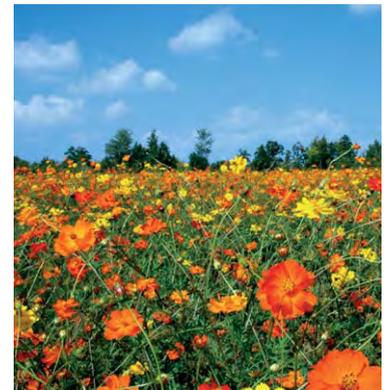




Department
for Environment
Food & Rural Affairs

Payments for Ecosystem Services: A Best Practice Guide



Annex - Case Studies

May 2013



Westcountry
Rivers
Trust



Pundamilia Ltd

Best Practice Guide for PES: 'PES in Practice' Case Studies

To support the Best Practice Guide for PES, 17 relevant case studies have been compiled which provide real life experience of 'PES in Practice'; highlighting both successes and challenges. While few are considered 'pure PES' schemes, each project provides valuable insights and lessons that are highly relevant to the phased approach to designing and implementing PES described in the guide. A short summary of each case study ('who and what') is listed below. For the 'Who?' section, the following abbreviations are used to designate the relevant PES actors in each case: **B** = buyer; **S** = seller; and **I** = intermediary.

Case Study	Who?	What?
Angling Passport (South West England)	B = Anglers S = Farmers & landowners I = West Country Rivers Trust	Landowners improve fishing beats through capital investment in infrastructure such as fencing and coppicing. Access to fishing beats is sold to anglers as tokens via the Westcountry Rivers Trust. Anglers deposit the tokens at fishing beats used; landowners then redeem the value of the tokens from the Trust.
Bonneville Environmental Foundation (BEF) Water Certificates (USA)	B = Private sector business S = Landowners with water rights I = Bonneville Environmental Foundation (BEF)	Enables private sector urban water users to invest in critically and chronically dewatered ecosystems. Water users purchase Water Restoration Certificates (administered by the BEF) which compensate landowners for transferring their water abstraction rights to serve environmental purposes; and importantly, to 'leave the water in the stream'.
Bush Tender (Australia)	B = Victorian State Government S = Landowners I = Victorian State Government Department of Sustainability and the Environment	Landholders competitively tender for contracts with Victoria State Government to be paid for protecting and improving the native vegetation on their land. The scheme uses a reverse auction-based approach, in which landowners propose conservation activities and their cost. The scheme aims to facilitate better management of native vegetation on private land.
Catskills (USA)	B = New York City S = Landowners in Catskills catchment I = Watershed Agricultural Council and Catskill Watershed Corporation	The New York City Department for Environmental Protection funds a Watershed Protection Program to provide high quality drinking water for nine million water consumers. Landowners in the Catskills supply catchment are paid to implement measures which reduce diffuse pollution.
English Woodland Grants Scheme - EWGS (England)	B = UK Government (Defra) S = Woodland owners I = Forestry Commission	Scheme aiming to sustain and increase public benefits through maintaining existing woodlands and investing in woodland creation. Six distinct grants are available to woodland owners.
Environmental Stewardship - ELS and HLS (England)	B = UK government (Defra) on behalf of taxpayers S = Farmers and landowners I = Natural England	Agri-environment scheme run by Natural England since 2005. Agricultural landowners and managers across England are paid for on-going management practices that provide ecosystem services.
Lysekil Nutrient Trading Scheme (Norway)	B = Lysekil community S = Mussel farmers I = Community board	Trial scheme whereby payments were made to mussel farmers to encourage the cultivation of Blue Mussels which filter excess nutrients and reduce eutrophication, thereby improving water quality. However, a lack of demand for the mussels meant that revenue could not be guaranteed and the trial scheme was unsuccessful.

Case Study	Who?	What?
<p>Natural England Uplands Ecosystem Service Pilots (Lake District National Park)</p>	<p>B = Multiple (public and private) S = Land owners and managers I = Natural England and partners</p>	<p>Pilot in the catchment of Bassenthwaite Lake, taking an integrated approach to managing the catchment for multiple outcomes. This is a catchment-scale example of spatially prioritising land management actions for multiple ecosystem services through partnership working. Combines public and private funding sources (Environmental Stewardship, English Woodland Grant Scheme, water utility company investment).</p>
<p>Nurture Lakeland (Lake District National Park)</p>	<p>B = Visitors to Lake District National Park S = Local conservation projects I = Nurture Lakeland charity</p>	<p>Visitor Payback Scheme supporting the ecosystem services pilot in Bassenthwaite Catchment (see above). Visitors donate money to promote landscape management via participating local businesses, providing a mechanism for tourists who benefit from the natural environment to directly support it.</p>
<p>Pumlumon Project (Wales)</p>	<p>B = Biffaward and Waterloo S = Land owners and managers I = Montgomeryshire Wildlife Trust (MWT)</p>	<p>Scheme taking an economic-based approach to ecosystem management with landowners in the Cambrian Mountain range and addressing multiple ecosystem services. Scientifically validated monitoring ensures improvements to ecosystem service delivery are demonstrated to funders. Beneficiaries include residents downstream (water quality and supply), tourists and visitors, and the general public (carbon storage and sequestration).</p>
<p>SCaMP I (North West England)</p>	<p>B = United Utilities (UU) S = Tenant farmers on United Utilities land I = United Utilities and RSPB</p>	<p>The Sustainable Catchment Management Programme (SCaMP) takes a partnership approach to improving raw water quality and the condition of Sites of Special Scientific Interest (SSSI) within United Utilities' (UU) water supply catchments. UU incentivises tenant farmers to improve land management to deliver ecosystem services.</p>
<p>Slowing the flow at Pickering (North Yorkshire)</p>	<p>B = Defra, Natural England, Forestry Commission, North York Moors NPA, the Environment Agency and Ryedale District Council S = Private and public land owners I = Forest Research</p>	<p>A scheme investigating whether better land management can enhance flood protection for Pickering and deliver co-benefits for water quality, wildlife and soil protection. The scheme aims to achieve protection for 1 in 25 year flooding events through a mixture of land management measures and woodland creation. Multiple funding sources support the project on the behalf of beneficiaries such as local residents and businesses (flood protection).</p>
<p>Upstream thinking (South West England)</p>	<p>B = South West Water S = Farmers in target catchments I = Westcountry Rivers Trust</p>	<p>Co-developed between South West Water and a broker (the Westcountry Rivers Trust) to encourage and/or incentivise farmers to implement land management actions to improve raw water quality, with many management measures locked into 10 or 25 year covenants.</p>
<p>US Conservation Rewards Programme (USA)</p>	<p>B = US government S = Landowning farmers I = Four US government agencies</p>	<p>Nationwide land retirement programme which incentivises landowners to change land use on highly erodible and environmentally-sensitive cropland and pasture via inverse auctions.</p>

Case Study	Who?	What?
<p>Vittel - PES for water quality (France)</p>	<p>B = Vittel (bottled water company) S = Farmers in source catchment I = Agriculture-Environment-Vittel (AGREV)</p>	<p>To address problems relating to the aquifer from which Vittel's bottled water is drawn, principally rising nitrate concentrations from agricultural intensification in the area, Vittel paid above-market prices to purchase land around its water springs and signed contracts with other farmers to use more sustainable dairy farming techniques and to improve farm facilities. The net result of these initiatives has been a reduction in non-point source groundwater pollution.</p>
<p>Wessex Water (South West England)</p>	<p>B = Wessex Water S = Farmers in the catchment I = Wessex Water</p>	<p>Wessex Water invests in catchment management for the benefit of improved raw water quality. An action plan aims to protect water quality in catchments serving Wessex Water abstraction points and to mitigate the impacts of low flows in rivers. Payments are made to farmers to implement improvements to farming operations which can contribute to improved water quality by reducing nitrates, phosphates, agrochemicals and sediment in surface run-off.</p>
<p>Woodland Carbon Code – Warcop Training Area pilot (Cumbria)</p>	<p>B = Retail companies and North Pennines AONB S = Ministry of Defence (MOD) I = Woodland Trust and Forestry Commission</p>	<p>The Forestry Commission's Woodland Carbon Code provides standards for woodland creation for carbon storage. This pilot was developed between the MOD and the Woodland Trust to develop new woodlands on MOD training areas at Warcop. Funding comes from retail companies wanting to mitigate carbon emissions and also from the North Pennines AONB.</p>

<p>Who the beneficiaries are The beneficiaries are split into two groups: 1. Direct – anglers benefiting from enhanced fishing opportunities; 2. Indirect – the WRT and the wider community benefiting from improved ecosystem function (habitats, carbon sequestration, water quality, water quantity etc.).</p>	<p>Type of contract and payment approach Payment is annual and the scheme is voluntary. Farmers can vary the number of tokens needed to fish their beat, thus altering the value, numbers, and interest. The intermediary covers its costs through brochure advertisements and so passes on 100% of the token value to the farmer.</p>
<p>Extent to which supply of ecosystem service(s) is/was threatened Recreational services were not necessarily threatened but, by realising the market potential and working with an ethical broker, a new recreational service was provided that improved several other threatened services (water quality and habitat).</p>	<p>Degree of additionality involved It appears unlikely that the management actions would have been carried out without specific funding through the scheme as similar areas without PES schemes have not seen similar changes in management.</p>
<p>Any packaging of ecosystem services? Although the project was initially developed as a PES scheme to secure a single service from multiple sellers, the Westcountry Rivers Trust are looking to offer multiple services to multiple buyers (layering). An example of this would be to develop a scheme that utilises the Forestry Commission - Woodland Grant Scheme and South West Waters Upstream Thinking scheme to increase buffers between intensive agricultural practices and the river through the creation of wet woodlands.</p>	<p>Any problems with leakage or potentially perverse impacts on other ecosystem services The main perverse impacts relate to reducing farmable land area and reducing agricultural production by opening up areas as fishing beats. However, this varies site by site and the Westcountry Rivers Trust seeks to mitigate this risk through improving overall farm-wide production/efficiency.</p>
<p>Equity implications There are few equity implications within the project as farmers with good farming systems and farmers with poor farming systems can enter land into the scheme. The only inequity is that larger rivers in the middle of the catchment are more fishable compared to smaller streams, and the headwaters are not fishable at all yet are essential to the provision of a sustainable fishing scheme. The Westcountry Rivers Trust is working with farmers to address this issue.</p>	<p>Arrangements for monitoring and evaluation The WRT monitors fishing usage and fish returns on an annual basis to evaluate the success of the beat. They can then set the voucher price with the farmer accordingly. Website hits are also monitored.</p>
<p>Challenges, successes, lessons learnt Challenges: One challenge for the project lay in convincing landowners to participate in the scheme and persuading them to reinvest the revenue in their fishing beats. Over recent years the scheme has required external funding, firstly to initiate the scheme in 2003 and then to overhaul and extend the beats in 2009. This was funded through European Interregional funds, however, these intermittent funds cannot be relied on for a sustainable business model. Successes: There are now 43 fishing beats and 9 booking office beats in the scheme. The passport was packaged up in 2009 and used by other groups to replicate similar and linked schemes across the UK. Lessons learnt: The relationships between the buyer, intermediary and seller are key and require an understanding of the supply and demand of recreational fishing services.</p>	
<p>Future considerations for the scheme The longevity of the passport requires up front funding for development of new fishing beats, which is a challenge as funds from existing beats are only sufficient to fund their maintenance, not to secure new beats. As such, additional seed funding is often sought. Also the scheme relies on the angling market which is subject to supply and demand issues so new beats need to be tempered with angling demand.</p>	<p>Other comments / background The Westcountry Angling Passport is now linked with the Wye and Usk Angling Passport and the Eden Rivers Passport; tokens are interchangeable between these schemes and numerous other fish passport schemes are being set up across the UK. Recreational fishing brings further funding into the region by supporting accommodation, subsistence, and travel services.</p>
<p>Date last updated July 2012</p>	<p>Website www.wrt.org.uk</p>
<p>Contact details bruce@wrt.org.uk</p>	<p>www.westcountryanglingpassport.org.uk</p>

Best Practice Guide for PES case studies – BEF Water Restoration Certificates (WRC)

Case Study Name: BEF Water Restoration Certificates
Location: Prickly Pear Creek, Evans Creek and Middle Deschutes River, United States



Before investment:



Landowners were abstracting water from Prickly Pear Creek at unsustainable levels resulting in it running dry during the summer months.

After investment:



Water certificates provided landowners with the option of leaving water in the stream, this helped to restore water levels in the creek.

SUMMARY - what makes this case study distinctive?

The surface water in waterways across the American West has historically been fully or over-appropriated, to the detriment of ecological function. In response, the Bonneville Environmental Foundation (BEF) set up the Water Restoration Certificate (WRC) Program; the first nationally marketed, voluntary environmental flow restoration program in the United States. BEF has provided a **collaborative mechanism** to allow private sector urban water users to invest in the restoration of degraded waterways and ecosystems. Buyers do not necessarily have to purchase WRCs for the catchment in which they operate, rather the program targets funds at waterways that have been identified as being chronically or critically dewatered. The WRCs represent **measurable, certified & endorsed, registered and audited** certificates that provide confidence to buyers that water is being restored. This market-based mechanism facilitates the transfer of water abstraction rights to serve environmental purposes, resulting in billions of gallons of water being 'left in the stream'.

Type of habitat / land use

To date WRC projects have been developed in and around areas of irrigated agricultural production. Projects typically aim to restore stream flows in rural areas.

Type of ecosystem service

The main ecosystem service being purchased is water quantity, particularly during the summer months when waterways have historically run dry. However a range of other services such as recreation and biodiversity are also supported by the increased volumes of water.

Type of provider / seller

Many of the landowners (predominantly farmers) who were abstracting water from the waterways had 'senior water rights', which they risked losing if they did not use their water. Recently, progressive legislation brought in by many western states, makes it possible to transfer water rights to serve environmental purposes and to leave the water in the stream although there was no incentive to do so. Money raised through WRCs has been used successfully to provide this incentive.

Type of intermediary

The WRCs are created by the not-for-profit Bonneville Environmental Foundation (BEF) which forms an intermediary between those progressive institutions that wish to purchase restoration credits and those sellers who will reduce their abstraction in return. The BEF works with water trusts and other NGOs across western America who have specific geographical expertise.

Type of buyer / financing source

On the whole the purchasers of the WRCs are progressive corporations who are seeking to reduce their residual water footprint and achieve Corporate Social Responsibility (CSR) objectives. The WRC Program does not strive to restore flows only in the watersheds from which buyers draw their water; rather money is targeted at waterways that have been identified as being chronically or critically dewatered.

How the PES is coordinated & administrated

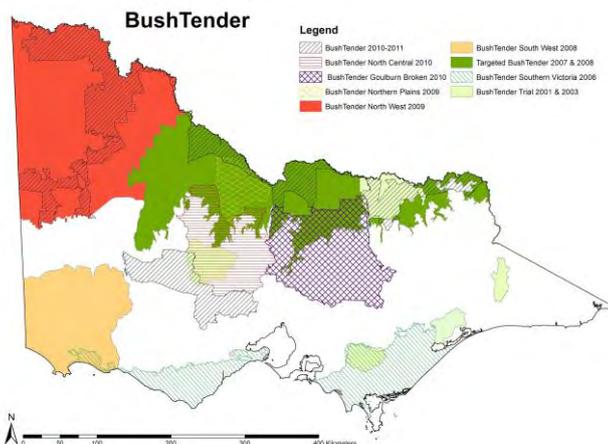
BEF contracted the National Fish & Wildlife Foundation (NFWF) to certify and endorse the standards used by BEF for selecting projects. NFWF staff review potential projects based on the extent to which they satisfy the established criteria. If the proposal is approved, BEF contracts the Water Trust Organisation to undertake the water restoration project. BEF approaches corporations, businesses and individuals to offer the WRC.

