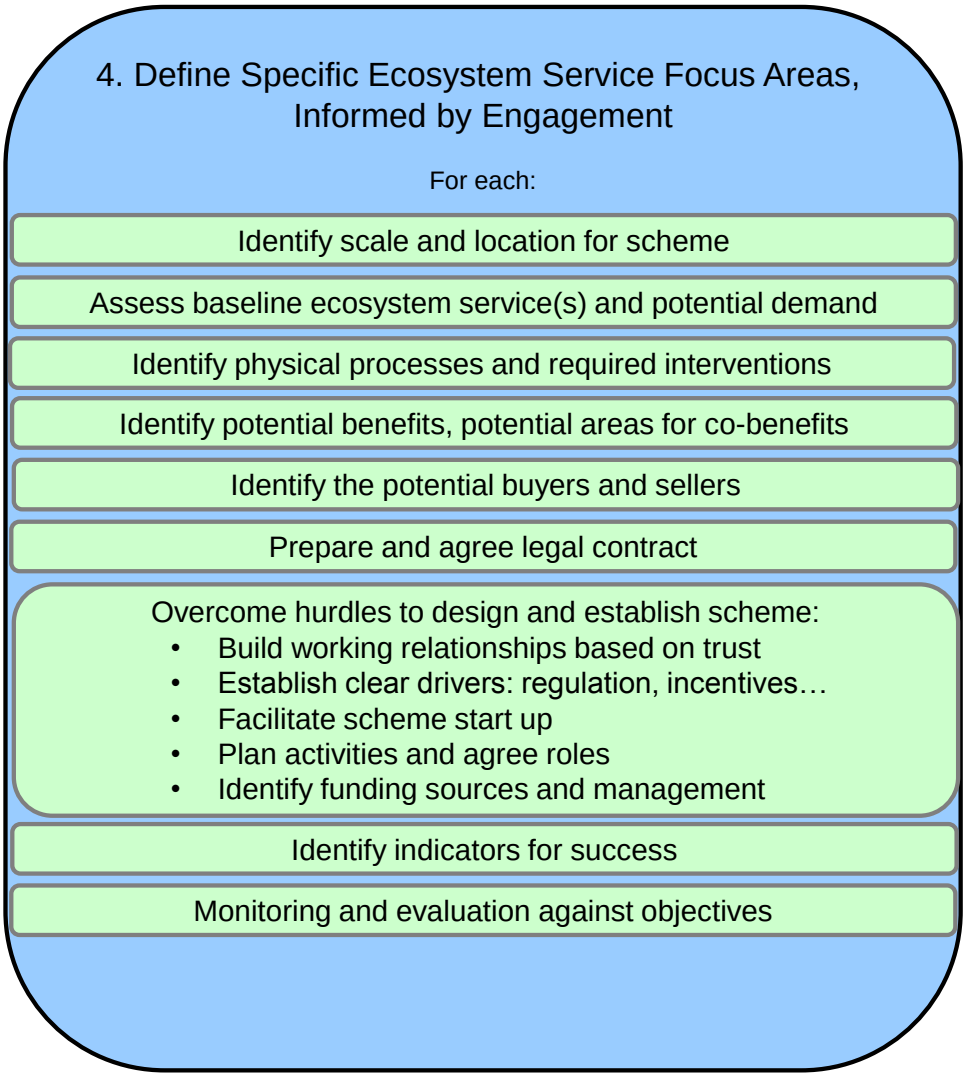
A requirement of this study has been to provide support to the legal team developing the Environment Bill. A recent meeting was convened to discuss these issues, at which this action was discussed. It is our understanding that this provision is currently being considered for incorporation into the Bill.

4.4 STEP 4 - DEFINE SPECIFIC ECOSYSTEM SERVICE FOCUS AREAS, INFORMED BY ENGAGEMENT

Step 4 of the over-arching framework is illustrated at greater resolution by the flow-chart in Figure 4.4. Step 4 is the implementation phase and would usually follow the development of the PES strategy for Wales. We have provided detail in this section to enable Welsh Government to facilitate specific pilots, and suggested two potential PES pilots in Section 4.6.

10. For each PES scheme that is developed, the following staged approach should be considered and steps implemented, where necessary, to support uptake. Responsibility for management will differ depending on whether the scheme is being centrally promoted or is being undertaken from the bottom up.

Figure 4.4 Detailed steps applicable to Step 4 of the framework



Identify scale and location for each PES scheme

Before Welsh Government embarks on selection and implementation of pilot schemes, a stakeholder engagement process should be undertaken so that future scheme contributors are given the opportunity to champion their needs, and to give the process additional credibility. It should not be seen solely as a 'top-down' exercise. This process, combined with analysis, will identify those focus areas where most social and economic as well as environmental benefit can be gained from promotion of ecosystem services. This process could be usefully guided and enabled by the technical committee recommended by this study. Given that Welsh Government and NRW have recently initiated catchment and area based pilot schemes and trials, it may be appropriate (should suitable ecosystem services exist in those catchments) to use these areas as test beds to trial PES uptake.

It is important that expectations of PES schemes are managed in view of the likely

complexity and timescales involved. Time and effort will be required to allow the schemes to mature and to promote uptake levels that are as effective as more conventional approaches of engendering change.

The relationship between provision of a clear framework and subsequent uptake by the PES community is of central importance. Successful development of the process should be encouraged through dialogue between the actors (buyers, sellers, regulatory bodies) to establish a small number of PES schemes that are seen to embed within the overarching framework. Further work is required between Welsh Government, NRW and the emerging PES community to agree an initial tranche of potential PES approaches that can be developed into schemes to trial.

Assess baseline ecosystem service(s) and potential demand

For any PES scheme to be successful there must be ecosystem services in the specified area, whether that be a catchment or other area based construct, that will benefit from improvement measures. The quantified availability of ecosystems in need of improvement will also give an indicator of the potential demand. These data will be a minimum requirement to engage stakeholders in the proposed scheme. It will therefore be important to characterise the ecosystem services baseline and future baseline against which to compare effects of any PES scheme. There is a large volume of evidence and guidance to support this activity. Sources of data would include but not be limited to NRW (water quality, flow, flood risk data), Catchment Change Monitoring Hub[39], Ecosystems Knowledge Network[49], and water companies.

Depending on the nature of the ecosystem service(s) being enhanced, it may be possible directly to measure outcomes (e.g. in terms of river phosphorus concentrations). Where direct measurement is not feasible, due to technical or cost constraints, modelling (e.g. in terms of flood risk management) or proxy indicators (e.g. for estimating carbon sequestration through vegetative condition of peatland) may provide an assessment of effectiveness. A monitoring plan describing methods parameters, frequency, locations, responsibilities should be integral to the agreement between contractual parties. This is likely to require specialist technical expertise. Overarching monitoring guidance developed through pilots with consistent assumptions and methodologies would help to engender transparency and accuracy across schemes[50,51]. Previous experience from ecosystem services work in the Tamar catchment has demonstrated the value of clear visualisation tools such as ecosystem

49 Accessed at http://ecosystemsknowledge.net/
50 Diaz and Delaney (2011) and Gammie and Olander (2012) in Hawkins S. (2011). Laying the Foundation - An analytical tool for assessing legal and institutional readiness for PES. The Katoomba Group and Forest Trends. December 2011
51 OECD (2010). Paying for biodiversity: enhancing the cost-effectiveness of payments for ecosystem services. OECD: Paris.

services mapping as a means of assessing options for PES schemes and supporting stakeholder engagement work[52].

A further feature of this sub-step is the consideration of where the regulatory baseline is set and where "voluntary" initiative is incentivised. For example, where could general binding rules or similar regulatory constructs be used to regulate the baseline (and comply with the polluter pays principle) and how this is balanced against the use of PES to support improvement to ecosystem function. It is our understanding that this is currently being considered by Welsh Government. It is an important component of setting up a PES scheme as it makes explicit what is expected of land managers and what mitigations or activities can be considered as part of a PES scheme for ecosystem improvement.

In this way the stakeholder community proposing to establish a PES scheme whether nationally or locally can develop an opportunities assessment that identifies the key habitats, ecosystem services and beneficiaries to support scheme promotion to the broader buyer and seller communities.

Identify physical processes and required interventions

Leading on from the baseline characterisation of ecosystem service provision, identifying the correct interventions is critical to the scheme. A link should be established between the proposed interventions and ecosystem service benefits. The link between interventions and outcomes will vary and in some cases there will be uncertainty, in which case the PES scheme may require buyers to commit on the reasonable expectation of a return. Interventions must be verifiable and acceptable to both buyers and sellers. A very useful resource for land management interventions is the Inventory of Methods to Control Diffuse Water Pollution from Agriculture[53]. Each method is described in terms of effectiveness and likely marginal costs to the farmer, and according to farming system, soil type and region. There are many similar tools and guidance available to land and catchment managers, many of which are referenced on the Catchment Change Management hub, rivers trusts[54] and Environment Agency websites. It would be useful in the future for Welsh Government or NRW to develop a gateway or signposted web portal specifically for schemes in Wales to support a sense of national purpose.

52 The Tamar Plan Phase 1: Developing a shared catchment vision. Accessed at http://river-gateway.org.uk/catchments/tamar.html April 2014

53 IGER & ADAS (2006) An Inventory of Methods to Control Diffuse Water Pollution from Agriculture (DWPA): User Manual. Available at http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=13405

54 Accessed at http://www.theriverstrust.org/ April 2014

Identify potential benefits and potential areas for co-benefits

For PES schemes to prosper it is important to identify the scheme benefits, so that they can be used to engender confidence and momentum in participation. Having identified the opportunities and intervention measures it is useful to consider the benefits afforded in terms of wider ecosystem function and service provision. It is likely that this will identify multiple benefits including but also going beyond those initially targeted.

It will also be helpful to identify potential beneficiaries of the scheme, in terms of individuals and organisations with a view to potentially expanding the source of funding, and in terms of policies and wider strategies that may also correspond with the aims of the scheme, and which may help to promote and increase uptake for the scheme. There may be additional funding streams which could be accessed through this route, including those at European administrative level, an example being the LIFE+ Programme[55], which supports conservation projects throughout the EU. It may also be possible to align public and private funding routes. For example, SCaMP has combined budgets from United Utilities with agri-environment scheme HLS funding.