<p>Who the beneficiaries are The direct beneficiaries are not necessarily those who are financing the ecosystem service improvements. The benefit they receive relates to CSR and improved brand image. Direct beneficiaries include those using the waterways for recreational activities and those that wish to enhance biodiversity.</p>	<p>Type of contract and payment approach Each WRC produced by BEF represents 1,000 gallons of restored water. BEF draws up contracts with water trust organizations and provides funding to implement, monitor, and report on flow restoration. Contracts with water rights holders can be set up to cover single or multi-year timeframes.</p>
<p>Extent to which supply of ecosystem service(s) is/was threatened In the US, thousands of miles of rivers, streams, and adjacent wetlands are chronically or critically dewatered due to legal diversions of water. In Montana, chronic or periodic dewatering occurs on over 4,000 miles of streams. The resulting ecological harm is manifold, for instance exacerbating water quality issues, and severely restricting the movement and productivity of fisheries and wildlife populations.</p>	<p>Degree of <u>additionality</u> involved In Prickly Pear Creek the sale of WRCs has funded the restoration of 400 billion gallons of water since the programme was initiated. It is unlikely that this would have occurred without financial incentive.</p>
<p>Any <u>packaging</u> of ecosystem services? The WRC product is based on a measured quantity of water restored to a dewatered ecosystem. There is some degree of piggy-backing involved with the increase in water quantity leading to a range of other ecosystem improvements.</p>	<p>Any problems with <u>leakage</u> or potentially <u>perverse impacts</u> on other ecosystem services This is very difficult to assess and is currently uncertain. However, it is unlikely since land users were over-consuming simply to protect their water rights, rather than through necessity.</p>
<p>Equity implications BEF works with 'senior water rights' holders as they hold the right to the water even during periods of drought, while junior water right holders do not. This is the established water rights system and it is not considered to have equity implications.</p>	<p>Arrangements for <u>monitoring and evaluation</u> The water restored through each BEF-funded project is measured and the quantified amount of restored water forms the basis of the WRC "inventory." Markit Environmental Registry evaluates the submitted documents, serialises each WRC and adds it to the inventory.</p>
<p><u>Challenges, successes, lessons learnt</u> Successes: BEF has successfully engaged high tech companies, brewers, beverage companies, outdoor retailers, pro sports leagues and teams, and many others in this market. WRCs are connecting for the first time those companies and individuals that use water with the projects and solutions that can restore water where it is needed most. Challenges: Working within an existing water right system that creates a disincentive to conserve water and changing attitudes around water use that are over 100 years old. Lessons learnt: The WRC Program shows that organisations can be willing to pay for ecosystem services that they benefit from only indirectly. In some cases the motivation to buy WRCs derives from an innate commitment to sustainability, in others, companies seek to brand their product and build market share around sustainability.</p>	
<p><u>Future considerations for the scheme</u> The historical, legal and economic drivers that have lead to chronically and critically dewatered ecosystems across western America are specific. Nevertheless, it may be possible to create water restoration certificates in the UK. For example, it may be possible for an intermediary to sell WRCs in order to fund the purchase of Environment Agency abstraction licences.</p>	
<p>Date last updated July 2012</p>	<p>Contact details Todd Reeve: treeve@b-e-f.org</p> <p>Website http://www.b-e-f.org/business/products/wrcs/</p>

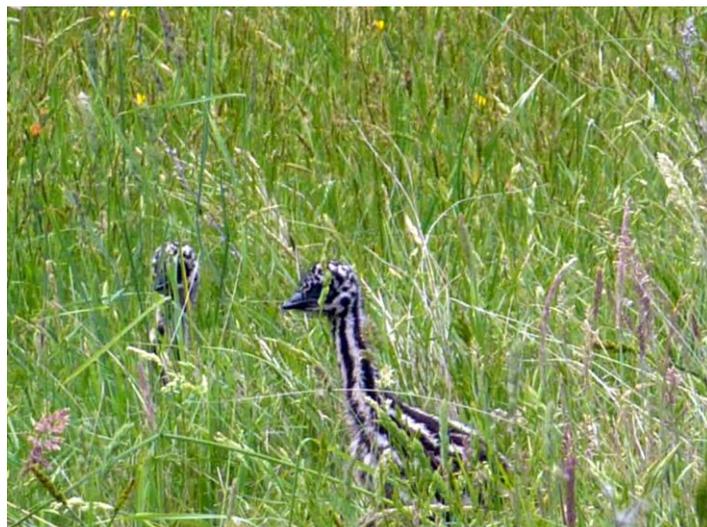
Best Practice Guide for PES case studies – Bush Tender, Australia

Case Study Name: Bush Tender Scheme

Location: Victoria, Australia



Areas that Bush Tender has covered each year (different colours) since its inception in 2001. (Source: Victorian Government 2012)



Bush tender aims to protect native vegetation cover and the species it supports. Current projects focus on grassland and grassy woodland.

SUMMARY - what makes this case study distinctive?

Bush Tender is a reverse auction-based approach to protecting and improving the management of native vegetation on private land; it is operated by the Victorian state government in Australia. Landholders competitively tender for contracts to better protect and improve their native vegetation by nominating conservation activities (such as restoring and retaining native vegetation) and the cost of the action in the form of a sealed bid. Bids are ranked using a biodiversity benefits index and contracts are awarded to the projects which secure the greatest conservation benefits for the least cost. Successful landholders receive periodic payments for their management actions. Auctions are used to achieve a more cost efficient outcome than using direct grants as the competitive bidding process reveals landowner's costs, allowing planners to select the most cost-effective projects. Auctions can also reduce the problem of adverse selection (landowners already providing conservation services are those most likely to apply for and receive grants) and can reduce rent seeking, as well as providing ongoing incentives for land owners to find efficient ways of generating conservation services.

Type of habitat / land use

Each round of the scheme targets specific areas and habitat types where native vegetation cover is low. The most recent Bush Tender auctions focus on grasslands and grassy woodlands.

Type of ecosystem service

The Bush Tender scheme purchases the protection and restoration of native vegetation in order to support biodiversity. Native vegetation provides a number of ecosystem services such as salinity control, water quality, soil protection, carbon storage and landscape preservation.

Type of provider / seller

All landowners located in the project area with native vegetation on their land are eligible to bid for a Bush Tender contract. The scheme has six distinct stages which must be followed: expression of interest, site assessment, draft management plan, submission of bids, bid assessment, management agreements. Once in place, reporting and payments commence.

Type of intermediary

The scheme is operated by the Department of Sustainability and the Environment in the Victorian government. Trained field officers undertake a landowner engagement process including site assessment, discussing potential management actions, and development of draft Management Plans.

Type of buyer / financing source

The buyer is the Victorian Government acting on behalf of residents of Victoria, Australia. The Department of Sustainability and Environment designed the scheme and has refined it with each round since inception in 2001.

How the PES is coordinated & administrated

Interested landholders are contacted by the Bush Tender Regional Implementation Manager to arrange a site visit and agree a management plan as a basis for the landholder's bid. Bids are assessed on the conservation significance of the site and the estimated improvement in native vegetation condition resulting from the agreed landholder actions relative to the cost. To ensure the process is fair the Department appoints independent auditors to review the bid assessment process.

<p>Who the beneficiaries are Landowners benefit directly from additional income and higher long term productivity due to improved land health. Victoria residents benefit indirectly from improved air and water quality, aesthetic improvements etc. Wider benefits accrue to those who value biodiversity and through carbon storage.</p>	<p>Type of contract and payment approach Successful landowners sign a 5 year agreement with clearly specified actions to be carried out at different times of the year. Landowners are paid in instalments based upon fulfilment of the conditions set out in the individual management agreement. Payments vary depending on the costs submitted in the bid.</p>
<p>Extent to which supply of ecosystem service(s) is/was threatened At least half of all Victoria's native vegetation has been cleared. On private land 80% has been cleared. The remaining 20% provides habitat for at least 30% of Victoria's threatened species populations. 60% of the native vegetation remaining on private land is a threatened vegetation type (i.e. its conservation status is endangered, vulnerable or depleted).</p>	<p>Degree of <u>additionality</u> involved All actions subject to agreements must be over and above those required by current obligations and legislation. Due to the extent of clearing in areas without similar schemes it appears unlikely that the majority of management activities would be undertaken without financial incentives. However, this is a relatively recent scheme and the lack of data means additionality is difficult to demonstrate.</p>
<p>Any <u>packaging</u> of ecosystem services? There is some level of 'piggybacking' in the Bush Tender scheme. The particular service sold is improved native vegetation cover however this can also lead to improvements in salinity control, water quality, soil protection, carbon storage, and landscape preservation.</p>	<p>Any problems with <u>leakage</u> or potentially <u>perverse impacts</u> on other ecosystem services There appears to be little evidence of problems of leakage or perverse impacts.</p>
<p>Equity implications The Bush Tender scheme is designed to ensure that all participants are treated equitably and provided with the same information and opportunity to participate. However, the competitive nature of the scheme means that payments are only made to landowners who can deliver biodiversity benefits cost-effectively so some willing landowners with high costs are excluded.</p>	<p>Arrangements for <u>monitoring and evaluation</u> Each year of the agreement landowners are required to submit a report on their commitments and management actions or achievement of biodiversity outcomes. Payments are only made subject to satisfactory progress and reporting. Monitoring of sites by field officers also occurs over the five-year Management Agreement period.</p>
<p>Challenges, successes, lessons learnt Successes: Around 25,911 hectares of native vegetation on private land has been managed and protected through the Bush Tender program since 2001. Threatened species are now considered by landowners to be a monetary asset. An evaluation of the scheme found that it was very popular amongst landowners. A number of studies have shown that the scheme is cost-effective with one evaluation finding it to be 700% more cost-effective than a fixed rate scheme. Challenges: While native vegetation has clearly improved, evaluating whether or not the scheme has been successful in terms of achieving biodiversity improvements is difficult. Transaction costs and the initial set up costs can be significant and need to be managed. Lessons learned: A well designed reverse auction approach can be both popular and achieve environmental targets at much lower costs than a fixed rate grant scheme. The auction approach is also able to capture higher value and higher cost sites within budget because it pays less (i.e. just enough) for lower value and lower cost sites.</p>	
<p>Future considerations for the scheme The success of the Bush Tender scheme has led to the development of a number of similar projects such as Eco Tender; a scheme which expands on the Bush Tender goal of securing improvements in biodiversity to include a much wider variety of ecosystem services. Management actions include weed and pest control, fencing and planting of native vegetation, protection of gullies and wetlands, and stock control. Despite the initially promising results of auction-based PES schemes in Australia, several studies have questioned whether such schemes can maintain the improvements in cost-effectiveness over the long term since repeated auctions allow for strategic behaviour, as bidders have the opportunity to learn from previous outcomes. The efficiency benefits of single shot auctions therefore do not necessarily extend to repeated auctions, as bidders adjust prices over time to capture informational rents.</p>	
<p>Date last updated June 2012</p>	<p>Website http://www.dse.vic.gov.au/conservation-and-environment/biodiversity/rural-landscapes/bushtender</p>

Best Practice Guide for PES case studies – Catskills, USA

<p>Case Study: Catskills – Long-Term Watershed Protection Program Location: Catskills and Delaware catchments, New York State</p> <p>The New York City Department for Environmental Protection (NYC DEP) funds a comprehensive Long-Term Watershed Protection Program which maintains and protects the high quality source of drinking water for nine million water consumers (nearly half the state’s total population). New York City’s partners include the Watershed Agricultural Council (land conservation) and the Catskill Watershed Corporation (community infra-structure and economic development), both local not-for-profit corporations that were specifically created to assist DEP with the administration and implementation of watershed programs. The program cost US\$1.5 billion compared to an estimated US\$8-10 billion for a water filtration plant and is administered through a formal urban-rural partnership considered a true market, based on a Memorandum of Agreement with the watershed communities.</p>	 <p style="text-align: right; font-size: small;">Source: New York City DEP</p>
<p>Components of the PES (sub-programs) - Land Acquisition Program: Acquiring environmentally sensitive watershed lands at fair market value is one key component of the City’s comprehensive efforts to protect the quality of its upstate water supply. The Land Acquisition Program is purely voluntary and operates on a willing buyer/willing seller basis. Conservation Easements Program: This Program buys conservation easements at fair market value from interested landowners who receive cash and property tax relief in return for relinquishing their development rights in perpetuity. Agriculture on Private Lands Program: The Watershed Agricultural Program is a partnership between DEP and the watershed farming community that strives to reduce agricultural pollution by assisting farmers with the development and implementation of comprehensive pollution prevention plans.</p>	
<p>Type of <u>habitat / land use</u> The Catskills watershed consists predominantly of forest, woodlands and farmland. The essence of watershed management (the process of organizing land and natural resource use to reflect the competing needs of society) is to stop contaminants reaching water resources. With careful planning and communication, water quality can be protected while still serving multiple priorities.</p>	<p>Type of <u>ecosystem service</u> The main ecosystem service being purchased by New York City DEP is improved water quality (either nitrates, phosphates or agrochemicals) through reduced pollution. Other benefits include community-based activities such as education awareness raising; and overall improvement to ecosystem integrity.</p>
<p>Type of <u>provider / seller</u> Landowners and farmers within the Catskills watershed as well as the wider stakeholders. An essential part of NYC DEP’s Long-Term Watershed Protection Program includes working with the many diverse stakeholders from the eight-county watershed region. Under the 1997 Watershed Agreement and subsequent filtration waivers, several organizations and government agencies are directly implementing new programs with funding provided by the City through contracts with DEP. These vital watershed partnerships help to protect water quality while promoting environmentally compatible economic development.</p>	<p>Type of <u>intermediary</u> New York City’s primary watershed partners include: Watershed Agricultural Council (natural resource and land conservation programs) and Catskill Watershed Corporation (community infrastructure and economic development). Both are locally-based not-for-profit organizations specifically created to assist DEP with the administration and implementation of watershed protection and economic development programs.</p>
<p>Type of <u>buyer / financing source</u> NYC DEP has funded the Long-Term Watershed Protection Program for over a decade, on behalf of nearly nine million urban consumers of the water supply. Other key stakeholders in the program include nearly a quarter of a million residents of the older and more suburbanized Croton Watershed (East of Hudson), and the tens of thousands of residents of the rural Catskill/Delaware Watershed (West of Hudson).</p>	<p>How the PES is <u>coordinated</u> & who takes the <u>administrative burden</u> The NYC DEP’s Long-Term Watershed Protection Program is administered by the Watershed Agricultural Council and the Catskill Watershed Corporation and by county level local government. This recognizes both that local duties and capacities are the best means to achieve water quality goals, and a strong tradition of local democratic autonomy. Many other watershed partners collaborate in various capacities, such as oversight, advice, public education, and communication.</p>

<p>Location of beneficiaries</p> <p>The beneficiaries are split into three groups:</p> <ol style="list-style-type: none"> 1. Direct – landowners benefiting from improved farming operations; 2. Indirect – NYC DEP benefiting from better raw water quality; 3. Indirect – The wider community benefiting from improved ecosystem function (habitats, carbon sequestration, water quality, water quantity, etc.). 	<p>Type of payment approach</p> <p>Payment is based on the three sub programs within the Long-term Watershed Protection program: (1) Land Acquisition Program – payment of market value; (2) Conservation Easements Program – payment via cash and tax relief; and (3) Agriculture on Private Lands Program – payment through advice and incentive schemes, including co-funding of farm infrastructure improvements.</p>
<p>Extent to which supply of ecosystem service(s) is/was threatened</p> <p>The Cannonsville reservoir has suffered from periodically excessive phosphorus concentrations. By far the greatest source of this phosphorus is dairy farming, and the magnitude of this source prompted greater regulation of farming. The other reservoirs are primarily threatened by development, but standards of water quality are historically high and the main driver for action has been regulatory. DEP's Long-Term Watershed Protection Program has thus been aligned to secure a series of filtration avoidance determinations every five years pursuant to the Safe Drinking Water Act of 1986 and its subsequent amendments. DEP's current Filtration Avoidance Determination covers the ten-year period 2007-2017.</p>	<p>Degree of additionality involved</p> <p>The Watershed Agricultural Program funds farm improvements and practices considered to exceed existing good practice and conservation norms for the region and its farming systems. This is part of comprehensive watershed management. Programs with the watershed communities also encompass planning and economic development; community services (local water supply and septic systems); storm water and highway run-off; waste management; forestry; stream corridor management and monitoring.</p>
<p>Any packaging of ecosystem services?</p> <p>Wider interests including invasive species, wetlands, fisheries, forest management, stream morphology, flood risk and wildlife and waterfowl have developed alongside the water quality focus of the watershed protection program, but depend largely on the initiatives of the watershed communities and their partners, including the NYS Department of Environmental Conservation.</p>	<p>Any problems with leakage or potentially perverse impacts on other ecosystem services</p> <p>Land acquisition mainly results in unmanaged land reversion to secondary scrub and forestation with limited or no provision for public access and recreation. Local communities have concerns about the negative economic impact of land acquisition and conservation easements.</p>
<p>Equity implications</p> <p>For individual landowners there are limited equality implications within the catchments as all schemes are voluntary operating on a willing buyer/willing seller basis, and participation by the farming community is open to all and exceeds 85%. However, the potential conflict between water resource protection and economic development is a continual source of tension between the New York City and state authorities and the watershed communities. There is also a degree of inequality between watersheds that supply water to NYC and those that don't. This demonstrates the spatially specific nature of watershed management programs focused solely on water supply priorities</p>	<p>Arrangements for monitoring and evaluation</p> <p>DEP's comprehensive watershed monitoring network not only serves as a scientific basis for assessing changes in watershed conditions and water quality, but it also contributes to the on-going review and refinement of the City's watershed protection program. Watershed communities have stipulated that all programs and measures be based on the strongest scientific credentials; partnerships with state scientific institutions have been essential in achieving this. Water quality is the ultimate indicator of success, and monitoring studies show that the whole farm planning process has significantly reduced phosphorus and ammonia loadings to the Cannonsville reservoir.</p>
<p>Successes, Challenges and Lessons Learnt</p> <p>Land and water management are local responsibilities and local administrative capacities and technical service providers have demonstrated the ability to develop and implement comprehensive agricultural and community programs for watershed protection. Adoption of cost-sharing incentives rather than regulation achieved participation by land users and residents under their own leadership. A clear vision was crucial to the initiative's launch and its success to date. This vision recognises that protection of water at source should not only focus on the control of pollutants but also on the promotion of sustainable rural economies within an environmentally healthy landscape; providing not only clean water but also food and viable rural communities. Land acquisition and conservation easements provide important but more expensive complementary approaches. Through their use water consumers can benefit from permanently protected private lands that will not be developed, but the scale and targeting of these programmes remains controversial without the full consent and cooperation of local communities.</p>	
<p>Other comments / background</p> <p>The sheer number of conservation easements held by NYC DEP inevitably means that a small number of stewardship violations will occur, and the costs of monitoring and enforcement should not be underestimated. Violations may result from the failure of a landowner to notify DEP about a particular activity, a misunderstanding about the easement language itself, or in some cases an outright violation of the easement requirements or limitations. DEP believes that the best way to avoid easement violations is to build strong relationships with landowners so that any violations are resolved quickly and amicably, approaches that can only be reinforced by trusted partnerships between local communities and local government.</p>	
<p>Date last updated</p> <p>July 2012</p>	<p>Website & References</p> <p>http://www.nyc.gov/html/dep/html/watershed_protection</p>

Best Practice Guide for PES case studies – The English Woodland Grant Scheme

Case Study Name: The English Woodland Grant Scheme

Location: Across England



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Before investment:



Since the 1930s almost half of ancient broadleaved woodland in England has been planted with conifers or cleared for agriculture © Natural England

After investment:



The EWGS Woodland Creation Grant offers extra financial incentives where woodland creation delivers the greatest public benefits

SUMMARY - what makes this case study distinctive?

The English Woodland Grants Scheme (EWGS) was introduced in 2005 to replace the Woodland Grant Scheme. The key aims are to sustain and increase the public benefits derived from existing woodlands and invest in creating new woodlands for additional public benefit. It consists of six distinct grants. The Woodland Planning Grant (WPG) funds the preparation of plans for sustainable woodland management in accordance with the UK Forestry Standard. The Woodland Assessment Grant (WAG) pays for information gathering to improve management decisions. The Woodland Regeneration Grant (WRG) supports change in woodland composition through natural regeneration or restocking after felling, to deliver environmental improvements such as ancient woodland restoration. The Woodland Improvement Grant (WIG) pays for work in woodlands to provide environmental and social benefits, such as coppice restoration, deer management, access tracks, and public access facilities. The Woodland Management Grant (WMG) helps with the costs of providing high-quality public benefits from existing woodlands. The Woodland Creation Grant (WCG) offers extra financial incentives where woodland creation delivers the greatest public benefits and Farm Woodland Payments to compensate for lost agricultural income.

Type of habitat / land use

The scheme covers woodland habitats across England, including: Conifer, Broadleaved, Mixed, Coppice, Coppice with Standards and Young trees.

Type of ecosystem service

The scheme targets creation and management of woodlands thereby providing: recreational uses, reduced flood risk, carbon sequestration, wildlife habitat, climate regulation, improved water and soil quality, timber provision, and cultural heritage.

Type of provider / seller

Owners of woodland in England registered on the Rural Land Register are eligible. Leaseholders and tenants require owner consent. Government departments, other than the Public Forest Estate, and other public bodies can apply as can their tenants.

Type of intermediary

The scheme is administered by the Forestry Commission (FC); the government department responsible for protecting, expanding, and promoting the sustainable management of woodlands and increasing their value to society and the environment. Grants are delivered through the Rural Development Programme for England.

Type of buyer / financing source

Ecosystem services are purchased by the UK government through the FC on behalf of the English public. The grant application process is managed at an area (sub-national) level.

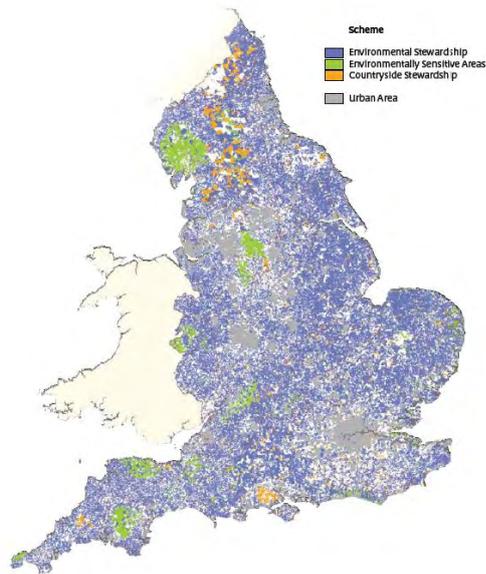
How the PES is coordinated & administrated

Applicants send a proposal to the local FC office. The FC may inspect the site or consult with bodies such as Natural England before approving an application. All felling and woodland creation proposals are entered on the FC's public register for 28 days for anyone to view and comment upon. Funds are allocated on a first come first served basis.

<p>Who the beneficiaries are Local landowners benefit directly from contributions to the cost of woodland creation and management. Local residents benefit indirectly from a better quality environment, recreational opportunities, and reduced flood risk. Wider benefits accrue indirectly through improved recreational opportunities, cultural heritage, carbon sequestration and the protection of biodiversity.</p>	<p>Type of contract and payment approach Agreements with woodland owners are in the form of contracts. Payment is a contribution to the cost of undertaking woodland creation or management ranging from 20% for some woodland regeneration grants to 80% for some woodland improvement and creation grants.</p>
<p>Extent to which supply of ecosystem service(s) is/was threatened UK woodland has been cleared extensively and now covers less than 12% of the country. There is significant evidence that the cessation of management of woodlands in recent decades has led to structural and habitat changes that has resulted in changes in some key aspects of biodiversity interest. Excessive grazing and browsing by ungulates, both domestic and wild, is leading to decline and eventual woodland deterioration. Climate change and increased prevalence of pests and diseases are increasing threats.</p>	<p>Degree of additionality involved This is difficult to prove without a full evaluation, but there is a strong logic chain that improvement of management and increase in woodland area will provide positive results. Management of over 190,000 ha of woodland has been achieved; between 2004 and 2010 the percentage of woodland SSSIs in favourable or favourable-recovering has increased from 71 to 96; 3,500 ha of Plantations on Ancient Woodland Sites have been converted to native species; and since 2007 almost 9,000 ha of woodland have been created (very limited areas of woodland are established without grant aid).</p>
<p>Any packaging of ecosystem services? Woodlands provide a wide range of ecosystem services. EWGS is characterised by multiple benefits paid for by a single buyer. Applications are evaluated in terms of: area of woodland under sustainable forest management and approved management plans; expanding the area of woodland with public access; bringing woodland SSSIs into favourable condition; assisting delivery of Priority Habitat and Species Action Plans for woodlands; improving the environment of disadvantaged urban communities; and woodland creation.</p>	<p>Any problems with leakage or potentially perverse impacts on other ecosystem services Leakage is unlikely as the scheme covers the whole of England and neighbouring countries have similar policies. Perverse impacts could include redistribution of agriculture to other types of land or more intensive farming, although such impacts are likely to be very small as afforestation of agricultural land makes up a small part of the scheme.</p>
<p>Equity implications While the scheme is open to all woodland landowners for eligible woodland types or activity, funding is allocated on a 'first come first served basis' so equity concerns may arise where grants are oversubscribed.</p>	<p>Arrangements for monitoring and evaluation Providers are required to allow Forestry Commission officers to enter their land during the contract period to check that they are keeping to the contract.</p>
<p>Challenges, successes, lessons learnt Successes: The EWGS has a good rate of take-up but there has not yet been any evaluation of the scheme's impacts, particularly in relation to ecosystem changes. Challenges: The challenges will lie in monitoring effectiveness while keeping costs low. Lessons learned: Although a full evaluation has not been undertaken, the most important lesson learned is the need to allow modification to respond to changes in policy priorities. The scheme has consequently been consistently amended in terms of design and targeting.</p>	
<p>Future considerations for the scheme Assessing the effectiveness of the EWGS is essential to demonstrate impact and value for money. Such an evaluation would assist in making improvements to the scheme. Some local evaluations of specific components of the scheme are under way. For example the FC is working with the Royal Society for the Protection of Birds to assess the impact of woodland management under the EWGS on increasing the number of woodland birds; this process involves setting up baseline monitoring of woods in the EWGS before any management takes place, followed by periodic surveys at 3-5 year intervals to assess changes in bird populations and habitat associated with habitat management carried out under the grant. Woods in the grant scheme will be paired with similar woods with no current plans for management to provide a comparison. Baseline survey work began in March 2010 and will continue in 2011 and 2012.</p>	
<p>Date last updated September 2012</p>	<p>Website http://www.forestry.gov.uk/ewgs</p>

Best Practice Guide for PES case studies – Environmental Stewardship

Case Study Name: Environmental Stewardship
Location: Across England



Source: Natural England (2009)

Before investment:



Intensive agriculture reduced the amount of suitable breeding habitat for birds such as skylarks © Natural England

After investment:



The scheme led to the creation of 18,000 plots supporting breeding skylark pairs © Natural England

SUMMARY - what makes this case study distinctive?

Environmental Stewardship is an agri-environment scheme funded by the UK Government and administered by Natural England. Launched in 2005, the scheme pays agricultural landowners and managers across England to secure on-going management practices that provide ecosystem services. The scheme is composed of two levels: Entry Level Stewardship (ELS) and Higher Level Stewardship (HLS). ELS provides 5 year non-competitive contracts where providers are paid a flat rate per hectare of land if they agree to adopt certain basic management options. The HLS involves more complex types of management and agreements are tailored to local circumstances. Applications are assessed against specific local targets and competitive contracts are offered for 10 years, with payment depending on the type of service. Together, the two parts of the scheme attempt to secure broad and shallow ecosystem services across the country as well specific targeted services in particular areas.

Type of habitat / land use

All agricultural land in England is eligible for application to the Environmental Stewardship scheme.

Type of ecosystem service

A number of ecosystem services are targeted including: encouraging species diversity; protection of water and soil; prevention of erosion and water pollution; flood management; and wildlife conservation.

Type of provider / seller

The scheme is open to anyone who owns, farms, or manages agricultural land in England. Providers must be registered with the Rural Payment Agency's Rural Land Register. Tenant farmers need to have management control over the land for 5 years for ELS or 10 years for HLS.

Type of intermediary

The scheme is administered by Natural England (a non-departmental public body of the UK government) on behalf of Defra who are responsible for overseeing the scheme. Significant changes need to be approved by the European Commission who provide funding. Independent agents also work directly with farmers and land managers.

Type of buyer / financing source

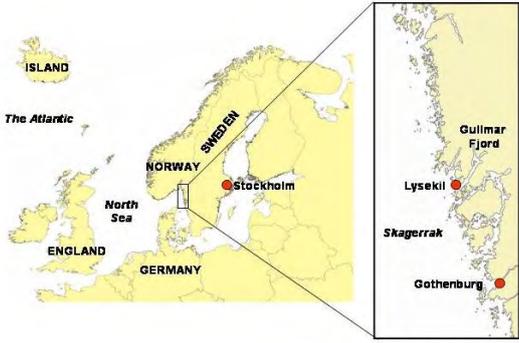
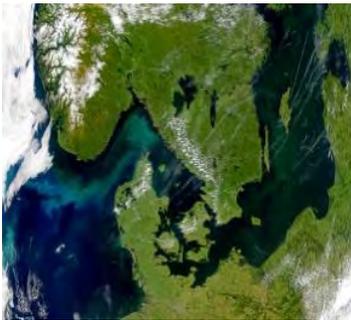
The scheme is a government-financed PES in which the UK government is the buyer acting on behalf of ecosystem service users. Funds are also contributed through the EU Common Agricultural Policy.

How the PES is coordinated & administrated

ELS is available to all farmers, Organic ELS to organic farmers, and Upland ELS to hill farmers in disadvantaged areas. Applicants choose management options assigned different points depending on the services provided. Any applicants reaching the target points receive funding. HLS is a targeted, competitive scheme available to farmers in particular areas or with high priority features on their land. Guides and handbooks to implement management plans are available on the Defra and Natural England websites. Training, advice, and farms visits are also offered.