Identify potential buyers and sellers

In reality it will be the stakeholder community, and particularly those with a vested interest in establishing a PES approach, that will dictate the appetite for a scheme and the rate of subsequent uptake. Work from the initial stages of Step 4 should allow broader consideration of the benefits, possible funding routes and thereby possible buyers and sellers.

Buyers will be convinced if they can see that PES schemes will:

- Reduce current costs of production for them
- Avoid current and future risks for their business
- Improve relations with consumers and enhance brand value and reputation.

Sellers will be encouraged if they are shown that there are long term gains to changing land use practices. This may be in terms of income but is likely to include wider considerations of certainty of payment and long term commitment.

In terms of advocating PES schemes to potential participants it is important to develop a compelling case or at least one that shows no significant risk to their business. For example in England it has taken many years to provide evidence to support catchment approaches to nutrient and pesticide reductions that are willing to

55 Accessed at http://ec.europa.eu/environment/life/ April 2014

be funded by water companies (to save further capital and operating costs). Further validation of the approach may be required in Wales to bring DCWW, Severn Trent, and Dee Valley into the buyer community. Similarly, should infrastructure developers (housing, mixed use, energy etc) consider that a PES scheme will unlock planning approval for sensitive developments, and that a mechanism exists to facilitate the transaction, it is far more likely to succeed. Negotiation between the parties to arrive at such a PES scheme would provide the clarity and certainty required. This could be undertaken at a national or regional/local level depending on how Welsh Government may want to regulate the market. The suggested examples identified in Section 4.2 should therefore be viewed as possibilities of a starting position, but others may well emerge as more appropriate over time.

Overcome hurdles to design and establish scheme

All potential PES schemes have hurdles that will need to be overcome, and these will vary with the scale and application of the scheme. Each scheme will however be predicated on providing data and evidence, talking to the correct range of potential scheme participants and engendering trust in the approach. Using a stepwise approach and facilitating dialogue will allow the hurdles to be exposed more quickly and the solutions to be developed by the user community. It is likely that Government and regulators may initially be involved, but that over time these types of negotiations will be between buyers and sellers, with the intermediary or advisory group arbitrating as necessary. Welsh Government may want to consider facilitating the approach so that this is the intended outcome.

A key element of any scheme will be the mode of payment, particularly in terms of whether payments are to be based on outcomes or interventions, as this will influence the monitoring strategy for contractual compliance. It is likely that payments based on interventions may present a more pragmatic and less costly approach. Research is continually trying to strengthen the links between interventions and outcomes, such that in time it may be possible to reduce uncertainty and design schemes where payments are made for outcomes more commonly. Advice on how to use available baseline information and tools to engage effectively with stakeholders is gradually emerging via the online fora referenced earlier (Demonstration Test Catchment website, Catchment Change Network, Catchment Change Management Hub, CaBA Knowledge Base).

Potential delivery of ecosystems services will vary spatially across any scale of PES scheme. Sellers may therefore be paid differentiated payments on the basis of the ability of their parcel of land to provide services, as opposed to a uniform payment system. For small area based schemes such as those which Welsh Government may initially pilot, this will need to be arranged by agreement on a case by case basis. The

already mentioned example of work undertaken by the Westcountry Rivers Trust on the Tamar catchment identified hotspot areas where payments to enhance and restore ecosystems services through land management might be targeted.

Reverse auctions act as a mechanism to reveal the price which landowners are willing to sell services, and hence about the true cost of their provision. The Westcountry Rivers Trust undertook a 'river improvement auction' where farmers submitted bids to undertake improvements and the amount of grant they would require from South West water to undertake the work. Bids were assessed in terms of their value for money, i.e. the level of improvement they would bring about for the cost. Farmers also elected to part fund improvements themselves, thus improving the cost benefit ratio for the water company[56].

Prepare and agree legal contract

PES schemes are based on voluntary agreement rather than regulation, although there are many cases where regulation does provide an incentive to participate. Security is provided by contractual agreements or covenants that define how much a buyer is prepared to pay for delivery of services over a certain timescale. Agreements need to be flexible to remain enforceable should land ownership change (Box 4.6). There would be a role for Welsh Government in provision of assurance to prospective actors by ensuring the contracts or covenants are standardised and have legal standing, and through other forms of assurance and backing, for example through certification of PES codes or provision of a consistent framework strategy (as recommended in this report). Agreements may require clarification of ownership and property rights through legal analysis – the individual or community whose land use decisions affect the provision of ecosystems services must have clearly defined and enforceable property rights over the land. The Katoomba Group provides a useful resource in the form of the PES Contract Toolkit[57], which could be a useful starting point for developing contracts.

An agreement should acknowledge risks and how these should be mitigated, noting the uncertainty around outcomes typical of environmental interventions, and the timescales over which benefits may occur. There is also a transaction risk between buyers and sellers related to the issue of enforcement and contractual compliance. Fundamental to any environmental scheme is the acceptable level of societal risk – is there an unacceptable risk to society of the scheme failing?

56 Westcountry Rivers Trust. Accessed at http://wrt.org.uk/wordpress/?p=254 April 2014
57 Accessed at http://www.katoombagroup.org/regions/international/legal_contracts.php

Box 4.6 Typical Features of a Conservation Covenant[58]

A covenant or agreement should feature the following:

1. Duration – may be affected by duration of tenancy agreements
2. Spatial boundary of the scheme
3. Identification of Parties – e.g. legal authority of all parties, who will pay start up and transaction costs
4. Legal nature of agreement – formal contract, registered contract
5. Objective and scope of contract
6. Rights and obligations – e.g. rights over the land or e.g. obligation to deliver a certain outcome or undertake a certain intervention, frequency etc.
7. Clarification over what constitutes additionality in context of existing regulatory obligations
8. Provisions to consider mitigation of leakage and other risks
9. Risk allocation – e.g. clauses that govern renegotiation of contract terms, remedies and dispute resolution, or risk-bearing (for example if seller fails to deliver)
10. Monitoring and Reporting – define roles to monitor, evaluate, demonstrate and communicate results, contractual compliance, wider communication, certification
11. Payment structure – type, manner and payment timing. It may not need to be financial – it could be advice and assistance or technical support. Some are even based on profit-share
12. Remedies and Dispute Settlement – rules for modifying and adapting the contract, reasons for voiding the contract.

The Law Commission has recently run a consultation on conservation covenants[59], with the intention of publishing a final report with a draft Bill and impact assessment during the summer of 2014. These covenants would be perpetual in that they would continue despite landowner changes to ensure conservation value is protected, and would counter established rules that each landowner should have the freedom to make decisions about how the land is used; and land should be controlled by the living, who can adapt its use to whatever is most appropriate at the time. Similar covenants are already in use in Scotland, the USA, Canada, Australia and New Zealand. The consultation paper identifies a requirement for a new statutory scheme for conservation covenants in England and Wales. NRW was identified in the consultation paper as a potential *'responsible body'*, likely to be nominated to enter into, regulate and enforce the conservation covenants. If this is an outcome, clearly its alternative role as a buyer/seller of ecosystem services will need to be carefully defined to avoid conflicts of interest.

Identify indicators for success, monitor and evaluate against objectives

As defined under the legal agreement or covenant, PES scheme performance should

58 Examples of covenants are available :
The Land Conservancy of British Columbia http://blog.conservancy.bc.ca/wp-content/uploads/2009/09/model_covenant_-_final.pdf
New Zealand Department of Conservation http://www.doc.govt.nz/getting-involved/volunteer-join-or-start-a-project/start-or-fund-a-project/funding/nature-heritage-fund/silna-forests/

59 http://lawcommission.justice.gov.uk/areas/conservation-covenants.htm

be monitored against original objectives to provide assurance of contractual compliance, effectiveness of interventions, and to ensure adverse effects are not being caused, including trade-offs and leakage. All costs (direct and indirect) should be monitored and assessed to inform application to other areas or wider adoption of approaches (e.g. across other catchments or wider geographical area). Monitoring should also consider wider effects such as socio-economic benefits (for example through tourism) and be flexible to pick up unforeseen effects that may require mitigation. There is a case to be made for monitoring effects that can be used to promote schemes more widely – this may require some creativity. As an example, it has been reported that there has been a significant drop in the number of sheep dying in gullies following ditch blocking as part of the Pumlumon Project[60].

Experience from other PES schemes may aid the definition of objectives, targets and criteria for success. Box 4.7 below highlights the factors for success identified through the Vittel scheme[61] (that has operated in France for many years), with additional factors which may be relevant for land managers seeking to reduce diffuse pollution[62].

60 Pumlumon Project (2013) Stakeholder workshop report: Scoping closer links between the Pumlumon Project and downstream beneficiaries in England.

61 Perrot-Maître, D. (2006) The Vittel payments for ecosystem services: a "perfect" PES case? International Institute for Environment and Development, London, UK. Accessed at http://pubs.iied.org/pdfs/G00388.pdf March 2014

62 SCaMP (2014). Accessed at http://corporate.unitedutilities.com/scamp-index.aspx April 2014

Box 4.7 Factors that should be considered for successful application of PES schemes

- Establishing PES programmes is a very complex undertaking.
- Primary reasons for success are not necessarily financial.
- The experience should be replicable.
- PES alone may not be sufficient to guarantee environmental services are provided.
- There is a business case for private sector participation in PES - projects such as SCaMP have demonstrated that delivery can be enhanced if complexities of managing a scheme with varying funding sources, including public and private, can be overcome..
- Transparency of all processes is very important for participation and success. The greater the complexity of the scheme, the greater the opacity and the asymmetry of information amongst potential providers which is a disincentive.
- Where scientific certainty exists, the information should be shared. Where this does not exist, independent assessment or participation of key stakeholders should be available.
- There is a tendency to focus on scheme design and scientific evidence. However, monitoring and implementation concerns are equally important. Participants behaviours before and after taking part in a PES / offset / banking agreement may be different, and hence implementation of agreements should be monitored to avoid moral hazards.
- PES schemes should be adaptable, pragmatic and opportunistic in changing to local circumstances.