<p>Who the beneficiaries are Direct beneficiaries are agricultural landowners and managers who receive additional income and benefit from improved land management practices and higher environmental quality. Indirect beneficiaries include people living in the local area who benefit from improved air and water quality, lower flood risk, aesthetic improvements etc. Wider beneficiaries can include those who value the existence of biodiversity.</p>	<p>Type of contract and payment approach All ELS agreements are paid a flat rate of £30/ha per year and last for 5 years (land above the Moorland Line receives a lower rate). For the OELS, appropriate land management is paid at £60/ha; while £175/ha is also available for the first two years for converting to organic farming. The standard UELS rate is £62/ha. HLS agreements last for 10 years and payment is dependent on the precise options chosen, rather than a flat rate.</p>
<p>Extent to which supply of ecosystem service(s) is/was threatened Around 30% of the UK's ecosystem services are in decline, with many others already in a degraded state, including wild species diversity and some of the services provided by soils. Demands for ecosystem services are likely to grow in the UK as a result of climate change and a population projected to grow by more than 10 million by 2033.</p>	<p>Degree of <u>additionality</u> involved Additionality is difficult to demonstrate. In general there has been high compliance and a good quality of management. However, many features entered into the ELS scheme (60% ELS, 75% OELS) were already managed to the ELS standard so the scheme may have led to little change in actual practices. Additionality in the HLS scheme is likely to be higher due to the greater level of action required.</p>
<p>Any <u>packaging</u> of ecosystem services? Multiple benefits are paid for by a single buyer (albeit on behalf of the UK taxpayer). Applicants choose options assigned points according to provision of a variety of services: protection of water and soil; prevention of erosion and water pollution; flood management; wildlife conservation; protecting historic sites; providing public access to countryside; and conserving rare and traditional livestock breeds.</p>	<p>Any problems with <u>leakage</u> or potentially <u>perverse impacts</u> on other ecosystem services The wide coverage of the scheme combined with the fact that the variety of management options allows farmers to take part in the scheme without necessarily leading to reductions in agricultural production (unlike in pure land retirement schemes) mean there is likely to be little concern over leakage or perverse impacts.</p>
<p>Equity implications The ELS scheme is equitable in that payments are uniform, it is open to all agricultural land owners and managers, and the UELS scheme directly targets disadvantaged farmers. However, many of the most disadvantaged land managers are tenant farmers, and there are questions about whether benefits from PES are passed on from land owners. There have also been concerns raised over the competitive HLS process and the per hectare uniform payment system favours large farms.</p>	<p>Arrangements for <u>monitoring and evaluation</u> Periodic evaluations are undertaken by Defra and Natural England including on farm interviews and questionnaires. The Central Science Laboratory (an executive agency of Defra) was commissioned to undertake an evaluation of the operation of Environmental Stewardship during its first two years. An additional survey of upland and lowland livestock farms was carried out in 2006, as a result of stakeholder concern that farmers in the Less Favoured Areas were finding it more difficult than their lowland counterparts to enter the ELS.</p>
<p>Challenges, successes, lessons learnt Successes: Nearly 70% of England's agricultural land is now under an agreement covering nearly six and a half million hectares of land. The scheme has had demonstrable positive impacts on bird populations with 18,000 plots supporting breeding skylark pairs and recorded increases in grey partridge, stone curlew, and curlew numbers. Challenges: In 2008 the EU set-aside policy was abolished so new options were incorporated into the Environmental Stewardship scheme (such as skylark plots) to maintain the ecosystem services previously provided by set-aside. Fully compensating for this through the voluntary Environmental Stewardship scheme is a challenge. Lessons learned: One of the most difficult aspects is getting the balance right between keeping transaction costs low to encourage entry whilst also ensuring strong monitoring and evaluation to reduce problems with additionality.</p>	
<p>Future considerations for the scheme The scheme has been successful in terms of uptake and popularity amongst agricultural land owners and managers but further work is needed to ensure additionality and cost and environmental effectiveness. Future developments will include an expansion of management options designed to incorporate the overarching theme of climate change.</p>	
<p>Date last updated July 2012</p>	<p>Website http://www.naturalengland.gov.uk/ourwork/farming/funding/es/default.aspx</p>

Best Practice Guide for PES case studies – Lysekil Nutrient Trading Scheme

<p>Case Study Name: Lysekil Municipality</p> <p>Location: Lysekil, west coast of Sweden</p>  <p>Location of Lysekil and the Skagerrak coastal waters. Source: Lindahl et al. (2009)</p>	<p>Before investment:</p>  <p>Phytoplankton bloom in the Skagerrak</p> <p>Source: NASA</p>	<p>After investment:</p>  <p>A long line mussel farm ready for harvesting</p> <p>Source: Lindahl et al.</p>
<p>SUMMARY - what makes this case study distinctive?</p> <p>Excessive nutrients from anthropogenic sources and the associated production of large quantities of phytoplankton can overwhelm marine environments. Mussels are filter feeding organisms that consume phytoplankton, and so are capable of turning excess nutrients into mussel meat. The Lysekil nutrient trading scheme offered a market for the ecosystem services of Blue Mussels (<i>Mytilus edulis</i>). In order to mitigate the nitrogen discharge of its local waste water treatment plant, the Lysekil community bought the ecosystems services provided by Blue Mussels after bidding from a mussel farming enterprise. The mussels from this farm were sold primarily for human consumption; demonstrating the potential for PES schemes that are based in both the environmental and market economy.</p>		
<p>Type of <u>habitat / land use</u></p> <p>The Skagerrak and the Kattegat form the inner end of the Norwegian trench, which has the characteristics of a deep fjord connecting the Baltic Sea with the Norwegian Sea. Mussel farming can be regarded as an activity closely related to open landscape feeding in terrestrial environments.</p>	<p>Type of <u>ecosystem service</u></p> <p>The main ecosystem service provided by the mussel farm was an enhancement in coastal water quality through improved regulation of eutrophication.</p>	
<p>Type of <u>provider / seller</u></p> <p>The mussel farmer was a private enterprise. Payments were received by the farmer for the ecosystem services the farm provided to the community in terms of nitrogen removal. The mussels produced were also sold, mainly as seafood for human consumption.</p>	<p>Type of <u>intermediary</u></p> <p>Direct contact was established between the farmer and the public bodies of Lysekil, although overall permission was obtained from the County Board of Västra Götaland, which also monitored the experiment.</p>	
<p>Type of <u>buyer / financing source</u></p> <p>The buyer of the ecosystem service was the community of Lysekil represented through their public bodies. The purchase was in order to mitigate the activities of the municipality's local waste water treatment plant, which emits 39 tonnes of nitrogen into the ocean each year.</p>	<p>How the PES is <u>coordinated & administrated</u></p> <p>The scheme was initiated by an INTERREG project. The Community board of Lysekil then gained permission from the County board to conduct the trial. The Lysekil example suggests that there is likely to be a key role for local and regional administrations in coordinating and administrating nutrient trading schemes.</p>	
<p>Who the beneficiaries are</p> <p>Direct benefits accrued to the mussel farmer, who gained access to environmental and market economies; and the local community, who achieved cost savings in comparison to traditional treatment methods. Wider indirect benefits potentially included improvements to ecosystem function and diversity, including food production, and better conditions for tourism and recreation.</p>	<p>Type of <u>contract and payment approach</u></p> <p>The trial ran from 2005 to 2011. Payments were based upon the quantities of nitrogen found in the harvested mussels.</p>	

<p>Extent to which supply of ecosystem service(s) is/was <u>threatened</u> Eutrophication causes algal blooms, hypoxic sea floors, habitat loss, and the impaired recruitment of commercial fish. Eutrophication levels in the Skagerrak Coastal waters are influenced by inflows of nitrogen and phosphorous from the Baltic Sea, where there has been a 5-10 fold increase in nutrient loads since the 1950s. In response to this, Sweden aims to achieve a 40% reduction in waterborne nitrogen flows on 1995 levels by 2025.</p>	<p>Degree of <u>additionality</u> involved It is unlikely that the mussel farm would have been able to become established without the additional income provided by the PES from the Lysekil community.</p>
<p>Any <u>packaging</u> of ecosystem services? Phosphorous was captured by the mussels but not included in the Lysekil nutrient trading scheme as there was no demand for its reduction. In future cases phosphorous removal could be a bundled service.</p>	<p>Any problems with <u>leakage</u> or potentially <u>perverse impacts</u> on other ecosystem services With their design being akin to a floating reef, the ecological threats of long line mussel farms are small and can be handled through best management practices. Rich bio-sedimentation from the mussel farm can potentially cause eutrophication. At Lysekil, the farms effect on benthic environments was studied. Risk was reduced where lines were positioned in areas with a good exchange of water between the top and bottom levels.</p>
<p><u>Equity</u> implications There are no equity implications with the Lysekil case. However, in future, diffuse nutrient pollution may need to be tackled by such schemes. Such polluters are harder to locate and define, with this likely leading to greater difficulty in reaching equitable outcomes.</p>	<p><u>Arrangements for monitoring and evaluation</u> The PES scheme in Lysekil took place under the supervision of environmental officers from the local County board. They ensured that the contracted amount of nutrients were recycled from sea to land. This was measured through analysis of the harvested mussels.</p>
<p><u>Challenges, successes, lessons learnt</u> Successes: The scheme was highly effective in removing nitrogen from the coastal waters. The farm removed 100% of the plants nitrogen emissions; far above the 70% minimum legal requirement. The project was highly cost effective, saving the municipality around EUR 100,000 per year compared to the use of traditional techniques. Challenges: Mussel farming as a method of nutrient removal is a relatively new development. As such, there is a relative lack of data of production costs, growth rates, and mussel sale options. Further research is likely to be crucial to the development of a strong PES market. Modelling exercises could aid in this respect. Lessons Learnt: In 2011, the farming enterprise at Lysekil went bankrupt. The reason for this failure was the lack of market demand for the produced mussels. This demonstrates that private enterprises operating in the environmental and market economy must ensure that their business plan is sufficiently robust in both respects.</p>	
<p><u>Future considerations for the scheme</u> There are currently three nutrient trading test farms operating in Sweden. Around 80% of nutrient discharges along the Swedish Coast are from diffuse sources. Consequently, nutrient trading schemes must include these sources in future if environmental goals are to be met. In Poland, a scheme is currently examining whether blue mussel farming could provide an alternative income for fishermen.</p>	
<p>Date last updated April 2012</p>	<p>Contact details Dr Odd Lindahl: odd.lindahl@kmf.gu.se</p> <p>Website http://www.bioenv.gu.se/english/staff/Odd_Lindahl_eng/</p>

Best Practice Guide for PES case studies – Bassenthwaite Ecosystem Services Pilot

Case study name: Upland Ecosystem Services Pilots

Location: Bassenthwaite Lake catchment, Cumbria



View of Bassenthwaite Lake © Natural England



Tree planting in the catchment at Roughten Gill on Mungrisdale © Natural England

SUMMARY - what makes this case study distinctive?

The large (360km²) Bassenthwaite catchment in the northern Lake District provides a wide range of ecosystem services for people who live in, and for people who live way beyond, the area. These include food, tourism, timber, water provision, water quality, carbon storage, flood regulation, recreation, education, historic environment, biodiversity, and health benefits. In 2009, the Bassenthwaite Ecosystem Services Pilot Project was launched to take an integrated approach to managing the catchment for multiple outcomes, and to connect wider public benefits to the land management by farmers. This project is one of three upland pilot schemes being led by Natural England and it is working across a range of sectors. It provides a catchment scale example of spatially prioritising actions for ecosystem services to deliver multiple public benefits through partnership working.

Type of habitat / land use

The Bassenthwaite Lake catchment is the largest in the Lake District National Park. The mountain terrain and high rainfall makes the River Derwent / Bassenthwaite Lake system prone to floods, affecting downstream communities at Cockermouth and Workington. The area is important for its cultural landscape, and has very high visitor numbers. Upland sheep farming and communities underpin the local culture and economy. The valley bottoms are managed intensively; the enclosed fells (mainly common land) are grazed communally.

Type of ecosystem service

Ecosystem services are important to both locals and visitors further from afield: carbon storage, flood risk management, water quality and supply, health and recreation. Tourism is a vital economic activity; the catchment is located in the Lake District National Park and includes the popular locations of Keswick and Derwentwater. Outdoor activities and the cultural landscape are key aspects of tourism in the area. The whole area is covered by biodiversity designations – the headwaters, catchment, rivers, and lakes.

Type of provider / seller

Land managers. The pilot is using an ecosystem approach to identify and prioritise integrated land and water management actions. Two of the seven agreed priority actions are to increase woodland cover and achieve sustainable grazing – these will be the focus of future Higher Level Stewardship (HLS) agreements. Involving farmers and other land managers is key – they have been combining hill farming with environmental management through agri-environment schemes for the last 20 years.

Type of intermediary

Natural England is responsible for overall coordination as part of the 'Delivering Nature's Services' programme. A task group of partners includes the Environment Agency, Lake District National Park Authority, United Utilities, Cumbria County Council, Forestry Commission, NFU, Nurture Lakeland and Cumbria Tourism. The project has engaged with over 30 organisations and builds on the strong foundations of the Bassenthwaite Lake Restoration Programme partnership.

Type of buyer / financing source

Combination of public and private funding: HLS payments from Natural England (the pilot is helping farmers secure future HLS agreements); English Woodland Grant Scheme administered by the Forestry Commission for woodland creation and management; SCaMP project funding from water company United Utilities (£4M for capital works beyond the scope of HLS to address deteriorating water colour and improve carbon storage and biodiversity.); and contributions from individuals through the Visitor Payback Scheme (VPS) run by Nurture Lakeland (extended to Bassenthwaite for the pilot). See associated case studies in this Annex.

How the PES is coordinated & administrated

Focus on Partnership Delivery. The existing effective partnership was extended to include the land managers and link them to the beneficiaries. Partners were encouraged to work together on managing the catchment and understand each other's objectives. The Bassenthwaite Lake Restoration Programme provided a ready-made governance structure which meant the pilot could focus on the key tasks. The key shifts in approach were sharing objectives, spotting opportunities, involving the farming and tourism sectors, and engaging the local community.