Monitoring should be collated periodically to enable an overall evaluation and review of a scheme's success. HM Treasury guidance in the form of the Magenta Book[63] sets out the key issues to consider when designing and managing evaluations and their interpretation. Evaluation results can be used to refine scheme design, and may also influence development of other schemes. A national repository of information would help to enable wider learning from monitoring and scheme review. The Ecosystems Knowledge network[64], funded by Defra and the Scottish Government fulfils this role for England and Scotland.

4.5 STEP 5 - MONITOR AND EVALUATE PES IMPLEMENTATION AND DISSEMINATE LEARNING

The purpose of PES schemes will be communicated through the message and objectives. Monitoring and evaluation against the objectives should be implemented by Welsh Government on an annual basis to start with so that lessons can be learnt and PES schemes modified accordingly where necessary. Targets should be set that

63 Accessed at https://www.gov.uk/government/publications/the-magenta-book May 2014
64 Accessed at http://ecosystemsknowledge.net/about April 2014

underpin the SMART nature of objectives that by their nature are measurable. A process of monitoring and analysis should be developed during the formulation of the Step 1 (message and objectives) and then implemented to track progress. This could be done by the technical committee recommended earlier, should Welsh Government choose to implement the recommendation.

Where necessary processes should be sufficiently flexible that they can adapt to ensure outcomes are achieved. We would recommend that objectives should link to the natural capital account for Wales which could then be the overarching reporting facility, conveying appropriate political weight. Monitoring could then be established around existing ecosystem services metrics, with PES scheme successes measured against gains/losses in natural capital, together with flows of money and co-benefits. It will be important to celebrate success, and dissemination of the message will benefit from enrolment of high profile ambassadors that can appeal to business as well as farming communities.

11. Implement a monitoring and evaluation process with associated metrics to assess progress against the targets and objectives. This will depend on Welsh Government decisions on which PES schemes will be facilitated and which may emerge organically [Welsh Government]

There is a significant body of guidance on how to set up monitoring and evaluation programmes. Recent Defra initiatives that could help to define a Welsh Government evaluation are the Catchment Based Approach[65]; Nature Improvement Areas[66] and emerging Place Based Initiatives[67]. A key feature of these programmes has been the use of professional facilitation, coherent communication and feedback loops into the schemes to facilitate learning and modification where necessary.

12. Establish a national forum for data, evidence and learning with open access that allows stakeholders and scheme contributors to see what schemes are available, how they are running, how to get involved and how well they are operating [Welsh Government or NRW]

14. Develop a benefits assessment process to ensure that the full suite of

65 Accessed at https://www.gov.uk/government/publications/catchment-based-approach-improving-the-quality-of-our-water-environment April 2014

66 Accessed at http://www.naturalengland.org.uk/ourwork/conservation/biodiversity/funding/nia/default.aspx April 2014

67 Accessed at http://www.valuing-nature.net/news/2013/natural-england-report-place-based-approaches-payments-ecosystem-services April 2014

benefits of PES schemes is identified. Current policy appraisals and definition of associated benefits are severely hampered by the lack of a cohesive and consistent benefits appraisal approach [Welsh Government]

A significant drawback to current catchment and place based evaluations has been the problem of identification of benefits from the pilots. There is no standard benefits identification guidance and individual pilots have tended to either develop their own, or not do a benefits assessment. We would strongly suggest for the WG pilots and NRW trials that effort is focused on establishing consistent benefits assessment guidance. This will allow a better evaluation of the costs, benefits and value for money of the pilots and trials generally, and if included, the implementation of PES schemes at the local/regional level.

4.6 RECOMMENDED WELSH PAYMENTS FOR ECOSYSTEMS SERVICES PILOTS BASED ON INTERNATIONAL EXPERIENCE

There is now an opportunity to test out the appetite for PES approaches in Wales with the recent announcement by Welsh Government and NRW of 3 and 7 area based trials/pilots for ecosystem approaches (locations shown on Figure 4.5). NRW is trialling an ecosystems approach to natural resources management, based on three hydrological catchments; the Dyfi, Rhondda and Tawe. These trials have the following stated objectives:

- Test how to take an ecosystems approach to natural resource management to achieve real outcomes for people, the economy and the environment
- Learn from different approaches to prioritise and identify opportunities in the three areas
- Develop and test a process for implementing area based plans elsewhere in Wales
- Understand the approach and techniques that work best with external audiences
- Understand the evidence needs to implement and deliver natural resources management.

It is noted that these three trials are aimed to pilot an ecosystems approach in general, and are not specifically concerned with trialling PES schemes.

Separate to these NRW led trials, Welsh Government are trialling the ecosystems approach across an additional seven Nature Action Zones:

- Brecon Beacons – focussing on the Usk and Wye catchments
- Cambrian Mountains
- Conwy Valley

- Pembrokeshire Coast
- South Wales Valleys
- Berwyn and Migneint
- Llyn Peninsula.

These pilots have yet to be formally announced. For each, stakeholders will be invited to form partnerships and submit funding bids. It is considered likely that area proposals are likely to include PES initiatives, although it is as yet too early to be clear about ecosystems service priorities, potential benefits, beneficiaries and providers. Again, the seven trials are not explicitly focussed towards trialling approaches to enable ecosystems services markets. Of the ten areas, it is likely although not certain that a number would provide opportunities to test approaches to stimulate PES schemes. The move to catchment pilots is a welcome development but will need to be focussed to achieve the outcomes Welsh Government requires.

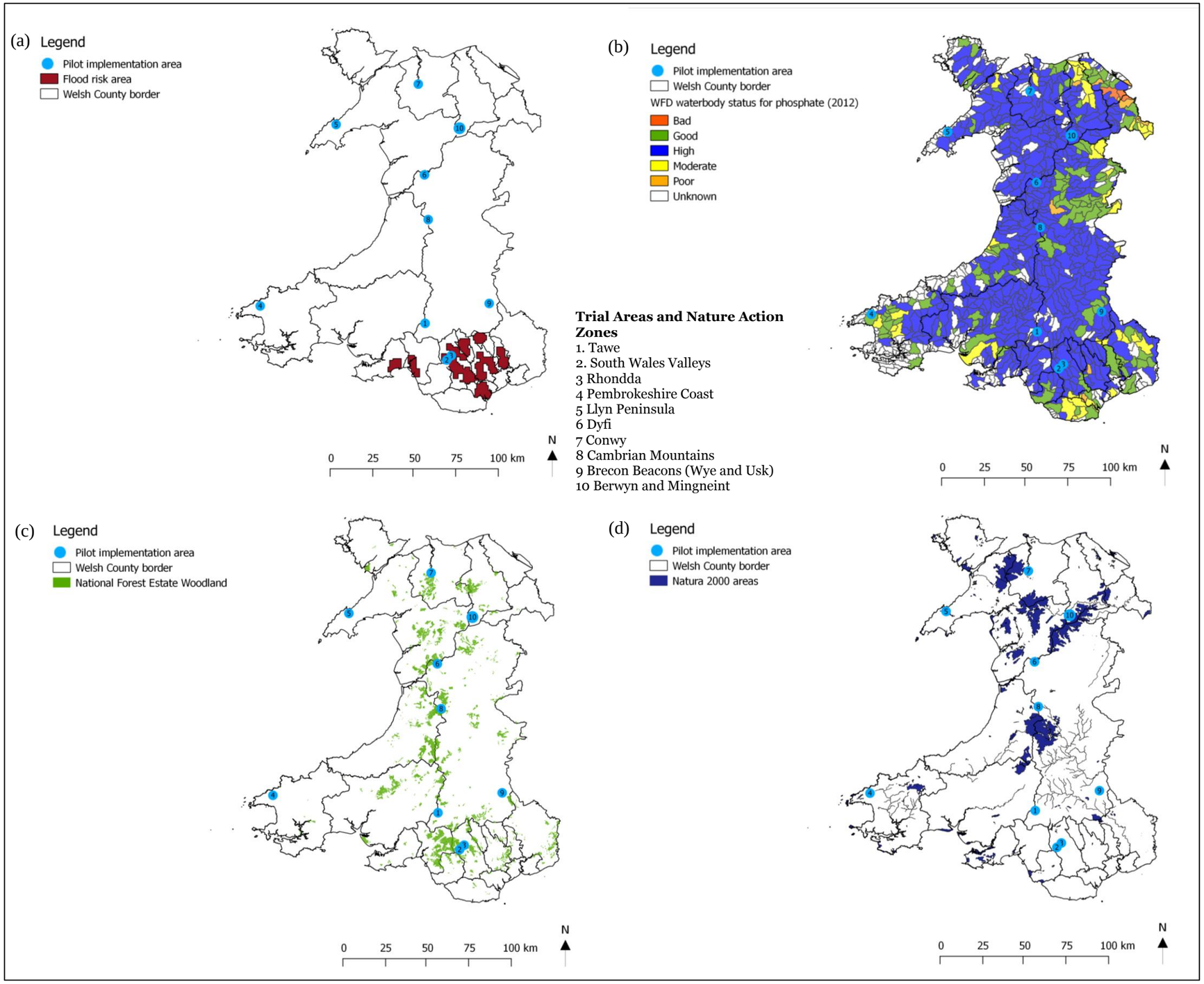
We would recommend that Welsh Government align a sub-set of the ten area based pilots/trials towards PES scheme pilots according to the framework strategy suggested in this report, even if the pilots are considered to already be under way. This would include specific opportunity mapping of ecosystems services and accompanying stakeholder engagement as advocated at the start of Step 4. We have recommended specific actions which would lead to roll out of 2 ecosystem service focussed pilots (see 4.6.1, 4.6.2) based on key ecosystems services identified in Section 2.2.

- Pilot 1 – Carbon sequestration through afforestation using a national approach

- Pilot 2 – catchment scale water quality, flood hazard management and biodiversity improvement at the catchment scale.

Figures 4.5 (a) to (d) show at a national scale, maps of the national forestry estate, Wales Natura 2000 sites, flood risk and WFD phosphorus surface waterbody failures, with the locations of the proposed NRW trial areas and Welsh Government Nature Action Zones (noting these are approximate locations only as area boundaries were not available). These maps are intended to indicate some of the ecosystems services which could be enhanced in the areas, noting that more data and higher resolution mapping would be needed for conclusive indications.

Figure 4.5 National Forest Estate, Natura 2000 sites, WFD Phosphorus Status and Flood Risk with locations of NRW Trial Areas and Welsh Government Nature Action Zones



With reference to Pilot 1, the forestry estate extends across a number of the areas, including the Dyfi and Rhondda, suggesting these areas may provide opportunities to trial schemes aimed at forest related ecosystems services. Forest cover may be lower in the Llyn Peninsula and Pembrokeshire Coast areas, suggesting there may be scope to explore afforestation schemes (which create additionality).

In terms of Pilot 2, there would appear to be significant opportunity to facilitate the move to active markets using the framework we have defined. There may be water phosphorus surface water quality issues in proximity to the South Wales Valleys and Rhondda catchments, and flood risk hazards downstream of the Tawe, Rhondda and South Wales Valleys catchments, suggesting these catchments may be appropriate to focus catchment scale water quality and flood risk management. In the Cambrian Mountains, interventions to improve water management may also deliver habitat benefits in the Elenydd SAC. In reality it will be up to the catchment partnerships to define the ecosystem services provision and potential improvements in their areas. This study could support the definition of potential schemes and help to orchestrate the actions and activities necessary to get schemes off the ground.

Successful PES schemes tend to be developed over time, with the key players driving the form and content of the scheme. As a result, previous learning would suggest that although government intervention to facilitate markets is pivotal, successful implementation will require goodwill from all actors. We have identified the two potential PES schemes for Wales that are already subject to some level of implementation in the international arena. This has the advantage of allowing progress more quickly to full uptake, which we understand is a key consideration of this work. However, messaging and subsequent engagement will be very important to early success, with identification of a suitable engagement process central. The two schemes are therefore predicated on the implementation of a successful stakeholder engagement process. It is the enthusiasm of buyers and sellers that will enable success or lead to failure or these potential markets.

4.6.1 Pilot 1 – Carbon Sequestration through Afforestation in Wales

Tackling carbon emissions through afforestation in Wales will help to deliver the outcomes of the Woodlands for Wales strategy[68]. It would directly contribute to progress against Outcome 7 *"Welsh woodlands contribute to reducing the carbon footprint of Wales"* and Outcome 4 *"Woodland cover in Wales increases*". There is potential, depending on the location and type of afforestation, to meet other outcomes relating to woodland health, community benefits, the forestry sector and

68 Accessed at http://wales.gov.uk/docs/drah/publications/130510woodlandforwalesactionplan2012en.pdf

environmental quality. These outcomes could be used as a starting point for identifying wider benefits and beneficiaries of the pilot scheme.

A series of specific actions are provided which would enable Welsh Government to implement a national PES scheme. The scheme would present an opportunity for emitters to purchase credits in order to offset their carbon emissions. Previous examples of afforestation work in Ukraine for more sustainable land management and climate change mitigation identified additional benefits in terms of wood production and reduced soil erosion[69].

The UK Woodland Carbon Code would provide a suitable template for the Welsh Government to establish a scheme specific to the Welsh context, particularly as the fundamental architecture has already been tried and tested. This could be promoted by Welsh Government to maximise benefit to the Wales green growth agenda, and to realise Wales' carbon reduction targets, noting that the 2020 target is considerably more ambitious than that for the UK as a whole (reduction by 40% of 1990 levels for Wales, compared to 34% for UK), and currently Wales is reducing emissions at a slower rate than the rest of the UK (to date Wales has achieved a 21% reduction compared to a 29% reduction for the UK)[70]. A Wales specific scheme could make use of Wales' significant available environmental resources in terms of land that could be afforested or already forested that could be maintained in perpetuity, and could be targeted at the top CO2 emitters in Wales, such as Port Talbot Steelworks and Aberthaw Power Station (in addition to existing carbon reduction commitments) [71]. It could also target commercial and industrial organisations with a CSR commitment to carbon mitigation and reduction in Wales and possibly more broadly. Such organisations may even be receptive to ideas of cooperation in developing the pilot. The Warcop Training Area pilot scheme is one example where the Woodland Carbon Code has been used to reduce atmospheric carbon dioxide through afforestation with native species using market mechanisms[72]. Noting the existing forestry estate, the code could incorporate credits for maintained management of existing woodland, with provisions to ensure this creates additionality.

69 Maria Nijnik, Arie Oskam, and Anatoliy Nijnik, "Afforestation for the Provision of Multiple Ecosystem Services: A Ukrainian Case Study," International Journal of Forestry Research, vol. 2012, Article ID 295414, 12 pages, 2012. Available at http://www.hindawi.com/journals/ijfr/2012/295414/

70 Welsh Government (2012) Climate Strategy for Wales First Annual Progress Report. March 2012. Accessed at http://wales.gov.uk/docs/desh/publications/120329climateannualreporten.pdf

71 National Assembly for Wales (2013) Greenhouse gas emissions for Wales. Accessed at http://www.assemblywales.org/13-006.pdf April 2014

72 Accessed at http://www.forestcarbonportal.com/project/warcop-training-area

Table 4.1 Implementation Stages for Pilot 1 – Carbon Sequestration through Afforestation in Wales

Strategy Stage	Recommended Action
Define, engage and promote the message	Intention to facilitate a market and develop a Welsh woodland carbon sequestration approach. The woodland code could form a component of a wider carbon mitigation approach to include peatland and coastal wetland carbon sequestration. Develop a technical oversight group, most likely to be a sub-group of the existing Natural Resources Reference Group, which would have responsibility for development of the Welsh Woodland Carbon approach. This Group would benefit from input from likely buyers and facilitators, including accountants active in the area (e.g. Deloitte, KPMG) and bankers (e.g. HSBC, Barclays), as well as landowners, and even wider beneficiaries such as health authorities. It is suggested the approach is championed by an environmental NGO, with a view to enabling NRW to actively participate in the market as a seller using its land holding. Develop a promotional group, which would work alongside the technical oversight group to promote the approach and enhance its uptake amongst plantation providers and potential buyers (in Wales and potentially abroad).
Set up infrastructure	Technical Group to oversee the accreditation process. Assurance to buyers is best provided by independent body approved by UKAS. Set up the Code to delineate the requirements required of projects in terms of management. Code to include requirements to assess baseline, leakage and permanence. Code may incorporate a 'buffer' such that there are always spare units in case an individual project fails. Landowners would be required to commit to the Code in terms of permanence of land use change, subsequent management and verification, accounting for potential change of land ownership. Buyer accreditation should also be considered such that the mitigation hierarchy can be enforced, i.e. so that companies are encouraged to reduce or avoid emissions before buying forestry offsets.
Design market system	Establish registry through which potential buyers can transact with sellers (project developers). This registry should be independent and would provide a transparent project tracking platform. Buyers and sellers would have accounts on this registry. The UK Woodland Carbon Code uses the Markit Registry[73]. Use of an independent, external registry provides assurance and avoids potential for conflicts of interest, and would also reduce costs compared to setting up a bespoke system. Sellers include farmers and landowners. Buyers would include the Welsh Government, noting there is likely to be scope for involvement of other buyers due to the wide range of potential co-benefits (water quality - e.g. DCWW, Severn Trent Water; flood hazard – e.g. councils, insurers). There would be a role for intermediaries such as NRW or third sector organisations such as rivers trusts to raise awareness and deliver advice to farmers/landowners. Engagement should be designed from the outset to prompt potential buyers and sellers to come forward and participate. The UK Woodland Carbon Code operates on the basis of units each representing one tonne of CO_2e. The system uses two types of unit;

73 Accessed at https://www.markit.com/Product/Registry

Strategy Stage	Recommended Action
	• the Woodland Carbon Unit (WCU) represents one verified tonne of CO2 that has been sequestered. This can be used for immediate reporting against emissions. • the pending issuance unit (PIU) provides the buyer with an opportunity to purchase advance credits in the likelihood that prices are likely to rise in the future. This cannot be used to report against emissions until verified. Verification of projects would take place on a cyclical basis, at which point PIUs would become WCUs.
Identify scale and location for scheme	Potential size of the market in Wales would need to be determined, potentially through an ecosystems services mapping solution (Box 2.1). Carbon calculator spreadsheets are available to calculate carbon sequestration at the project level. Although the scheme would be instigated at a national level, there would be advantages to area based focus of effort, particularly in areas identified as particularly suitable for afforestation in terms of co-benefits. Area based focus could be aligned towards those local authorities responsible for the most emissions, such as Neath Port Talbot, Cardiff, Flintshire and Newport – although this would primarily depend on habitat availability.
Assess baseline ecosystem services and potential demand	For the chosen pilot catchment, map and estimate the current extent of soils with high carbon content which would be likely to benefit from afforestation and use the literature to calculate sequestered carbon to establish the baseline. The Code would include a requirement to ensure additionality, incorporating a process to assess baseline carbon sequestration. The UK Woodland Carbon Code stipulates specific tests to ensure additionality.
Identify physical processes and required interventions	The Code would detail management appropriate and required for participant landholders. The Code would require landholders to develop a management plan for each project focussed on the establishment period, including a financial analysis of inputs, summary of management techniques, time schedule for interventions, consideration of species selection in view of future climate, with an outline of management approaches in the longer term.
Potential barriers and opportunities	Engagement and promotion at an early stage, potentially targeted at an area or catchment scale, should seek to maximise opportunities to achieve wider co-benefits of afforestation, such as water quality and flood risk management. The outcomes set out in the "Woodlands for Wales" strategy could provide a good starting point for identifying these. Informational barriers in terms of promoting uptake can be overcome through effective promotion of the Welsh Code, in order to maximise inward revenue. There is an ever growing body of research on carbon uptake through afforestation, enabling a clear link between actions and outcomes in terms of carbon sequestered. The fact that this scheme can be administered on a national scale, and that there is already an established and recognised code system, will bring efficiencies in its deployment and benefits. Potential leakage effects of afforestation are acknowledged and there is a body of research to support targeted monitoring, for example if the project results of change of land use under the same ownership, the Woodland carbon Code requires this to be taken into account in carbon accounting. Trade-offs should also be considered, such as adverse effects of conifer plantations. Financial and legal risks are accounted for under the code system.