<p>Who the beneficiaries are Tourists and visitors benefit directly from conservation of the cultural landscape and improved access for activities such as walking and mountain-biking. Local communities benefit in turn through employment and income generation from tourism. United Utilities and their customers benefit from improved water quality and avoided additional treatment. Local residents and communities downstream benefit through enhanced flood risk management. The wider public benefits indirectly from improved conditions for biodiversity, carbon sequestration, livestock/food production.</p>	<p>Type of contract and payment approach Payment through uptake of 10-year HLS agreements in return for implementing the agreed land and water management actions set out in the delivery plan. Potential HLS agreements were identified through an opportunity mapping workshop with partners. Initially 40 key farms were identified as high priority for HLS agreements that can deliver multiple outcomes. In addition, on United Utilities (UU) land, joint SCAMP-HLS agreements are being offered to farmers on UU Sustainable Catchment Management Plan farms.</p>
<p>Extent to which supply of ecosystem service(s) is/was threatened High rainfall, intensive visitor use, historic overgrazing as a result of previous farm support payments, invasive species, and climate change are all affecting ecosystem function and services provision. The area is vulnerable to erosion, carbon storage is reduced, and mountain habitats are degraded. Poor water quality in the catchment due to soil erosion and pollution (particularly phosphates) affects the wildlife and waters of Bassenthwaite Lake and is causing deteriorating raw drinking water colour (which is expensive to treat).</p>	<p>Degree of additionality involved Restoration of key habitats via these agreements is having a direct benefit on key ecosystem services. Without the partners adopting an integrated approach and agreeing to the delivery plan this would not likely be the case. The added value to local business is shown in the 'Economic Benefits of Ecosystem Services of the Bassenthwaite Catchment' report. Without HLS, EWGS, and visitor payback funding from Nurture Lakeland, habitat restoration would not likely be happening and ecosystem services such as carbon storage, water quality, and recreation would likely be static or declining.</p>
<p>Any packaging of ecosystem services? The project aims to integrate the delivery and improvement of multiple public benefits and so the priority land management actions are assessed according to ecosystem service delivery. One of the key actions is native woodland creation which can deliver multiple benefits, particularly carbon storage, improved water quality, and habitats for wildlife. HLS provides a ready-made scheme to package most of the land management actions identified in the delivery plan.</p>	<p>Any problems with leakage or perverse impacts? The possibility that in other catchments in the area which are not receiving similar assistance, conditions may deteriorate and/or there may be resentment from farmers. It has been suggested that visitors will be concerned at the planned changes to the cultural landscape, particularly woodland and scrub creation. Gathering evidence on this to understand the extent of the risk is difficult.</p>
<p>Equity implications Targeting and prioritising HLS agreements is helping to ensure good value for public money. However, for non-priority farms there are concerns about reduced support once farms leave the existing ESA scheme. Involving farmers in setting and agreeing objectives, actions, and priorities can help manage this. Creating woodland and scrub on common land, where farmers share the grazing that is owned by large estates, does pose issues over property rights. The 10-15 year agreements is also a concern as the desired change has a much longer life.</p>	<p>Arrangements for monitoring and evaluation A baseline assessment was produced including mapping of ecosystem services and beneficiaries. Potential management actions and locations were identified and mapped onto the baseline, as spatial prioritisation is central to the project. It informs the 'what, where, how, and why' of Delivery Plan implementation. Data are shared for monitoring outputs e.g. water quality (EA), SSSI habitat (NE) and drinking water quality (UU). Some measures are proxies for ecosystem services e.g. blanket bog condition as a proxy for carbon sequestration.</p>
<p>Challenges: Integrating objectives and actions across a range of ecosystem services is complex and hard to communicate. Agreeing the key ecosystem to focus on and distilling the actions down to a set of 7 key actions helped to make them clear. Support and payment mechanisms operate separately which makes linking up farmers and land managers to beneficiaries difficult. Another challenge is how to support delivery of actions not covered by HLS or EWGS in one package.</p> <p>Successes: Using an existing partnership helped this project to make progress quickly. Partners were used to discussing sharing catchment scale planning and management. Involving farmers helped to develop a set of integrated actions that were focused on action and that could fit within their farm businesses. Opportunity mapping workshops were a good way to identify synergies and conflicts between outcomes. The discussions at these events helped to resolve these simply.</p> <p>Lessons learnt: Integrating objectives, ideas, actions and priorities takes time and co-ordination – a project officer was critical to making this work. Involving new sectors, such as tourism, and increasing the input from farmers also took time. The result, however, is a shared Delivery Plan with agreed priorities. It was worth the effort!</p>	
<p>Future considerations for the scheme The delivery plan was developed through workshops and meetings with partners; it sets actions for 2011-16 aiming to maximise ecosystem service provision in the Bassenthwaite area. Success depends on the voluntary uptake of HLS and other funding by farmers / land managers. Changes to HLS from the next CAP settlement may affect this. There is potential to build on Nurture Lakeland's VPS pilot to increase funding. Almost all businesses engaged in the VPS have opted to continue to support their chosen conservation project.</p>	<p>Other comments / background The priority land management actions were mapped against partner objectives to facilitate more efficient delivery e.g. catchment sensitive farming, Biodiversity Action Plan targets, SSSI condition, Rights of Way Improvement Plan. Farmers strongly supported the integrated 'joined-up' approach across organisations to the priorities for land management.</p> <p>Date last updated: July 2012 Contact: Dan.Hunt@naturalengland.org.uk Website: www.bassenthwaite-lake.co.uk</p>

Best Practice Guide for PES case studies – Nurture Lakeland

Case Study Name: Nurture Lakeland
Location: The Lake District National Park



Map of the Cumbria region

Before investment:



Erosion of footpaths threatens iconic lakeland landscapes such as the Striding Edge approach to the summit of Helvellyn.

After investment:



'Fix the Fells' is one of the projects supported by the Nurture Lakeland VPS funding. It helps to restore eroded footpaths, improving the landscape and its recreation value.

SUMMARY - what makes this case study distinctive?

To support the Vital Uplands ecosystem services pilot project, Nurture Lakeland developed a pilot Visitor Payback Scheme (VPS) in the Bassenthwaite Catchment within the Lake District National Park. Visitor Payback Schemes allow visitors to contribute to landscape management through a small donation and the scheme is one of the few existing PES mechanisms that allow tourists who benefit from the natural environment to directly support it. Nurture Lakeland has raised almost £2million in donations over an 18 year period through the scheme. The use of VPS provides a long term and sustainable source of income for projects. However, the growth of such schemes tends to be slow and organic. This pilot therefore set out to understand the barriers and constraints to the expansion of VPS.

Type of habitat / land use

Mainly upland (upland farming and recreational use) with some agricultural land in the base of the valley. There are also significant amounts of woodland cover at Winlatter forest. Most significantly, the catchment contains two of Cumbria's largest lakes; Bassenthwaite and Derwentwater.

Type of ecosystem service

Participating businesses were given the opportunity to support one of three projects which support improvements to ecosystem services. 'Fix the Fells' focuses on the protection and restoration of footpaths; 'The Osprey Project' supports the re-colonisation of the area by this rare species; and 'Love your Lakes' is working to improve Lakeland water quality.

Type of provider / seller

The providers supported by the pilot VPS scheme are charitable organisations focused on the improvement of the Lakeland environment. They rely primarily on donations, with some statutory support. The providers already existed and were seen as undertaking activities that were readily communicated to business owners and the public.

Type of intermediary

Nurture Lakeland is a locally based charity which has operated the VPS for the last 18 years and acts as the intermediary between participating businesses and the ecosystem service providers. Businesses also act as a type of intermediary between the tourists and Nurture Lakeland. Businesses include accommodation providers, retailers, and tourist attractions. To join the scheme a business has to demonstrate a customer base of at least 1,000 per annum.

Type of buyer / financing source

The area receives 2.5 million visitors per annum. The overriding reason for visiting the catchment is the scenery, with over 70% of visitors participating in outdoor recreation. Visitors then make voluntary contributions through the businesses participating in the scheme.

How the PES is coordinated & administrated

Nurture Lakeland offered businesses in the Bassenthwaite Catchment the opportunity to participate in the pilot. Pilot businesses choose a project to support and then raise funds from their customers. It is free for businesses to join the scheme.

<p>Who the beneficiaries are The beneficiaries are split into two groups: 1. Direct – tourists benefit from improved amenity, access, and recreation; 2. Indirect – Nurture Lakeland, businesses, and the local community benefit from improved ecosystem function and the greater numbers of tourists coming into the area.</p>	<p>Type of contract and payment approach Nurture Lakeland engages with and enlists local businesses into the scheme. Businesses collect money from their customers using either an opt-out system via the bookings systems; donation envelopes; or sponsored products. Nurture Lakeland then distributes money to the charitable organisations. Payment is conditional on receiving annual monitoring data and the submission of a work plan, costings, and other background information.</p>
<p>Extent to which supply of ecosystem service(s) is/was threatened The three main projects supported by the VPS all seek to address degraded ecosystems. These include eroded footpaths, poor quality habitat for Ospreys, and poor water quality resulting from phosphate pollution. These were having and continue to have a range of adverse impacts on supporting and cultural ecosystem services.</p>	<p>Degree of <u>additionality</u> involved The VPS pilot provides funds to the projects it supports above those that would have otherwise been received. This enables the charitable organisations to significantly increase the scope of their activity.</p>
<p>Any <u>packaging</u> of ecosystem services? All of the projects that are supported by the scheme provide multiple ecosystem services. Ecosystem services are therefore bundled.</p>	<p>Any problems with <u>leakage</u> or potentially <u>perverse impacts</u> on other ecosystem services No. The project promotes greater understanding within businesses and visitors and it has been reported that visitors often make further donations to the project following their stay.</p>
<p>Equity implications Free riding – the main equity implication is that those not paying into the scheme and those businesses that are not participating also receive the benefits.</p>	<p>Arrangements for monitoring and evaluation The charitable organisations that are supported are required to provide monitoring data. This is then reported to the local businesses and consumers via social media, the website, and an annual report.</p>
<p>Challenges, successes, lessons learnt Successes: Operating a VPS in a distinctive catchment area resulted in cost savings during the recruitment phase and created a sense of ownership amongst participating businesses. All but one of the businesses involved in the pilot have continued to support the scheme. Compared to previous VPS, the catchment approach was successful in securing business buy-in much more quickly. In three months participation was higher than it would have been after a year in an area where businesses were more spread out. Challenges: Costs to businesses, such as developing their website, were cited as the primary barrier to participation. Another significant challenge relates to the difficulty in securing support for projects that provide less tangible/visual impacts, such as climate change mitigation. Lessons: The main lesson learnt was that it is essential that Visitor Payback Schemes are free for businesses to participate in. Furthermore, funding needs to be in place to cover the costs for at least the initial six months, due to the time lag before any return on investment is realised. Another key finding was that it is easier to create empathy between businesses and local conservation projects, and between visitors and projects, when the results of the project are <i>visible</i> and <i>physical</i>.</p>	
<p>Future considerations for the scheme The scheme is replicable anywhere where there is a significant tourism industry that is reliant on ecosystem services. The creation of a nationally recognisable Visitor Payback brand and associated quality standards could potentially help to spread the scheme in the UK. Nurture Lakeland plan to launch such an umbrella association in October 2012.</p>	<p>Other comments / background VPS schemes are regarded as a ‘medium burn’ fundraising activity. Generally, getting a business up and running on the scheme takes around three months, with a further three required before funds start to come forward. Nurture Lakeland has found that it takes a further one or two years before significant amounts of money are raised.</p>
<p>Date last updated July 2012</p>	<p>Contact details ruth@nurturelakeland.org Website www.nurturelakeland.org</p>

Best Practice Guide for PES case studies – Pumlumon Project, Wales

Case Study Name: Pumlumon Project

Location: Cambrian Mountain Range, Wales



Source: MWT (2010)

Before investment:



2007 - Significant peat hag formation in a Rhosygarreg holding as a result of post-war drainage works © MWT

After investment:



2011 – Water table around peat hags has risen significantly following blocking up of ditches downslope © MWT

SUMMARY - what makes this case study distinctive?

The Pumlumon Project (PP) is a flagship scheme of the Wildlife Trusts (WT), lead by the Montgomeryshire Wildlife Trust (MWT). The scheme pioneers an upland economy built around wildlife, ecology, and long-term sustainability across 40,000 ha of the Cambrian Mountain range. From its inception in 2007, the PP has been built around addressing the specific problems and opportunities in an area of upland Wales; piloting an integrated approach whereby ecosystem services are delivered via sustainable land management. This economic based approach to ecosystem management in the uplands is a significant departure for the WTs, however, given the current and future pressures affecting the uplands in Wales, it is necessary in order to work with farmers to support a robust and resilient landscape. Another key element of the project is the introduction of scientifically validated habitat and hydrological monitoring to ensure that any changes in the delivery of ecosystem services as a result of the project are quantified. This information is essential when working with policy makers and the private sector to influence future funding schemes (e.g. Glastir – Welsh Agri-environment scheme initiated in 2012).

Type of habitat / land use

The 5,000 ha Pumlumon SSSI supports a mosaic of habitats including blanket bog, heathland, acid grassland, gully woodland, semi-improved and improved grassland, and conifer plantation. Five catchments are found within the project area including the nationally important Severn, Wye, and Usk rivers.

Type of ecosystem service

The PP delivers a number of ecosystem services: safeguarding carbon in upland peat soils, carbon sequestration from restored bogs and tree planting, lower flood risk through better water storage, improved water quality through erosion control, enhanced ecosystem function and biodiversity through better management.

Type of provider / seller

The majority of the land is privately owned, with 250 farms within the project area. The remainder of the land is owned by the Forestry Commission Wales (FCW), Crown Estates (CE), and MWT.

Type of intermediary

MWT acts as both a broker – facilitating arrangements between the private sector/statutory agencies and landowners; and also as a funder - developing agreements with farmers to carry out land management works.

Type of buyer / financing source

MWT is the primary buyer through funds from two major charitable sources - Biffaward and Waterloo - provided to mitigate climate change. Smaller amounts of funding have been received from local and national government and statutory agencies to support biodiversity.

How the PES is coordinated & administrated

MWT has developed partnerships with farmers, landowners, and the FCW. Arrangements are voluntary and the range is constantly expanding. Where possible, the areas worked on are contiguous and cover: land management actions to be undertaken, the expected ecosystem service benefits, and the payments to be made.

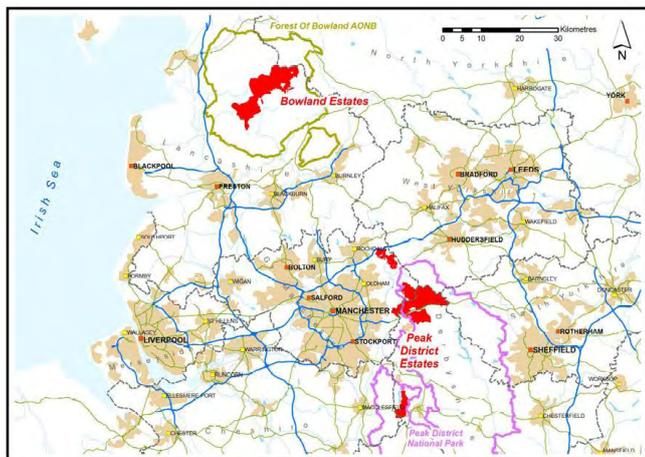
<p>Who the beneficiaries are The beneficiaries are mostly indirect but are numerous and widespread. They include residents in downstream catchments (water quality and supply), tourists and day visitors to the area (access and new visitor attractions), and the general public (carbon storage and sequestration).</p>	<p>Type of contract and payment approach Contracts are comprised of two elements – a direct land management intervention element usually carried out by the farmer or a local contractor, and an on-going management contract which covers the term over which the funding is available.</p>
<p>Extent to which supply of ecosystem service(s) is/was threatened Prior to the PP, the area was in an unfavourable condition with heavily drained blanket bogs and extensive Molinia grass dominance throughout. These elements led to significant declines in water quality and biodiversity and increased flood risk downstream.</p>	<p>Degree of <u>additionality</u> involved Although a substantial proportion of the project area is within the Pumlumon SSSI, it is highly unlikely that the management interventions being employed through the PP would have received the necessary funding from alternative sources.</p>
<p>Any <u>packaging</u> of ecosystem services? The scheme is layered; with charitable funders supporting the PP primarily interested in mitigating climate change and government agencies in biodiversity. In addition, a number of other services 'piggyback' such as reduced flood risk and improved water quality.</p>	<p>Any problems with <u>leakage</u> or potentially <u>perverse impacts</u> on other ecosystem services The payments involved in the PP were calculated to a rate which was thought to be fair and equitable for the service delivery being provided so that the farmers would not need to increase production levels through harmful practices on other parts of their holding.</p>
<p>Equity implications Several farmers within the project area were already engaged in agri-environment schemes. These schemes however were based on habitat rather than management intervention payments. To engage these landowners the PP negotiated a payment mechanism with the Welsh Government whereby, rather than receive an additional habitat based payment, agri-environment participants would instead be paid an intervention support payment.</p>	<p>Arrangements for <u>monitoring and evaluation</u> As the primary funder of the PP, MWT undertakes all monitoring and evaluation within the project area. Analysis of the hydrological monitoring data is carried out by CEH and feeds into the national data set on the hydrological impacts of upland ditch blocking. Prior to the release of payment for any interventions, the sites are inspected by authorized members of the PP to assess quality and completion.</p>
<p><u>Challenges, successes, lessons learnt</u> Successes: As of April 2012, the area of private farmland within the PP under active land management intervention exceeded the total area of land within Montgomeryshire under MWT Nature Reserve ownership. Through hydrological monitoring, the ditch blocking works in one area have been shown to have raised the water table by 5cm. Red Grouse levels on this site were the highest recorded in Wales in 2011. Challenges: The first hurdle that the PP had to overcome was not engaging the landowners but rather convincing the conservation movement that ecosystem service delivery was the primary mechanism for protecting wildlife into the future. Supporting and enhancing biodiversity is the primary tenet of the organization and there is always a risk that biodiversity will be seen as a by product rather than a driver of ecosystem service delivery. Lessons learnt: Demonstrating the viability of new, more sustainable, ecosystem based business models to farmers requires a huge cultural shift in attitudes and perceptions, however, if your argument is based on sound logic, even the hardest of audiences can be won round.</p>	
<p><u>Future considerations for the scheme</u> At the current scale, the PP is acting as a pilot for a much larger area which would require a significant increase in funding. In addition to the private sector interests in the area (i.e. water quality and flow), funding could also come from the better targeting of public payments to farmers and land managers for the regulating and supporting services they provide. The longevity of the PP is dependent upon a viable market mechanism to support the delivery of ecosystem services. Although it is hoped that the Higher Level agri-environment payments under Wales's new Glastir scheme may provide such a mechanism, MWT will continue to seek funding through alternative sources and to work with both the public and private sector to achieve the aim of ecosystem service delivery through sustainable land management.</p>	
<p>Date last updated July 2012</p>	<p>Contact details liz@montwt.co.uk Website www.montwt.co.uk/pumlumon.html</p>

Best Practice Guide for PES case studies – United Utilities: SCaMP 1 2005-2010

Case Study Name: United Utilities:
SCaMP 1 2005-2010



Location: UU owned Catchment land in
Bowland, Lancashire and the Peak District, UK



**Before investment
(an example):**

In 2007 Quiet Shepherd had large areas of bare and eroding peat, in part caused by wildfires.



After investment:

In 2009 the bare peat in Quiet Shepherd had been largely restored.



SUMMARY - what makes this case study distinctive?

The Sustainable Catchment Management Programme (SCaMP) scheme is being undertaken by United Utilities (UU) in partnership with the RSPB. It is a good example of a partnership approach with a variety of national and local organisations working to enhance habitats, benefit wildlife, and improve raw water quality. Previously the UU owned catchment land had been managed by tenant farmers for purely agricultural purposes. However, the environmental impact of these farms, amongst other factors, was leading to poor SSSI condition and increasingly discoloured and turbid water. By incentivising improvements in land management, the SCaMP scheme has sought to improve the condition of the SSSI's, reduce risks to water quality, whilst also providing additional benefits through improvements in ecosystem quality. In order to prove the economic viability of the SCaMP approach to its regulators, UU is monitoring its impact on a number of sub catchments.

Type of habitat / land use

The SCaMP area covers 20,000 hectares of catchment land owned by United Utilities, consisting primarily of upland moorland. 13,000 ha of the land is designated as an SSSI. Much of the land consists of peaty, wet soils, which have sponge-like properties, retaining rainwater, filtering and cleaning it, and releasing it gradually into reservoirs and rivers.

Type of ecosystem service

Although the main ecosystem service being purchased by the water company is improved water quality, they are also interested in a range of co-benefits, such as improvements to the condition of the SSSIs, carbon sequestration, and biodiversity and recreational improvements.

Type of provider / seller

The SCaMP area is farmed primarily for sheep, with some cattle grazing. There are 45 land holdings and 21 farms. These holdings are currently economically marginal and are dependent on agri-environment payments.

Type of intermediary

SCaMP was managed by UU land agents following agreements with tenants. The RSPB provided technical assistance in developing farm plans and in helping farmers gain access to grants. On a wider scale UU and the RSPB could be considered intermediaries helping Natural England (NE) and the Forestry Commission (FC) reach their respective targets.

Type of buyer / financing source

United Utilities is the UK's largest listed water company and is also a major land-owner (57,500 ha). The capital investment for SCaMP is financed by UU and NE/FC. UU customers have paid 75% of the capital costs for improvements through minor increases in their water bills, while agri-environment payments from NE/FC provide ongoing revenue support to farmers.

How the PES is coordinated & administrated

The initiative is a partnership between United Utilities, the RSPB, local farmers and a wide range of other stakeholders, including Natural England and the Forestry Commission.

<p>Who the beneficiaries are The direct beneficiaries of SCaMP are United Utilities and its customers, who, it is believed, will benefit from cleaner water and a reduction in future operational and capital treatment costs. Indirect 'spill over' benefits to the wider population include nature conservation, recreational improvements, and enhanced carbon sequestration.</p>	<p>Type of contract and payment approach SCaMP activities include blocking drainage ditches, restoring moorland, establishing woodland, installing waste management facilities, and livestock fencing. Costs are split between UU funds (£8m) and public support through agri-environmental grants (£2.5m). Farm plans that are consistent with SCaMP objectives are prescribed in the long-term agreements between the farmers and UU.</p>
<p>Extent to which supply of ecosystem service(s) is/was threatened The poor condition of the SSSI's on UU owned land were leading to: (1) a loss of biodiversity; (2) increasingly discoloured and turbid waters; (3) increased carbon emissions; and (4) reduced amenity value.</p>	<p>Degree of <u>additionality</u> involved Through its protection and enhancement of designated and non-designated sites, the SCaMP scheme goes beyond legal minimum requirements. The activities undertaken through SCaMP are unlikely to have occurred without the funding UU provided to tenants.</p>
<p>Any <u>packaging</u> of ecosystem services? The project focuses on water quality, but additional ecosystem services are 'free-riding' based on the improvements generated for biodiversity and recreation (including SSSI condition) and carbon sequestration.</p>	<p>Any problems with <u>leakage</u> or potentially <u>perverse impacts</u> on other ecosystem services The agri-environmental scheme agreements cover all land holdings held by the tenants and therefore mitigate the risk that farmers would simply move harmful practices elsewhere.</p>
<p>Equity implications Some farmers were already participating in agri-environmental schemes. However, SCaMP enabled them to rise to a higher level within the scheme and access greater funding and resultant benefits. Therefore equity implications were minimal.</p>	<p>Arrangements for <u>monitoring and evaluation</u> The SCaMP Monitoring Project is nationally significant in its scale of spatial and temporal operation. Hydrological monitoring is conducted across four separate sites and nine different treatment plot types. Intensively monitored data is collected from over 40 monitoring installations, the current data series spans over six years with current funding to continue to 2014.</p>
<p><u>Challenges, successes, lessons learnt</u> Successes: United Utilities has overcome a market failure by negotiating directly with farmers and other stakeholders, and coordinating the draw-down of agri-environment payments. Initial results suggest that SCaMP is starting to provide measurable water quality benefits. However it is too early to draw strong conclusions. SCaMP was the first catchment scheme to be funded by the UK water industry in 2005 and at the latest price review its success has led to over 100 schemes at 17 water companies being accepted by the regulator Ofwat. Challenges: A key challenge faced by UU, and by others aiming to implement similar schemes, is the need to convince the industry regulator (OFWAT) of the direct benefits to customers of water companies investing in such activities. The monitoring programme undertaken by SCaMP may help to make this link more firm. Furthermore, getting tenant farmers 'buy-in' was a major challenge that required extensive stakeholder management. Lessons Learnt: SCaMP is an innovative approach to addressing a number of issues, and demonstrated the importance of getting and maintaining stakeholder buy-in across the board. It demonstrated that PES can be successful even when knowledge is imperfect and that PES can be iterative and flexible.</p>	
<p><u>Future considerations for the scheme</u> To receive continued Ofwat approval, United Utilities must demonstrate that SCaMP is an economically viable approach. In terms of replication, SCaMP's success relies to some extent on UU's status as landowner and the relatively clear link between the ecosystem service and the benefit obtained. In other cases the situation may well be more complex. SCaMP 1 has provided UU with the confidence to deliver SCaMP 2 on land that is not SSSI designated and to promote catchment management on land not directly owned by the company.</p>	
<p>Date last updated July 2012</p>	<p>Contact details scamp@uuplc.co.uk</p> <p>Website http://www.unitedutilities.com/scamp.aspx</p>

Best Practice Guide for PES case studies – Slowing the Flow at Pickering

Case Study Name: Slowing the Flow at Pickering
Location: Pickering Beck and neighbouring River Severn Catchments, North Yorkshire



Catchments shown in blue, Forestry Commission land in green.



One of >150 large woody debris dams constructed in woodland streams to 'slow the flow'

SUMMARY - what makes this case study distinctive?

Slowing the Flow at Pickering is a project that seeks to demonstrate how better land management can help to tackle the flooding problem faced by Pickering in North Yorkshire and deliver other benefits to water quality, wildlife, and soil protection. The project aims to achieve protection for Pickering for up to 1 in 25 year flooding events through a mixture of land management measures (including flood storage bunds and debris dams) and woodland creation. These measures aim to increase the time it takes from rain falling on the upper catchment to flood waters flowing through Pickering. The project began as one of three pilots funded by Defra in response to the Pitt Review of the 2007 floods in England and Wales. This called for Defra to work with partners to deliver flood risk management involving greater working with natural processes. The project also responds to a strong local lobby for action after suffering the consequences of flooding; Pickering has been flooded four times in the last ten years.

Type of habitat / land use

There are four principal land uses in the 66 km² catchment of Pickering Beck, comprising: forestry and woodland, heather moorland, improved grassland, and arable crops. A significant part of the catchment lies within the North York Moors National Park, sizeable areas are designated SSSI and Scheduled Ancient Monuments. It is a Priority Catchment under the Catchment Sensitive Farming Delivery Initiative (CSFDI).

Type of ecosystem service

Enhanced flood protection for Pickering. Catchment Flood Management Plans note that the current reliance on engineered flood defences is not sustainable, so more natural measures are being implemented including: low-level flood storage bunds, woodland creation, large woody debris (LWD) dams, blocking drains where appropriate. Other benefits include water quality, soil protection, carbon storage, habitat, and community awareness.

Type of provider / seller

About one third of the catchment is under public ownership - largely Forestry Commission (FC) and North York Moors National Park Authority (NYMNP). Most measures are implemented on publicly owned land, although flood storage bunds are expected to be sited on Duchy of Lancaster Estate land. Local farmers are encouraged via the CSFDI to implement soil management and erosion control measures to reduce run off rate.

Type of intermediary

Forest Research performs the role of intermediary and knowledge provider, coordinating the various partners and undertaking mapping, monitoring, and evaluation work. Durham University also acts as a knowledge provider and has developed a coupled hydrological-hydraulic model called 'Overflow', which simulates how each stream in the catchment contributes to flood risk downstream at Pickering. The outputs of the model are being used to identify optimum locations to slow run-off.

Type of buyer / financing source

The lead funder is Defra, supplementary partners include: FC for woodland creation / forest measures; NYMNP for moorland measures; and the EA for developing flood storage bunds. Ryedale District Council (RDC) are expected to cover the main cost of flood storage bunds. The CSFDI is funding a number of farm-based measures to improve management of agricultural run-off and diffuse pollution. Funding is provided by Defra, Local levy, and RDC as grants to help protect individual properties in Pickering from flooding.

How the PES is coordinated & administrated

Partnership project led by Forest Research, closely supported by FC England, the EA, NYMNP, Durham University, Natural England, the Yorkshire Regional Flood and Coastal Committee, and the wider community. A programme manager is responsible for overall project co-ordination and reports to a Project Board which oversees and helps steer the work. The programme manager leads a Programme Delivery Group of key stakeholders, which is responsible for the development and implementation of the land management measures approved by the Board.

<p>Who the beneficiaries are Residents, businesses, and property owners in Pickering should benefit directly from improved flood protection, while farm businesses gain from better soil and water management via investment under the CSFDI. The wider community should benefit indirectly from improved water quality, fisheries and wildlife habitats. Other beneficiaries include those who have received training on implementing natural flood management measures under the Countryside Estate Management Apprenticeship Scheme.</p>	<p>Type of contract and payment approach The project funds land management measures through grants, capital and compensation payments, and in-kind support. Success will be gauged by the number of measures implemented and the frequency of future flooding in Pickering. Key targets are to: construct low-level flood storage bunds; create 50 ha of riparian woodland; construct 150 LWD dams; block problem drains; restore streamside buffer zones; plant 5 ha of farm woodland; and install farm-scale measures to reduce rapid runoff.</p>
<p>Extent to which supply of ecosystem service is threatened Inappropriate cultivation of arable soils, overgrazing of grassland, excessive moorland and forestry drainage, and poor river management contributed to enhanced risk of flooding in Pickering by promoting rapid runoff and increasing sediment and siltation in Pickering Beck. Pickering was flooded four times in the last 10 years. Climate change may increase flooding frequency.</p>	<p>Degree of additionality involved The aim of the project is to try to reverse the hydrological effects of previous land management practices and restore the catchment's natural flood attenuation capacity. While the scheme was not set up as a PES, it provides a good example of how an ecosystems approach and partnership working can help to address the flooding issue at source, as an alternative to more traditional hard engineering flood defence.</p>
<p>Any packaging of ecosystem services? No explicit packaging of services but recognition that these strengthen the case for natural flood management. Ecosystem services 'piggy-backing' on the project include: water quality, soil protection, trout fishery, habitat for wildlife, carbon sequestration, local skill base, and public understanding.</p>	<p>Any problems with leakage or perverse impacts? Careful siting of measures required to avoid slowing the flow at sites where this will synchronise rather than desynchronise flood flows. LWD dams can fail under very high flows; this can be mitigated by confining dams to water channels <5 m for greater stability. Woodland planting will reduce agricultural production.</p>
<p>Equity implications Experience shows that land management measures often need to be carefully sited to be effective or to deliver greatest benefits and minimise risks. The required targeting will thus skew grants and payments to specific landowners, leaving others feeling excluded.</p>	<p>Arrangements for monitoring and evaluation Models were used to estimate the impact on flood risk and identify preferred sites. The EA's river gauging stations and seven additional water level recorders installed by Forest Research are used to distinguish the effects of the riparian woodland planting and LWD dams.</p>
<p>Challenges, successes, lessons learnt Challenges: The short time period to implement the project. Community expectations and the pressure to quickly install flood protection measures, limiting time for establishing a baseline. The risk-averse nature of regulatory bodies has implications for scope, time scale, and costs. Working in multi-designated and sensitive catchments is challenging. Designing cost effective and 'soft engineered' flood storage bunds within the requirements of the Reservoirs Act (1975) and Floods and Water Management Act (2010) is also challenging. Successes: Implementation of a range of land use management measures that are designed to reduce future flood risk at Pickering. The local community has largely embraced the concept of a whole-catchment/ecosystems approach to flood risk management. The project has raised the profile of natural flood management and helped to guide and integrate government policy on flood risk and land use management. Lessons learnt: Need a minimum of three years and probably five years to implement a catchment demonstration project. Partners need to adopt a 'can do' attitude and carefully manage community expectations; maintaining good communication is key. Need for careful siting of measures to avoid synchronising sub-catchment flows and increasing flood risk. Need for grant payments and other incentives to better reflect ecosystem service provision and assist the spatial targeting of measures. Demonstration projects should include a formal ecosystem services assessment, carefully planned from the start of the project.</p>	
<p>Future considerations for the scheme Defra has extended funding for to 2015. The focus of Phase 2 is to: secure full implementation of outstanding measures; continue monitoring the outcomes of the existing measures; extend and/or develop new measures to further reduce flood risk; continue to evaluate and promote the benefits of a sustainable catchment-based approach to flood management.</p>	<p>Date last updated: July 2012 Contact details: Tom.Nisbet@forestry.gsi.gov.uk Website: http://www.forestry.gov.uk/fr/slowingtheflow</p>

Best Practice Guide for Payments for Ecosystem Services (PES) – Upstream Thinking

Case Study: Upstream Thinking – Westcountry Rivers Trust Catchments

Location: Upper Tamar, Fowey and Wimbleball Catchments

South West Water Upstream Thinking Initiative
WRT PRog Catchment Management Projects

- Abstraction locations
- SWW Water Treatment Works
- Pumped transfer from abstraction *
- Proposed water transfer routes in SWWs Water Resource Management Plan
- * Otherwise abstraction is adjacent to WTWs



Before Investment



Before intervention agricultural pressures meant that soil, nutrients, and fecal matter were entering the water courses through poor, but legally compliant, infrastructure.