Strategy Stage	Recommended Action
	For example, risks around contractual compliance can be mitigated through provision of a carbon buffer, whereby projects provide a reserve carbon store – this is held by the registry should any projects fail due to unforeseen circumstances.
Monitoring and evaluation	The Code should require projects to develop a monitoring plan to ensure successful woodland establishment and anticipated carbon uptake. Monitoring of socio-economic benefit as well as environmental impacts should be incorporated within the monitoring plan to consider progress towards the Welsh Government's vision "One Wales: One Planet"[74]. The monitoring plan should be linked to corrective actions or mitigation should the interventions not result in the expected outcomes. Certification to UK Woodland Assurance Standard.
Timescales	Plantation projects would be required to register with a certain period of implementation. It is suggested that projects have a defined duration – for the UK Woodland Carbon Code this is 100 years. Given that the UK Code is already operational this scheme could be implemented relatively quickly, in line with Welsh Government aspirations.

4.6.2 Pilot 2 – Catchment Management for Water Quality, Flood Hazard and Biodiversity Improvement

There is a clear driver for catchment management to deliver wider ecosystem services in Wales. The Welsh Government's vision for water management, as set out in the Water Strategy Consultation Document[75] states that *"Catchment management is at the heart of our integrated approach. Whilst historically we may have tended to look at water management issues in isolation, our work on implementing the Water Framework Directive has emphasised the benefits of taking an integrated approach to river catchment management"*. In addition, the national strategy for flood and coastal erosion risk management in Wales places great emphasis on developing sustainable and innovative approaches to managing the sources of flooding, stating *"We need to adopt a more holistic approach of defence combined with a range of other measures to help communities and the wider environment"*[76].

NRW is currently embarking on three area based trials. Welsh Government also has 7 pilot areas. The specification of activities in the pilot/trial areas is not currently known, although we understand that there is an aspiration to trial PES in at least some of the areas. It is not clear whether the pilot/trial areas were selected with specific ecosystem services provisions or PES approaches in mind. We recommend that each pilot area that is being considered for PES is subject to a preliminary screening to identify areas where ecosystem services are currently sub-optimal or

74 Accessed at http://wales.gov.uk/docs/desh/publications/090521susdev1wales1planeten.pdf
75 Accessed at http://wales.gov.uk/docs/desh/consultation/140407water-strategy-consultation-document-en.pdf
76 Accessed at http://wales.gov.uk/docs/desh/publications/111114floodingstrategyen.pdf

that could usefully be improved from their current state. It is also important that there are potential buyers and sellers in the pilot areas who have a wish or could potentially contribute to a future market. These activities should be undertaken quickly to ensure that the pilot PES schemes can be usefully taken forward. The following table identifies the broad tasks that could be undertaken to generate momentum in a catchment that could lead to successful uptake of PES schemes.

It should be noted that this approach has multiple ecosystem services bundled together, which may attract different types of buyers depending on their specific needs. Examples may include:

a) Water company buyer to improve water quality or quantity through upland land management, sellers from land management community leading to reduced pesticide and nutrient applications and better husbandry of farm areas. A working example is the Tees Water Colour Project[77]. Although DCWW and other water companies in Wales may welcome the catchment based approach, they are yet to be convinced that PES schemes will be beneficial for them. Given that elsewhere water companies are often important initiators of catchment PES, Welsh Government may wish to provide support to facilitate uptake and promotion in this sector.

b) Grant/subsidy body buyer to improve biodiversity, either to improve specific nature conservation areas (including N2K) such as under Glastir, funded by the RDP, or to promote identified BAP species improvement through better land management practices. A working example is the SCaMP project[78], which is funded by a water company and public funds.

c) NRW buyer of flood hazard protection through upland and floodplain flood peak reduction, enabled through natural water storage solutions implemented by land managers (sellers). A working example is the Exmoor Mires project[79].

d) There are national and international examples where attempts have been made to maximise cost-efficiency by identifying 'hot-spot' areas which deliver multiple ecosystems services, including work by the Westcountry Rivers Trust in the Tamar catchment (Box 2.1), and in Madagascar, where demand for and provision of ecosystems services was mapped and understood in the context of deforestation threat and opportunity costs. This helped to identify spatially where PES could be a conservation strategy, but the research also found that the conditions and capacity to monitor and implement the schemes must also be in place, including appropriate property rights, policy coherence among institutions, political will, sustainable

77 Accessed at https://www.nwl.co.uk/your-home/environment/river-tees.aspx
78 Accessed at http://corporate.unitedutilities.com/scamp-index.aspx
79 Accessed at http://www.southwestwater.co.uk/index.cfm?articleid=11311

funding and education and engagement among stakeholders[80].

Other ecosystem benefits will be established should some or all of these attributes be delivered. These may include carbon sequestration and recreational benefits, although for the purposes of the pilot these attributes would not be specifically traded unless seen to be marketable by stakeholders within the catchment pilot area. The following recommends steps to facilitate suitable pilots and emerging PES schemes.

Table 4.2 Implementation Stages for Pilot 2 – Catchment Management for Water Quality, Flood Hazard and Biodiversity Improvements

Strategy Stage	Recommended Action who what
Define, engage and promote the message	WG and NRW are currently developing their strategies for the pilot/trial areas and messaging for PES pilots is not currently available. It will be important that a consistent message on PES is defined during the inception phase of the wider pilots to allow potential participants to identify whether they want to be involved. We would recommend that the message is disseminated widely, to include water companies, agricultural sector, relevant commercial groups, insurance companies (with reference to flood risk management), rivers and wildlife trusts, health authorities, property developers and recreational groups, all of which may be indirect or direct beneficiaries of a multiple ecosystems service delivery scheme. Depending on the scale of the scheme, it may be appropriate to develop a campaign involving a celebrity champion – as an example the Pumlumon Project worked with Chris Packham. A recent UK study found that neighbourhood networks are particularly important for uptake in small remote communities, whereas farmers on large farms near cities are less likely to be influenced by collective decision making. This study used the Hagerstrom mathematical model to calculate the distribution of farmers taking up new environmental activities[81]. Understanding these effects would inform decisions around engagement for these pilots.
Set up infrastructure	This should be the first step for the WG and NRW pilot/trial areas. Are the areas suitable for PES scheme piloting? Elsewhere PES schemes have often been identified from the bottom up, with buyers and sellers identifying markets without initial Government support. Elsewhere volunteer "Champions" have been sought through competition and funding opportunities (e.g. Defra pilots). The infrastructure usually varies significantly, dependant on which group takes the lead. Regulatory lead groups tend to be more process based than community led initiatives.
Identify scale and location for scheme	An ecosystem services assessment should be undertaken to establish the range and quality of ecosystems available in the pilot/trial areas. There are well developed approaches led by Rivers Trusts to undertake this step, and as defined through the Catchment Based Approach[82,83].

80 Wendland KJ, Miroslav H, Portela R et al (2009) Targeting and implementing payments for ecosystems services: Opportunities for bundling biodiversity conservation with carbon and water services in Madagascar. Ecological Economics. 69. 2093-2107.
81 Van der Horst D (2011). Adoption of payments for ecosystems services: An application of the Hagerstrand model. Applied Geography. 31: 668-676
82 Accessed at http://www.catchmentbasedapproach.net/ecosystem-services-mapping-f10.html
83 Accessed at http://river-gateway.org.uk/catchments/tamar.html

Strategy Stage	Recommended Action who what
	For water quality, biodiversity and/or flood management services the catchment scale is suggested as an appropriate starting point. The land use and geography of the catchment will also determine the specific nature of the pilot, taking into account the sources of flooding and/or water quality and biodiversity issues, and the range of stakeholder concerns and aspirations in the area. It also aligns with Welsh Government Environment Bill White Paper objectives to move towards area-based planning[84]. For a pilot it may be that a smaller scale is used for implementation, allowing more control and more effective monitoring, supported by engagement facilitated at the catchment scale.
Assess baseline ecosystem services and potential demand	Demand for a PES pilot will depend on where and why ecosystems have become sub-optimal, and which parties may be suitable as a buyer community. For example, where water quality issues are a significant problem the water company or water quality-sensitive industries may be targeted. It is important therefore to identify those services, their location, the magnitude of the impact and the potential for remedy, improvement or enhancement. Identification of services should make use of experience and knowledge of key stakeholders such as Natural Resources Wales, water companies, rivers trusts and LLFAs. The baseline should also identify what services are currently funded or partly funded through existing agri-environment schemes and other funding sources e.g. European funding, other GIA.
Identify physical processes and required interventions	The causes of the diminished services should then be considered, and the measures necessary to support improvement. In this way the sellers of the PES scheme can be identified. Interventions for flood risk may include upstream storage, attenuation of runoff, reconnection of rivers to the floodplain, or more sustainable drainage. For water quality and biodiversity, appropriate interventions will depend on the location and aims of the scheme and could include upland peatland management, changing agricultural practices and habitat restoration. It is emphasised that the PES scheme should bring additional benefits to those already delivered through established schemes such as Glastir. There is significant guidance on how to do this stage from previous UK initiatives.
Design market system	The sellers are likely to be those with land holdings that can be utilised in scheme design (e.g. flood storage areas) or are seeking subsidy payments, although where co-benefits can be identified it may broaden into other sellers. For water quality improvements it could be simple contracts between the water company and farmers (refer Upstream Thinking). Other buyers may be drawn from a wide spectrum of organisations, including government, local authorities, and possibly the tourist industry, developers and other commercial enterprises. For flood hazard it could be contract between NRW and farmers. Local authorities, developers, insurance companies and community groups are potential buyers in this market with respect to flood risk. For biodiversity it could be Glastir grant conditions required to provide outputs commensurate with provision of a biodiversity improvement, or action that may lead to improvement. Other

84 Accessed at http://wales.gov.uk/consultations/environmentandcountryside/environment-bill-white-paper/?lang=en

Strategy Stage	Recommended Action who what
	groups may want to promote biodiversity gain, including appropriate third sector organisations (RSPB, WWF etc).
Potential barriers and opportunities	Informational barriers including water company being potentially unconvinced that the scheme will achieve stated outputs or outcomes (scientific uncertainty), and NRW unconvinced that natural flood storage and/or flow attenuation will work. Overcoming informational barriers requires research and evidence and longer term commitment of government, plus a regulatory safety net if outputs do not deliver the required outcomes. This sort of scheme, with multiple benefits, may be subject to diffuseness, and therefore is most suited to systems with institutional buyers, particularly in the initial stages when outcomes are uncertain. The same can be said for schemes which may be susceptible to free-riding – it is very unlikely that 100% of beneficiaries of schemes to reduce flood risk would contribute to payments. Trade-offs and leakage could occur outside the target area, potentially in terms of flows or water resources downstream from the catchment. Effects should be monitored, and scoped to include the full range of potential effects, supported by experience gained from similar schemes (e.g. SCaMP). Financial barriers, such as requirement for capital investments may be allayed through provision of start-up funding, or front-loaded payments. Here Government may wish to pump prime the process. Institutional and legal issues around property rights and payment design can be resolved through effective design of legal contracts. Cultural barriers can be overcome through effective messaging backed up with technical evidence and time to build trusting relationships. This is inevitably linked to an appropriate scale of community interaction and engagement.
Monitoring and evaluation	In the short term, particularly the first year, monitoring and evaluation should be undertaken that seeks to facilitate uptake and development of a cohesive approach. It should establish participatory uptake, and support timely identification of problems or conflicts that need to be ironed out. Medium to long-term monitoring of effectiveness of measures should be undertaken including: • Recording of measures uptake and delivery • Monitoring of impact in terms of delivery of the selected ecosystem services • All costs (direct and indirect) - to inform application to other areas or wider adoption of approaches • Wider benefits e.g. impact on tourism / recreation benefits, carbon offsetting • Identification of evidence gaps and uncertainty • Identification of unforeseen effects that may require intervention and mitigation. Certification bodies could be set up to undertake monitoring - these would provide assurance under any 'code' and potentially enable producers to charge a premium according to the co-benefits realised (providing consumers are willing to pay for them). Monitoring of socio-economic as well as environmental impacts should be incorporated within the monitoring plan to consider progress towards the Welsh Government's vision "One Wales: One Planet"[85]. Focus should be given to identification and promotion of

85 Accessed at http://wales.gov.uk/docs/desh/publications/090521susdev1wales1planeten.pdf

Strategy Stage	Recommended Action who what
	benefits, to create goodwill and momentum though case studies.
Timescales	One year to set pilot catchment up and start to build a level of trust between actors. Scheme effectiveness should be re-evaluated after 2 and 5 years. It will be necessary to set expectations. For government and scheme participants. In most cases involving land management it takes a number of years to develop consistent engagement and uptake, and a decade or so to reach maturity (e.g. SCaMP was 10 years to maturity and some of the measures are still being assessed; CSF is still being developed; Upstream Thinking has taken at least 5 years to start to achieve full suite of notable ecosystem improvements, etc).

Further consideration could also be given to how recreational visitors and the tourist industry may be facilitated to contribute to PES schemes, including possibly the catchment based PES pilot. Visitor Payback schemes, such as the Nurture Lakeland project[86] (Box 4.8), may provide an efficient and administratively less onerous route for raising funds for small scale environmental enhancement. The system may be helpful where buyers for a given ecosystem are scarce. The system relies on accredited tourism businesses asking visitors to the area to donate a very small proportion of their bill or fees to conservation benefit. However, there is therefore a significant level of uncertainty in the funds that will be raised. It is recommended that Welsh Government explore potential for Visitor Payback schemes. Of the proposed trial areas, the Dyfi catchment which overlaps with Snowdonia National Park may provide a suitable location for a pilot.

Box 4.8 Nurture Lakeland – Visitor Payback Scheme

One of the most successful examples of Visitor Payback is the 'Visit Give' scheme run by Nurture Lakeland. The overall aim of the project is to address some of the impacts caused by the intensity of tourism in the area. Local tourism related businesses are invited to participate, benefitting from the positive identity and branding of the scheme, and often linking to a specific local project. Organisations except businesses and individuals can apply for funding for small projects. Projects must demonstrate a clear and positive contribution to the natural environment, for example by conserving biodiversity, taking measures to tackle climate change, educating communities, raising awareness or carrying out countryside maintenance. They should normally be accessible to members of the public, and where possible involve and benefit local communities.

In practical terms, businesses can add a small 'opt out' or 'opt in' facility to customer bills. Other systems include a 10p levy on the Ullswater Steamer, where to date the system has raised £20,000 for conservation work around Ullswater Lake. This has funded path repair work, and so benefitted recreational walkers, Ullswater Steamers who receive good publicity for their support, and enhanced conservation of the lakeshore of Ullswater itself. Other systems have included match funding, sponsored products and donations, including collection boxes.

86 Accessed at http://www.nurturelakeland.org/what-do-we-do/visitorpayback.html April 2014

5 OTHER MARKET BASED INSTRUMENTS

Feedback from Phase 1 and subsequently has indicated that there is likely to be less immediate scope for development of MBIs other than PES, offsetting and habitat banking. The sections below provide a number of recommendations towards enabling use of these MBIs.

5.1 BIODIVERSITY OFFSETS AND HABITAT BANKING

As explained in Section 3.2, there are both commonalities and differences between PES, biodiversity offsets and habitat banking. Both offset and banking schemes are designed to ensure remediation of damage. However, banking enables credits to be prepared in advance of the damage, without knowing the type of damage which requires compensation. There is therefore a requirement to anticipate the type of habitat banking credit likely to be required in terms of the type of habitat that is likely to be degraded. For both, it is important that the schemes enable additional protection to that afforded by existing legislation and mitigation, and also that they incorporate monitoring systems to ensure rules are adhered to and that the required outcomes are provided. Offsetting and banking schemes do not provide any alternative to the primacy of the well-established mitigation hierarchy; parties must be required to avoid or mitigate adverse effects on biodiversity before any consideration is given to accepting damage and compensating for it. Any schemes will require effective design and administration to ensure that they provide adequate protection to important habitats and species, and actually result in a biodiversity gain. This would include consideration of factors such as individual species, local habitat significance, ecosystems service provided, and ecosystem network connectivity.

Most offsetting schemes are required to minimise environmental impact (with most requiring 'no-net loss') and then compensate for the residual damage. Biodiversity Offsetting does this on a project by project basis whereas schemes such as Habitat Banking operate at different spatial and temporal scales (i.e. habitat is purchased, usually at a much larger scale, and credits are sold later to offset impacts of schemes in the future).

The framework of steps specified for PES in Figure 4.1, and explained and defined in terms of actions in the subsequent sections, would apply for both biodiversity offset and trading schemes, with the exception of Step 3 *Governance Structures*, for which specific actions would be required. These are outlined in Box 5.1.

As noted by the UK Government's response to the Environmental Audit Committee's

report of November 12 2014 on Biodiversity Offsetting[87], biodiversity offsetting systems should incorporate a metric for calculating biodiversity losses and gains that reflects the full complexity of habitats, including particular species, local habitat significance, ecosystem services provided and habitat connectivity. The Government noted that bespoke offsetting approaches may be appropriate where more sensitive habitats such as SSSIs are concerned. It may be feasible to introduce a risk factor into the metric system in case habitat restoration or recreation is unsuccessful – similarly to the provision for risk common to PES schemes which are based on over-supply of a service (e.g. carbon buffers). Such risk factors are incorporated into the Defra biodiversity offset pilots, based on scientific literature, and subject to review.

Only in certain circumstances can compensation be considered for internationally designated sites protected under the Habitats Directive. Offsetting is not appropriate to consider for habitats which are effectively irreplaceable, such as ancient woodlands. Constraints on the location of offsets may be appropriate to prevent reduction of public access to biodiversity, and there would need to be some sort of registry and accreditation system to ensure no net loss. Developers may be expected to undertake and provide equivalency analysis as part of the assessments provided to local planning authorities in applications for development consent. There may be a role for NRW to monitor offset systems to ensure equivalency, i.e. that new habitats are broadly similar to those that have been lost, noting that NRW would need resources to do this. This monitoring would then feed back and provide evidence to review the metrics.

As for PES, there will be resource implications and costs associated with facilitation, monitoring, accreditation and assessment of offset schemes. It is likely that developers would need to provide assessments and evaluation of proposed schemes for evaluation and audit by local planning authorities – Defra has established a biodiversity metric by which the offset requirement and value of compensatory action can be defined[88]. The metric is transferable between sites and habitats so that an impact on one habitat type can be offset with compensatory habitat elsewhere, or involving a different habitat type and/or quality. There are a number of different systems in operation around the world, most of which combine quantity and quality attributes.

87 Accessed at http://www.publications.parliament.uk/pa/cm201314/cmselect/cmenvaud/1195/119504.htm, April 2014

88 Defra (2012) Biodiversity Offsetting Pilots. Technical Paper: the metric for the biodiversity offsetting pilot in England. Accessed at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69531/pb13745-bio-technical-paper.pdf April 2014

Set out minimum standards for methods and metric and off-the-shelf conversion to ensure equivalency between damage and offsets or credit. Set damage thresholds beyond which bespoke calculation methods need to be implemented

However the Government should consider developing a clear set of protocols according to which developers can undertake assessments and against which audits can be undertaken. By imposing the requirement to provide assessments on to the private sector, cost burden to the public sector could be controlled.

The Environment Bank[89] is established to provide an offset brokering role; although it is not a habitat bank in that it does not own any land, it holds a registry of land suitable for offset and provides a searching service to locate suitable land working with partners. The Environment Bank currently provides services such as calculation of credits required by a given development and provision of a platform for landowners with suitable compensation sites, and administration of a management plan with landowners to ensure suitable management. The Environment Bank also draws up the contracts between itself and the offset provider (the Conservation Bank Agreement), and the contract of sale between the Environment Bank and the developer (the Conservation Offset Purchase Agreement).

Welsh Government could elect to set up an initiative in Wales, incorporating learning from and potential support of the Environment Bank - this would allow promotion of the systems to developers with a focus on Wales. The systems would rely on close cooperation between local planning authorities and the habitat banking system. Any systems must be both economically efficient and simple to understand and use. There is a risk that over complicated processes will prevent uptake and wider adoption by stakeholders. Box 5.1 lists the governance requirements for an offsetting or habitat banking system.