After Investment



Investment removes or minimises these pressures and is 50% co-funded by the farmer

SUMMARY - what makes this case study distinctive?

This scheme was co-developed between the beneficiary, in this case the Water Company (South West Water), who had a knowledge of the benefits of improved raw water quality, and an ethical broker (Westcountry Rivers Trust), who had a knowledge of catchment wide actions that could be sold to farmers which would lead to improved raw water quality. The beneficiary and ethical broker worked together to develop an action plan for the three catchments based on the Drinking Water Inspectorate failures for the area that also integrated with other requirements under the Water Framework Directive and Habitats Directive.

Type of habitat / land use

As an example within the three catchments, the Upper Tamar catchment drains an area of about 900 square kilometres. The upper catchment is made up of rolling farmland valleys, heaths, and granites, which make the area relatively impervious leading to the flashy nature of the rivers and their tributaries and often resulting in water levels rising rapidly in a short time accompanied by high surface runoff. The predominant land use is grade three and four agricultural land; used for dairy, beef, and sheep, and linked with indicative arable operations (maize, winter wheat, winter beat etc.).

Type of ecosystem service

Although the main ecosystem service being purchased by the Water Company is improved water quality (either nitrates, phosphates or agrochemicals), they are also interested in water quantity changes to summer base flow that affects sewerage discharge levels. Additionally they are keen to see secondary habitat and cultural improvements.

Type of provider / seller

As an example within the three catchments, there are roughly 500 farmers in the Upper Tamar catchment. The Westcountry Rivers Trust has a relationship with these farmers formed over the past 15 years, where they have given best practice advice and administered grant aid schemes. The goods and services bought from these sellers are usually improved farming through capital investment in infrastructure, which is accompanied by a contract detailing restrictions placed on farming operations (such as stock density limits). If the grant is above £5,000 these requirements are enshrined in a covenant on the deeds of the property for the life of the infrastructure (10 or 25 years).

Type of intermediary

The Westcountry Rivers Trust is an environmental charity established in 1994 to secure the preservation, protection, development, and improvement of the rivers, streams, watercourses, and water impoundments in the Westcountry. The Trust is set up as an ethical broker that aims to secure the ecosystem services needed by the buyer in a way that co-delivers other wider ecosystem services.

Type of buyer / financing source

The buyer is the local private Water Company (South West Water) that utilises its capital works programme generated through the periodic review. The company has had catchment management plans approved by OFWAT to deliver preventative measures on land that they do not own. They decided to work with an intermediary as they did not have relationships with the sellers of the services they required.

How the PES is coordinated & administrated

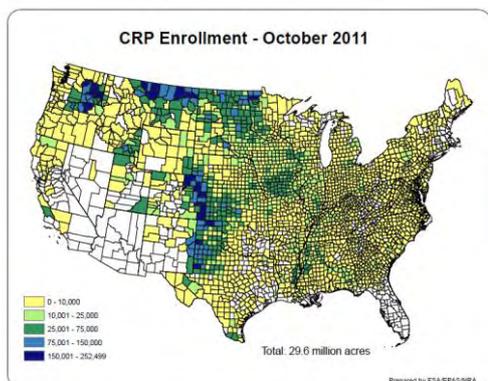
The Westcountry Rivers Trust administers the scheme in partnership with South West Water. Grant agreements are signed by the farmer, SWW, WRT, and the lender, where appropriate.

<p>Who the beneficiaries are The main beneficiaries are split into three groups:</p> <ol style="list-style-type: none"> 1. Direct – farmers benefiting from improved farming operations; 2. Indirect – water company benefiting from better raw water quality; 3. Indirect – the ethical broker and the wider community benefiting from improved ecosystem services (habitats, carbon sequestration, water quality, water quantity, etc.). 	<p>Type of contract and payment approach Payment is based on action through the provision of improved infrastructure and operations. Longevity is ensured through the contract and 10 or 25 year covenant. There is currently no payment based on actual raw water quality although it is under review.</p>
<p>Extent to which supply of ecosystem service(s) is/was threatened Raw water quality was being threatened through diffuse agricultural pollution that fell outside of the regulatory framework. The level of threat was summarised by the Drinking Water Inspectorate concerns, Water Framework Directive status, and South West Water's catchment investigations over 17 water bodies.</p>	<p>Degree of additionality involved Most of the investments are unlikely to have been made without additional funding as economic uncertainty, high up front costs, and long payback periods for infrastructure investment mean that the financial benefits are not always clear cut.</p>
<p>Any packaging of ecosystem services? Although the project was initially developed as a PES scheme to provide a single service from multiple sellers, the Westcountry Rivers Trust have bundled multiple services and offer this to multiple buyers. Some buyers have adapted funding schemes to co-deliver aims (Natural England – Catchment Sensitive Farming Grant Scheme & Forestry Commission - Woodland Grant Scheme). There is some degree of free riding.</p>	<p>Any problems with leakage or potentially perverse impacts on other ecosystem services Potentially perverse impacts include the reduction of farmable land area and limitations on food production. Westcountry Rivers Trust attempts to mitigate changes in food production by improving overall farm-wide production / efficiency.</p>
<p>Equity implications There are equity implications within the project as farmers with good farming systems, that have updated facilities and infrastructure over past years, are less of a priority and tend not to need grant aid. This is counteracted by the stringent requirements for farmers entering into a contract and covenant between them, South West Water, and the Westcountry Rivers Trust. As further beneficiaries and buyers are brought in this issue should reduce as services being bought broaden.</p>	<p>Arrangements for monitoring and evaluation Part of the project is to demonstrate proof of concept and the Westcountry Rivers Trust has been engaged by South West Water to evaluate work at a sub-catchment scale. The Trust is doing this in partnership with various academic groups.</p>
<p>Challenges, successes, lessons learnt Challenges: One challenge for the project was developing a new way of working between a private company and a private charity. The usual relationship of a private company and profit-making contractor was not adequate to reflect the type of approach needed. Alongside this challenge, an understanding that grants are voluntary and are in competition with other less rigorous grant schemes available in the same catchment was needed. Another challenge to the project was working with tenant farmers, where the landowner did not perceive there to be a need for investment. Successes: There are now many examples of long-term infrastructure and improved farming operations in place that are additional to what is legally required by farms. Lessons learnt: The relationships between the buyer, intermediary, and seller are key and require an understanding of the legal, ethical, and social backgrounds of each to allow sympathetic development of a scheme.</p>	
<p>Future considerations for the scheme The longevity of the Westcountry Rivers Trust Upstream Thinking scheme is ensured by putting in place infrastructure, contracts, and covenants that deal with market fluctuations and vulnerabilities. The aim of the Trust is to develop multiple PES schemes that broker bundled services to multiple buyers</p>	<p>Other comments / background The Upstream Thinking project undertaken by the Westcountry Rivers Trust on the Fowey, Upper Tamar, and Wimbleball Catchments is part of a wider Upstream Thinking initiative that includes the Exmoor and Dartmoor MIREs project, the Devon Wildlife Trust's Working Wetland's project, Cornwall Wildlife Trust's Wild Penwith project, the Farming and Wildlife Advisory Group South West, and Westcountry Rivers Trust's Otter project.</p>
<p>Date last updated July 2012</p>	<p>Contact details laurence@wrt.org.uk Website www.wrt.org.uk & www.upstreamthinking.org</p>

Best Practice Guide for PES case studies – US Conservation Reserve Program (CRP)

Case Study: US Conservation Reserve Program

Location: Across the United States



Source: FSA (2012a)

Before investment:

Before the CRP was introduced blowing soil reduced visibility and air quality in Gaines County Texas, making it susceptible to wind erosion. Source: FSA (2012)



After investment:

Since the CRP, soil erosion has significantly decreased. Source: FSA (2012)



SUMMARY - what makes this case study distinctive?

The Conservation Reserve Program (CRP) is a nationwide land retirement programme. The US government offers landholders incentives to enter into contracts to change land use on highly erodible and environmentally sensitive cropland and pasture. The land is converted to grass, trees, wildlife cover, or other uses providing ecosystem services including: surface water quality improvement, wildlife habitat creation, carbon storage, preservation of soil productivity, protection of groundwater quality, and reduction of offsite wind erosion damages. Annual rental payments are made based on the agriculture rental value of the land as well as cost-share assistance for up to 50% of the costs in establishing approved conservation practices. CRP contracts last for 10 to 15 years and over 80% of the CRP land is registered using a competitive bidding process; making it the largest and longest-running PES programme utilising inverse auctions. Inverse auctions require potential ecosystem service sellers to submit bids indicating the minimum payment they are willing to accept for the provision of specified ecosystem services.

Type of habitat / land use

CRP contracts are awarded in areas of agricultural production, buffer areas, and wetlands across the United States.

Type of ecosystem service

The primary goal was originally to purchase reductions in soil erosion however this was expanded to include wider ecosystem services such as fostering natural habitat; reducing water runoff and sedimentation; protecting groundwater; improving the condition of lakes, rivers, ponds, and streams; and increasing wildlife populations.

Type of provider / seller

Land-owning farmers are the sellers; in order to be eligible land must be cropland that is suitable for planting, or marginal pastureland that is suitable for use as a riparian buffer or similar water quality purposes. The provider must have owned or operated the land for at least 12 months barring extenuating circumstances.

Type of intermediary

There are four main agencies involved. The United States Department of Agriculture (USDA) is the governing body. The Commodity Credit Corporation (CCC) is a corporation controlled by the USDA that landowners enter into contracts with when enrolling in the program. The Farm Service Agency (FSA) is the administrative body that runs the program for the USDA. While the Natural Resources Conservation Service (NRCS) is the technical agency which supports CRP through implementation on private lands.

Type of buyer / financing source

The US government purchases environmental services through the CCC on behalf of the buyers, the American tax-paying public.

How the PES is coordinated & administrated

Mainly through general sign-ups to the CRP during specified enrolment periods. Landowners compete nationally to enroll their land by submitting a bid for ecosystem services provided and the cost of provision. Offers for CRP contracts are ranked according to the Environmental Benefits Index (EBI). Each eligible offer is ranked in comparison to all other offers and selections are made from that ranking. In addition, continuous sign-ups allow landowners to enroll high priority conservation practices at any time without competition.

<p><u>Who the beneficiaries are</u> Farmers benefit directly through additional income sources; reduced soil erosion; and greater productivity due to improved air, water, and soil quality. Improved environmental conditions indirectly benefit people living in the local area. The program has shown improvements in water quality and biodiversity (particularly birds) through reduced pollution via agricultural runoff and increased / improved habitat.</p>	<p><u>Type of contract and payment approach</u> CRP participants are provided with annual rental payments in return for establishing long-term, resource-conserving covers. Cost-share assistance may be provided to participants who establish approved cover on eligible cropland for up to 50% of participants' costs in establishing approved practices. Additional financial incentives of up to 20% of the annual payment for certain continuous sign-up practices may also be offered.</p>
<p><u>Extent to which supply of ecosystem service(s) is/was threatened</u> Soil erosion was a significant problem in the US in the 1970s with cropland soil erosion losses estimated to be between 2 - 6.8 billion tonnes. Since the CRP this rate has fallen significantly. However many US rivers, streams and wetlands remain critically depleted or polluted and biodiversity loss continues.</p>	<p><u>Degree of additionality involved</u> While proving additionality is difficult, several studies clearly document significant reductions in soil erosion and nutrient runoff in CRP areas as well as increases in carbon sequestration, biodiversity, water quality, air quality, and tree cover that haven't been recorded outside of the CRP. It is estimated that 51% of CRP land would be returned to crop production in the absence of CRP payments and spending on outdoor recreation would decrease by as much as \$300 million per year in rural areas.</p>
<p><u>Any packaging of ecosystem services?</u> The CRP is designed so that multiple benefits are paid for by a single buyer. Contract bids are ranked according to their EBI which assesses benefits to: wildlife habitat, water quality, on-farm production, long-term outcomes beyond the contract period, air quality, and cost.</p>	<p><u>Any problems with leakage or potentially perverse impacts on other ecosystem services</u> Potential problems with the CRP include fewer farming-related jobs, lower agricultural production, and inflated land rental rates. Employment impacts may be lessened by expansions in services such as hunting, fishing, and other recreational industries. Further, CRP enrolment is capped at 25% of a county's cropland and a limit of 36.4 million acres across the country at any one time.</p>
<p><u>Equity implications</u> The CRP is an equitable scheme which is open to all farmers. The inverse auction process avoids the problem of well managed farms receiving fewer subsidies than poorly managed farms that can arise in grant based schemes. There are also one-time sign-up bonuses and incentives for socially disadvantaged, just beginning, and limited-resource farmers and ranchers.</p>	<p><u>Arrangements for monitoring and evaluation</u> Producers terminating a contract early face a penalty fee of 25% on rental payments paid, plus repayment, with interest, of all the funds already paid to the producer. Most evaluation is carried out before contracts are issued, with evaluation criteria assessing the extent to which a CRP contract application would improve soil resources, water quality, or wildlife habitat.</p>
<p><u>Challenges, successes, lessons learnt</u> Successes: Since 1982 it is estimated the CRP reduced erosion (454m tons per year); restored wetlands (2m acres); sequestered carbon (48m tons per year); established wildlife habitat (3.2m acres); reduced nitrogen and phosphorus use; increased wildlife populations (Prairie Pothole Ducks by 30%); reduced flood damage; and improved water quality with annual reductions in sediment (220m tons), nitrogen (607m pounds), and phosphorous (122m pounds). Challenges: Fluctuating commodity prices present a challenge for setting CRP rental rates. When commodity prices rose in 2008 CRP rental rates were significantly lower than some producers could get by renting their land out for production. Low rental rates can lead to declining enrolments and failure to renew contracts at expiration. Lessons Learned: The CRP demonstrates that countrywide, government led PES schemes can successfully achieve ongoing environmental benefits. While the benefits are significant it is less clear whether they outweigh the costs. As conservation practices become more complex, greater investment is needed to effectively monitor the activities of participants and ascertain the benefits and costs through more precise modelling and data collection capabilities.</p>	
<p><u>Future considerations for the scheme</u> The CRP has proved to be a widely successful long-lasting scheme continuously evolving to meet changing demands. The success of the scheme has led to similar projects in many other countries. However, advances in modelling and data collection could improve the CRP's cost and environmental effectiveness.</p>	
<p><u>Date last updated</u> July 2012</p>	<p><u>Website</u> http://www.fsa.usda.gov/FSA/webapp?area=home&subject=copr&topic=crp</p>

Best Practice Guide for PES case studies – Vittel PES for water quality

Case Study Name: Vittel

Location: North-eastern France



Before investment:

Farmers in the Vittel catchment were starting to switch to an intensive maize based agricultural system which threatened to raise the historically low levels of nitrate in the water.



Vittel landscape

© George Lansdowne/Alamy

After investment:

Farmers were incentivised to discontinue maize cultivation for animal feed, adopt extensive cattle ranching, replace agrochemicals with composted manure, and modernise farm buildings to reduce leaching of animal waste. As a result water quality has been maintained.



SUMMARY - what makes this case study distinctive?