89 Accessed at http://www.environmentbank.com/index.php April 2014

Box 5.1 Governance Requirements for Biodiversity Offsets and Habitat Banking Schemes

A legal framework to allow the long term protection of land and/or ecosystems services is required, even if ownership (the offset may need to be conveyed to another party), or Government policy changes. The framework should encompass general binding rules (GBRs). The agreement is to specify responsibilities for any offset or banking agreement (note there are precedents for such mitigation bank agreements). The agreement will establish the purpose of the scheme, relevant legislation, location and ownership of the land to be used, project description including requirements for assessments and monitoring etc., and role and make up of an inter-agency review team and authorities. Key legal considerations which should be provided for in any template are:

1. Identification of parties
2. Legal nature of agreement
3. Objective and scope of contract
4. Rights and obligations
5. Payment structure
6. Duration
7. Risk allocation
8. Monitoring and reporting
9. Remedies and dispute settlement

Equivalency - can't usually offer exact replacement compensation, so need to ensure compensation is sufficient in context of the damage. The system of offsetting / habitat banking is voluntary, but one way to encourage buyers and sellers to join the system is to ensure transparency and comparability between offsets / credit trades etc. and hence such methods should be regulated.

Defra / NE are suggesting off-the-shelf metrics and conversions and there are also some other international examples of this. These off-the-shelf metrics and conversions would be for 'standard cases' or cases in which damage is below a certain threshold. The objective of using such metrics / conversions is to reduce transaction costs as well as to ensure transparency and comparability. However, if damage is beyond this threshold (i.e. more serious), then bespoke calculations and more evidence / proof would be required.

As stated above, Steps 1, 2, 4 and 5, and the themes of stakeholder engagement and monitoring and evaluation would be similar to those defined for PES in Section 4. In terms of evaluation and feedback, once the offsetting system is in place it would be appropriate to review potential changes to the planning process that could better enable the systems. There could perhaps be some incentives too. For example, developers that deliver better than the minimum offset could be fast-tracked through the planning system (being mindful of potential creation of perverse incentives, and inequality of how developers are treated).

5.2 ENVIRONMENTAL PERFORMANCE BONDS

Environmental performance bonds are not considered suitable as a priority for promotion in Wales under the current policy and industry situation. They are primarily suited to extractive industries, and are generally aimed to provide delivery or maintenance of ecosystem services over the long-term in terms of habitat and ecosystem service restoration, rather than enabling continued and improved provision of currently delivered ecosystem services. They constitute a financial mechanism to assure environmental responsibilities are met on project closure. Extractive industries are not included in the nine key sectors identified by the Welsh Government as of strategic importance[90], and from discussions it is understood that the Welsh Government are interested in developing ecosystem markets to provide funding for environmental improvements in the short to medium term.

That said, there may be specific cases where environmental performance bonds do provide a suitable mechanism to ensure maintained provision of ecosystem services. In these cases, negotiations could be undertaken on a voluntary and case-by-case basis, without requirement for new legislation. The following governance requirements are likely to require consideration:

- Likely to require a detailed assessment of what habitat restoration / creation might be necessary.
- Requires provision of legal protection (including requirement for considering financial security) for the bonds so that they are secure for future use (by the government for rehabilitation)– even if the original company goes out of business or changes ownership.
- There may be a requirement to set up a government entity that can hold the bonds and pay back the company at the end of the period.
- For government held bonds, there could be a ring-fencing requirement in the legislation to ensure that bonds are not spent on anything else, with corresponding assurance systems for financial security.
- There are potential links to planning and development. For example, planning permission, for some types of development at least, could be conditional on purchase of a bond. For the bond system to be more transparent and comparable across different development types, rules could be put in place on how to calculate the size of the bond to ensure equivalency between potential future

90 Welsh Government (2013) Business and Economy webpages. Accessed at http://wales.gov.uk/topics/businessandeconomy/sector/?lang=en, March 2014

damage and potential future rehabilitation / restoration investments. The actual type of investment and cost will of course be site-specific, but the rules that govern this determination could be set to have general applicability.

There could be potential for the Welsh Government to consider issuance of government 'green bonds' should further tax and financial powers be devolved. Green bonds have been used by the World Bank to raise funding for projects related to climate change, and some US and Canadian administrations are issuing green bonds to fund investment in environmental projects and infrastructure[91]. Green bonds in this sense are distinct from the environmental performance bonds discussed above.

5.3 TRADING

5.3.1 Water Trading

Water trading for Wales only, as currently considered by the Defra Abstraction Reform programme, would probably have little advantage over more direct regulatory approaches. The key to water trading is an active market, particularly and usually where water availability is limited or skewed to a particular user (normally water or energy utilities). The conditions in which a water trading market would provide economic and environmental advantage are not usually prevalent in Wales and the cost and benefits of setting up such a market are likely to be prohibitive. Opportunity for trading between Wales and England are outside of the current project scope.

5.3.2 Carbon Trading

The package of carbon emissions trading schemes currently in place includes:

- the Climate Change Agreements (CCA)
- the EU Emissions Trading Scheme (EU ETS)
- the CRC Energy Efficiency Scheme (CRC).

NRW took responsibility from the Environment Agency for managing certain aspects of the CRC and EU ETS in Wales from April 1, 2013.

Compulsory emissions trading is already in place in the form of the EU Emissions Trading Scheme. There would be no advantage to be gained from Welsh Government introducing a national equivalent for Wales.

91 Accessed at http://bonds.about.com/od/munibonds/a/What-Are-Green-Bonds.htm June 2014

There could be scope for promoting the development of a voluntary carbon offset market, based on carbon credits generated by forest projects (reforestation, afforestation, improved forest management) within Wales. The creation of national carbon forest credits would enable carbon offsets for emitters who are not already legally obliged to offset their carbon emissions. Green marketing and Corporate Social Responsibility strategies of Welsh private companies would benefit by investing in local forest while promoting the *carbon neutral* production process. In terms of equivalency this would be limited to carbon offset/credit only.

There may be potential to implement projects under the Clean Development Mechanism, defined in Article 12 of the Kyoto Protocol, which allows a country with an emission-reduction commitment under the Kyoto Protocol (Annex B country - include the UK) to implement an emission-reduction project in developing countries. Such projects can earn saleable certified emission reduction (CER) credits, each equivalent to one tonne of CO2, which can be counted towards meeting Kyoto targets. Such an approach helps to enable sustainable development, technology transfer, and would allow flexibility in meeting emissions reduction targets. A similar system exists under the Protocol where countries can earn emission reduction units (ERUs) for deploying emission reduction or removal projects in another Annex B country.

There may be potential to implement a scheme through which carbon credits are earned for mono-purpose afforestation projects, and there could be potential to design a scheme to promote renewable energy such as wind power. However, there could be arguments around additionality over the current baseline, particularly as Welsh Government has already committed to extending woodland cover, and promotion of such a scheme could be seen as a commitment on the part of the Welsh Government to a specific form of renewable energy.

Although opportunities may present themselves for carbon trading in the future, the focus of this study is on PES scheme implementation. However, a number of issues would need careful consideration:

- Specific powers would be required to set up a trading system, or to provide general rules with which to support a voluntary system.
- Trading would need to be initially facilitated by Government, with availability allocations defined through consideration of existing and future baselines, potentially linked to consideration of grandfathering rights for existing users of the ecosystem (e.g. water companies for water trading)
- Level powers would be required to design permit allocation systems.
- It would be important to ensure that legal provisions did not conflict with

competition rules.

- Legal provisions would have to allow for area-based characteristics to be reflected in the trading volumes / equivalency.

- For carbon trading, and possibly other assets types, a legal framework would be required that allows for trading beyond Wales (although the EU ETS is presumed to provide this).

Perhaps the most scope for delivering carbon related benefits is through implementation of voluntary carbon offsetting, through enabling improved sequestration in plants and organic soils such as peat. This would require funding via offset of a scheme, for example to preserve peatlands, that would otherwise not occur. This is a possibility for Wales, and has been included as one of the multiple benefits in the proposed PES pilots. However it would be feasible to design a pilot specifically around *biocarbon,* and this has been explored through PES Pilot 1. Precedents already exist in the form of the IUCN Peatland Code and the Forestry Commissions Woodland Carbon Code. One scheme already running under the Woodland Carbon Code is *Forest Carbon*[92] which operates across the UK, for which the Code provides assurance and clarity about the carbon savings of the sustainably managed woodlands. It is noted that the draft IUCN Peatland Code, although it provides guidance on quantifying climate and other benefits, is not currently intended for use in carbon offset schemes, corporate carbon reporting or for carbon trading on international carbon markets. This does not preclude this use from occurring in the future, subject to Government approval.

92 Forest carbon (2014) Accessed at http://www.forestcarbon.co.uk/ March 2014.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 FINDINGS OF THE STUDY

Welsh government has signalled in its White Paper the desire to implement market based instruments in Wales. Our studies have identified PES, offsetting and habitat banking as the most immediately accessible market based instruments for early consideration. Welsh Government has indicated that this study should focus primarily on consideration of PES schemes.

There is significant international and UK experience that should be drawn on to facilitate the uptake of PES in Wales, particularly as Welsh Government has signalled that it would like uptake to be established quickly. We have therefore developed the framework for introduction and evaluation of PES scheme in Wales based on international experience and emerging findings from the Defra/Natural England PES pilots, the catchment based approach and place based initiative evaluations.

To facilitate PES markets, Welsh Government will need to:

1. Communicate a coherent and compelling message and objectives detailing the reasons for the introduction of the PES approach in Wales, why it is necessary and what it seeks to achieve. Recent communication from NRW suggests that this element is not currently clear.

2. Develop and implement a strategy for PES implementation, based on national ecosystems services provision and ambition for improvements in ecosystem function. This should set the priorities for the short, medium and longer term from which PES schemes can be identified and developed.

3. Identify national and catchment scale governance arrangements (depending on pilot findings) that support market implementations, including legal arrangements.

4. Facilitate and support derivation of individual PES schemes at national through to community levels in Wales. These will be dependent on identification of suitable buyers, sellers, intermediaries and knowledge providers for each application. Facilitation of suitable levels of stakeholder engagement at national and catchment scales (for the WG pilots and NRW trials) will be pivotal to engender enthusiasm and develop momentum.

5. Implement a rigorous monitoring and evaluation process to identify successes and difficulties. This should be linked to facilitated learning, as successfully undertaken for Catchment Based Approach, which allows for modification to the

approach or processes should it be necessary to meet Welsh Government strategy and objectives. This will be predicated on being able to assess benefits, co-benefits and savings from PES pilots, which require a consistent methodology.

The recommended actions, activities and PES pilots contained in this report will support implementation of the approach in Wales. In the end, however, the key recommendation with complex multiple-stakeholder environmental initiatives is that there should be a significant element of "Learning by Doing", gathering and disseminating good practice as it emerges that modifies and improves the processes and programme. We have recommended two potential PES pilots to trial, embracing the national to local scales, and a range of ecosystem services.

Pilot 1 – carbon sequestration through afforestation as a national scale scheme

Pilot 2 – catchment approach to water quality, flood hazard and biodiversity improvements.

If considered suitable by Welsh Government the pilots should be evaluated to ensure that learning is shared and progress accelerated.

NRW can support the PES pilots by provision of regulatory advice to the PES scheme developers and assessing the baseline ecosystem services. It may also be required to provide supporting data and evidence, although for national schemes that may fall to a third party arbitrator. Its role in PES in Wales could be as a buyer (e.g. natural flood hazard protection through natural flood storage payments to land holders); a seller (e.g. land holder for forestry provision); an intermediary (e.g. market facilitator/arbitrator at national or catchment level) or knowledge provider (e.g. ecosystem services data, impact assessment etc). At present NRW has indicated that its role should focus on participation as a seller/buyer, and is keen not to take any additional role which would compromise this[93]. Welsh Government should clarify its intentions for NRW at an early juncture to enable any roles that it does not then fulfil to be adequately covered. Multiple roles would present a conflict of interest and should be avoided.

6.2 RECOMMENDATIONS TOWARDS ESTABLISHING A PAYMENTS FOR ECOSYSTEMS SERVICES DELIVERY FRAMEWORK

Wales has significant natural capital capacity. Welsh Government would like to promote the use of PES to support maintenance and improvement of these ecosystem services. A 5 step framework is proposed to manage implementation of a robust process that will facilitate the development of PES schemes. Steps 1 to 3 concern

93 NRW (2014). Personal communication via Emma Edworthy, 23 April 2014.

activities required of Welsh Government to set the direction and support overall delivery of suitable PES schemes. Step 4 establishes the approach to individual PES schemes within the broad framework, including monitoring and evaluation. Step 5 seeks to evaluate the overall PES programme and build in adaptive management to ensure that lessons learned can be quickly cascaded into the specific schemes and fed back into the overarching strategy, and that the overall success of PES for Wales is measured and communicated.

6.2.1 National PES Stakeholder Sub-Group

A fundamental element for successful implementation of the PES framework will be buy-in and adoption of the approach by the stakeholder community, particularly those who will be active in the buyer and seller market. We would recommend significant focus on interaction with key market actors during the initial phase of implementation to establish PES champions. Initial momentum and subsequent take up will benefit greatly from a few early wins that are well communicated. This should be facilitated by a new and specific sub-group of the Natural Resources and Food Reference Group that focuses on PES implementation. This group would have a different membership with an emphasis on bringing together buyers, sellers and intermediaries. Key in the early stages would be getting feedback from the banking, accounting and professional services community, which is increasingly active in this area. Recent conferences by the Natural Capital Coalition (Natural Capital Incentives and Support Mechanisms for Business and the Financial Sector, Dec 2013) and Globe UK (Natural Capital Legislation conference, April 2014) provide many of the active contributors and attendees which could be the focus for the initial forum participants.

Welsh Government has started to establish a message and objectives for PES implementation in Wales. This work needs to be further progressed so that it begins to reach those communities of commercial and industrial actors that are likely to become contributors to the schemes. Evidence from the international community would suggest that this would not be too onerous. A strategy for delivery of the Welsh Government's objectives for PES then needs to be developed over the next year to provide further clarity. The strategy will necessarily evolve as learning from the pilots emerges, and the strategy should reflect the need for this flexibility.

6.2.2 Ecosystem Services Provision and Knowledge

Welsh Government should seek to understand the full suite of ecosystem services that are currently delivered in Wales, where there are problems and where there is most potential for improvement. Although some work may be underway it is not likely to be comprehensive and targeted at this outcome. The importance of this approach is that it can then set the context within which future PES schemes can

operate. It will also allow the scale and magnitude of potential benefits, and hence markets to be identified. It would be useful to link this to a national natural capital accounting approach.

We would therefore recommend that Welsh Government continues the research that has been started on mapping and characterising ecosystems services across Wales. The SCCAN work referenced earlier in the report (Section 2) should be built on. The SCCAN work has been referenced by the Joint Nature Conservation Committee[94] in a project which pulled together learning from a number of case study ecosystems service mapping projects, at varying scales. This project created a spatial framework to aid the quantification and valuation of ecosystem services to inform decision making at a range of scales, from local to UK wide. This would be useful for Wales, as the framework was developed to be applied across a range of spatial scales, but would require more data at higher resolution than are currently available for evaluation at a local scale. The study does note that where data are not available, proxy data can often be used effectively (e.g. habitat attribute data).

Once PES pilot schemes are under way, opportunities for technical research into linkages between interventions and outcomes are likely to arise. As has been stated earlier, learning from development of the PES strategy, and implementation of the individual PES schemes should be collated, disseminated and fed back into scheme and strategy development. Although there is a large amount of existing research and projects, there is relatively little communication about existing work, many times due to the project organisers being unaware that it is taking an ecosystem service approach. It is therefore crucial that ecosystem service projects are publicised so that organisations with relevant experience and/ or data are aware of the new work. For example, extensive mapping of ecosystem services has been undertaken in multiple locations across the UK, but with the majority of work being done without interaction between projects. This raises several issues, including methodological differences between maps preventing direct comparison, replication of work, the risk that one dataset will be rendered obsolete, and reduced productivity as funding streams are split.

6.2.3 Recommended PES Pilots

Two pilots focus areas are recommended, which can hopefully be integrated with the work Welsh Government and NRW have recently started on area based initiatives. WG is in the process of promoting PES schemes at the scales identified, a national approach and catchment scale pilots (some of the 3 plus 7). These pilots and trials, if

94 Medcalf, K. A., Small, N., Finch, C., & Parker, J. 2012. *Spatial framework for assessing evidence needs for operational ecosystem approaches*. JNCC Report No 469, http://jncc.defra.gov.uk/page-6241, Accessed 14/03/14.

correctly focussed from the start will provide proof of concept and allow evolution of the strategy to meet government aspirations. There is significant learning that has been referenced in our report to support implementation and delivery. Detail of the many specific recommendations is contained in the main body of the report.

6.2.4 Monitoring and Evaluation

Monitoring and evaluation of the strategy and pilots is essential to establish good quality implementation. The process will benefit from the learning identified, which will allow broader uptake and facilitate quicker adoption. Again, significant evidence is available on best practice in this area from UK and international experience that Cascade and Eftec are leading. It will be important to celebrate and promote successes. The strategy may benefit from endorsement from credible celebrities who appeal to a broad range of stakeholders, not only wildlife enthusiasts or farmers. It is not clear whether Welsh Government and/or NRW has defined the requirements for evaluation as part of their area based initiatives.

Finally, it is worth reflecting on the advice of the Natural England lead on PES pilots, summing up many years of experience in this area - it is essential for these emerging approaches that government and regulators "learn by doing". Too much prescription can stifle enthusiasm and uptake.

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APPENDIX A - LOGICAL FRAMEWORK FOR THE PAYMENTS FOR ECOSYSTEMS SERVICES STRATEGY

Figure A1 Suggested Logical Framework for the PES Strategy[95]

LOGICAL FRAMEWORK FOR THE PES STRATEGY				
	Intervention logic	**Objectively verifiable indicators of achievement**	**Sources and means of verification**	**Assumptions**
Overall objectives	*List them and number them.* *What are the overall broader objectives to which the action will contribute?* *O1 – "Title of objective 1"* *O2 – Title of objective 2"*	*Indicate a **target value** for each indicator in this column whenever possible.* *What are the key indicators related to the overall objectives?*	*List the sources of verification for **each** indicator.* *What are the sources of information for these indicators?*	
Specific objective	*What specific objective is the action intended to achieve to contribute to the overall objectives?* *SO – "Title of the specific objective"*	*Which indicators clearly show that the objective of the action has been achieved?* *List the indicators as follows:* *SO. "Indicator 1" : target value* *SO. "Indicator 2" : target value* *…*	*What are the sources of information that exist or can be collected? What are the methods required to get this information?*	*Which factors and conditions outside the Beneficiary's responsibility are necessary to achieve that objective? (external conditions) Which risks should be taken into consideration?*
Expected results	*Results are the outputs/outcomes helping to achieve the specific objective. What are the expected results?* *R1 – "Title of result 1"* *R2 – Title of result 2"*	*What are the indicators to measure whether and to what extent the action achieves the expected results?* *List the indicators for each result, as follows:* *1.1 "Indicator 1" : target value (R1)* *1.2 "Indicator 2" : target value (R1)* *1.3 ….* *2.1 "Indicator 1" : target value (R2)* *2.2 "Indicator 2" : target value (R2)…*	*What are the sources of information for these indicators?* *Ex:* *Source 1 (Indicator 1.2, 2.3 etc)* *Or Indicator 1.1: source 1* *Indicator 1.2: source 1* *…*	*What external conditions must be met to obtain the expected results on schedule?*

95 Adapted from a structure suggested by the European Commission. Accessed at http://ec.europa.eu/echo/files/partners/humanitarian_aid/fpa/2003/guidelines/logical_framework_guidelines_en.pdf May 2014

LOGICAL FRAMEWORK FOR THE PES STRATEGY				
	Intervention logic	**Objectively verifiable indicators of achievement**	**Sources and means of verification**	**Assumptions**
Activities	*What are the key activities to be carried out, to produce the expected results? (Group the activities by result and number them as follows:* *A1.1 – "Title of activity 1" (R1)* *A1.2 – Title of activity 2" (R1)* *(sub activities may also be created A1.2.1 etc.)* *A2.1 – "Title of activity 1" (R2)* *A2.2 – Title of activity 2" (R2)*	***Means:*** *What are the means required to implement these activities, e. g. staff, equipment, training, studies, supplies, operational facilities, etc.*	*What are the sources of information on action progress?* ***Costs*** *What are the action costs? How are they classified? (Breakdown in the Budget for* the Action)	*What preconditions must be met before the action starts? What conditions outside the Beneficiary's direct control have to be met for the implementation of the planned activities?*