Regarded by some as a near perfect example of a PES scheme, the Vittel case study demonstrates the importance of establishing a strong relationship with ecosystem service providers through active engagement. Vittel, a world leader in mineral water bottling, realised that its aquifers were at risk from nitrate contamination due to agricultural intensification in the area. For around \$9 million, Vittel paid above-market prices to purchase 1500 hectares of land around its water springs. It then signed long-term (eighteen to thirty year) contracts with forty farmers, compensating them to use more sustainable dairy farming techniques and to improve farm facilities. The net result of these initiatives has been a reduction in non-point source pollution and significant changes in local dairy farming and animal waste management practices, while eliminating maize cultivation and the use of agricultural chemicals.

Type of habitat / land use

All the farms in the water catchment are located upstream of Vittel's spring and had traditionally practiced a hay-based cattle ranching system. This was being replaced by a more intensive maize based system. The increased nitrate rate was caused primarily by the heavy leaching of fertilizers from the maize fields in winter, overstocking, and poor management of animal waste.

Type of ecosystem service

The ecosystem service being purchased by Vittel is improved water quality. More specifically, it is the maintenance of nitrate concentration levels in the aquifers of below 4.5mg/l.

Type of provider / seller

Vittel created a typology of the farmers upstream of its spring and chose to focus on larger farms producing milk, meat, hay, and maize, with a good level of productivity, relatively young farmers, higher levels of mechanisation, and high levels of both short and long term debt. These farmers agreed to discontinue maize cultivation for animal feed, adopt extensive cattle ranching, replace agrochemicals with composted manure, and modernise farm buildings to reduce leaching of animal waste.

Type of intermediary

Dialogue between the farming community and Vittel began in 1989, through the establishment of Agriculture-Environment-Vittel (AGREV). Farmers were invited to participate in research identifying acceptable conditions for a new production system. In 1992, Nestlé Waters created Agrivair to act as an intermediary. It was located close to farmers and farmers associations, and its director was well known to farmers and local stakeholders. Intermediaries were key to building trust between the farmers and Vittel.

Type of buyer / financing source

The buyer is Vittel, one of the largest mineral water bottling businesses globally. As a large corporation it was able to fund scientific research and provide incentives to farmers to change their practices. These resources also allowed it to invest time in understanding the farming community and their social, economic and technical position, which was essential in brokering a deal.

How the PES is coordinated & administrated

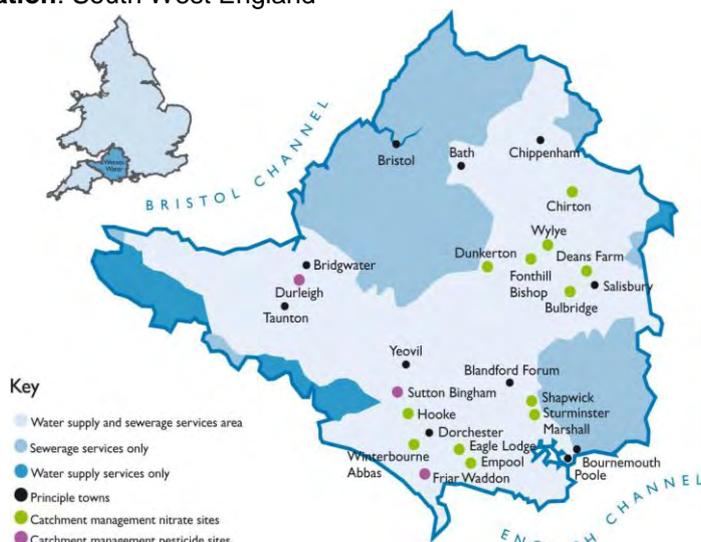
The PES deal was brokered by Agrivair; an intermediary institution established by Nestlé. The PES scheme involves one buyer and 26 sellers. Agrivair continues to facilitate transactions, lead negotiations, co-ordinate design, and implement and monitor compliance. Agrivair monitors the farming practices, the use of new building facilities, and the livestock stocking rate.

<p>Who the beneficiaries are The direct beneficiary is Vittel, who are able to maintain low nitrate levels in their mineral water and sell it globally. The farmers also benefit directly from the investments in modernisation and farm buildings. The local community benefits indirectly since Vittel employs a large number of the local population.</p>	<p>Type of contract and payment approach The contracts are differentiated according to the cost structure and farm location. Incentives included long term contracts, abolition of land acquisition debts, modernisation costs, subsidies, and free labour and technical assistance. Payments are not conditional on changes in aquifer nitrate rates, as the contribution of individual farms cannot be established. Instead, they are based on the cost of altering farm nitrate inputs.</p>
<p>Extent to which supply of ecosystem service(s) is/was threatened The supply of low nitrate mineral water (less than 4.5mg/l) was threatened. Scientific evidence established that to maintain these low levels, nitrate levels at the root zone needed to be no greater than 10mg/l. Land under maize production shows nitrate rates of up to 200mg/l in this zone. The move towards an intensive maize based system therefore represented a significant threat to water quality.</p>	<p>Degree of <u>additionality</u> involved The specific improvements attributable to the scheme are difficult to establish. However, it is likely that water quality would have been significantly impacted without the measures and investment made possible through the PES scheme.</p>
<p>Any <u>packaging</u> of ecosystem services? Ecosystem services were not packaged.</p>	<p>Any problems with <u>leakage</u> or potentially <u>perverse impacts</u> on other ecosystem services This is difficult to establish. It might be that the reduction in dairy production in the Vittel catchment area led to an increase in intensification elsewhere.</p>
<p><u>Equity</u> implications Due to the variation among the farms, compensation was negotiated over several years as the proposed amounts were initially disputed. The final compensation levels agreed were high. Estimates indicate that in the first five years, subsidies were equivalent to 75% of farm disposable income. The 18 to 30 year contracts were important for adding security.</p>	<p>Arrangements for <u>monitoring and evaluation</u> Agrivair continues to monitor farming practices, the good use of new building facilities, and the livestock stocking rate. Nitrate rates are monitored all year round at 17 sites across four soil types and two types of farming systems.</p>
<p><u>Challenges, successes, lessons learnt</u> Successes: The Vittel case has achieved success by engaging with and understanding the ecosystem service providers, as well as undertaking scientific research and developing a technical solution to the problem. The acceptance of the idea of a mutually beneficial partnership was vital to achieving the scheme's objectives. Challenges: Despite scientific knowledge and active engagement, negotiations took ten years. This was primarily due to the heterogeneity in farming situations and difficulties in agreeing the amount of compensation. The intermediary was key in bringing buyers and sellers together, but it could not entirely resolve the distrust that remained on both sides, which complicated the valuation disputes, thus increasing transaction costs and delays. Lessons Learnt: This case illustrates the complexity relating to the interactions between technical, economic, social, legal, and political aspects of PES, and the importance of taking all facets into account when developing programmes. However, the case study also shows that imperfect knowledge does not limit the effectiveness of action and that perfect PES schemes can emerge under the right conditions.</p>	
<p><u>Future considerations</u> for the scheme The scheme is secure for the duration of the 18 to 30 year contracts. Furthermore, the farming practices were designed to be sustainable and provide a secure source of income, reducing the incentive to switch back to more intensive forms of agriculture.</p>	<p>Other comments / background For further information, see 'The Vittel payments for ecosystem services: a "perfect" PES case?' a report produced for IIED and DFID, 2006 available from: http://pubs.iied.org/G00388.html</p>

Best Practice Guide for PES – Wessex Water’s catchment management programme

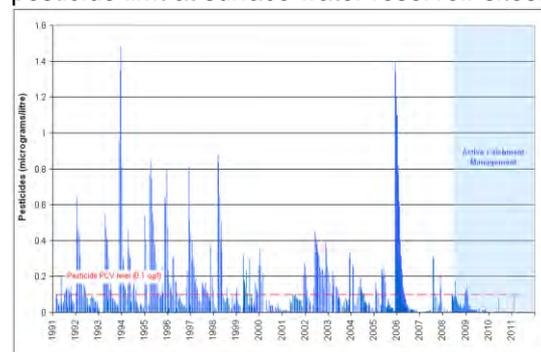
Case Study: Wessex Water catchment programme

Location: South West England



Before investment:

Prior to the catchment management initiative there were frequent exceedances of the pesticide limit at surface water reservoir sites.



After investment:

Active catchment management began in 2008, since then there have been only two occasions when the drinking water pesticide limit has been exceeded.

SUMMARY - what makes this case study distinctive?

This project was co-developed with the water service company Wessex Water and aims to invest in catchment management for the benefit of improved raw water quality. Wessex Water represents both buyer and broker. The 'knowledge provider' role is supported by intellectual capacity within Wessex Water and with external advice as required. The Wessex Water catchment team has developed an action plan for catchments serving Wessex Water abstraction points; predominantly groundwater but with some surface water points as a means to protect the quality of the resource and to mitigate the impacts of low flows in rivers. The legislative drivers for the scheme include Drinking Water Inspectorate standards, EU Directives (Water Framework Directive, Habitats Directive), BAP obligations, as well as commitments to becoming a sustainable water services company. The investment is principally funded by the water company but further agri-environment funding is also sought where appropriate.

Type of habitat / land use

80% of the water abstracted by Wessex Water is from groundwater. The quality of water infiltrating from farmland is critical natural capital for Wessex Water, which is keen to work with farm businesses to prevent cumulative pollution. Influencing riparian management can protect surface water intakes as well as mitigate low flows in rivers resulting from abstraction of groundwater. Land use across the Wessex Water area is diverse including arable farming, grazing, mining, and urban development.

Type of ecosystem service

The predominant ecosystem service being purchased is improved water quality (nitrates, phosphates, agrochemicals, and sediment). However, BAP and corporate commitments include impacts of changes in river flows, particularly baseflow in summer, which also influences dilution of sewage effluent. Related habitat and cultural improvements are also secured.

Type of provider / seller

The programme works with farmers in 15 specific catchments across the area. Relationships have been developed over the past 7 years by promoting best practice advice and aiding access to grant aid schemes. Measures include improved farming through intensive monitoring, advice, equipment calibration and financial support for winter cropping, improvements to slurry stores, and use of alternative chemicals (particularly where Metaldehyde is a problem).

Type of intermediary

Wessex Water keeps the catchment programme in house (as compared to Upstream Thinking which uses the services of a Rivers Trust). Actions promoted by Wessex Water seek to protect or improve water quality and/or quantity, and also recognise the potential to co-deliver broader ecosystem service benefits.

Type of buyer / financing source

Wessex Water invests income from its operations and the capital works programme (agreed via the periodic review). By gaining approval for catchment plans and associated works with OFWAT, preventative measures are identified on land that is not owned by the water company but which affects the core natural resource upon which the business depends.

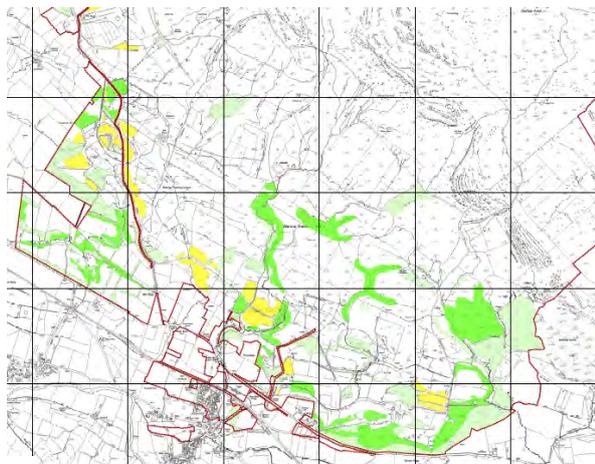
How the PES is coordinated & administrated

The PES is an investment by Wessex Water of advice and expertise, with some leveraging in of capital grants to benefit farms and the water company through resource protection.

<p>Who the beneficiaries are Farmers benefit directly from improved farming operations. The water company also benefits directly from better raw water quality and customers in turn benefit from water treatment costs averted. The wider community benefits indirectly from other improved ecosystem services (e.g. habitats, fisheries etc).</p>	<p>Type of contract and payment approach There is currently no payment based on actual raw water quality. Instead, the farmers benefit from data, monitoring, and advice provided by Wessex Water. Engagement is based on trust and mutual benefit, and payments are administered between the farmers and water company advisers.</p>
<p>Extent supply of ecosystem service was threatened Raw water quality was being threatened through diffuse agricultural pollution that fell outside of the regulatory framework. The level of threat was summarised by the Drinking Water Inspectorate concerns, Water Framework Directive status, and Wessex Water's commitments to the BAP.</p>	<p>Degree of additionality involved Difficult to prove but likely to be reasonably high. Wessex Water ensures that works improve raw water quality through an extensive monitoring programme. Embedded and operational carbon emissions are reduced through avoided additional treatment. Benefits such as improvements to soil, river water quality and biodiversity are captured anecdotally.</p>
<p>Any packaging of ecosystem services? The project was developed as a PES scheme to provide a single service from multiple sellers. However, Wessex Water recognise a leverage effect, delivering multiple services to many wider constituencies. Potential buyers of these additional services are currently 'free riders', but there is scope to develop further markets 'stacked' onto the main purpose of the catchment scheme.</p>	<p>Any problems with leakage or potentially perverse impacts on other ecosystem services? The main perverse impacts are potential reductions in the productivity of better-managed farmed land, and potential intensification of farming practices away from the subsidised/advised area.</p>
<p>Equity implications There are equity implications within the project as farmers with good farming systems, that have updated facilities and infrastructure over past years, are less of a priority and tend not to need the same level of support. However, all farmers in priority catchments are encouraged to use the data provided and attend best practice events.</p>	<p>Arrangements for monitoring and evaluation A key input from Wessex Water to the project is the provision of data demonstrating the relationship between groundwater contamination and land management. This helps to pin point at a field scale where the problems are, enabling the company to engage with the land manager to discuss potential improvements which can be made. Data is collected for analysis and feedback to farmers, using sampling points located around the catchment (including soil testing, groundwater monitoring and nitrate sampling).</p>
<p>Challenges, successes, lessons learnt Challenges: One challenge for the project was developing a new way of working between a private company and the many farm businesses with which the water supply (and quality) is intimately connected. This goes beyond the traditional behaviour of a private, profit-taking company, though clearly protection of core natural resources makes business sense. Alongside this challenge, an understanding that the grants are voluntary and are in competition with other less rigorous grant schemes as well as the driver to produce 'cheap food'. Another challenge to the project was working with tenant farmers where the landowner did not perceive there to be a need for investment. Successes: There is evidence that groundwater quality has improved since active catchment management began, with fewer pesticide exceedences and stabilisation of rising nitrate levels. There are now many examples of long-term improved farming operations in place that are additional to what is legally required by the farmer. Lessons learnt: The relationships between the buyer, intermediary and seller are key, and require an understanding of the legal, ethical and social backgrounds to each to allow sympathetic development of a scheme.</p>	
<p>Future considerations for the scheme A possible route into future packaging of ecosystem services might be to develop synergies with parallel schemes such as the Natural England Catchment Sensitive Farming (CSF) Grant Scheme or the Forestry Commission Woodland Grant Scheme.</p>	<p>Other comments / background The Wessex Water catchment programme takes leadership by looking at the whole water cycle and those impacting it, looking to intervene in the system in the most sustainable way rather than merely cleaning up pollution at the abstraction point.</p>
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Best Practice Guide for PES case studies – Woodland Carbon Code

Case Study: Woodland Carbon Code – Forestry Commission
Location: Warcop Training Area, Eden Valley, Cumbria



Before Investment

Before the intervention, the MOD was unable to create new woodlands for training purposes.



After Investment

New woodland provides training areas; increases habitat for black grouse; delivers net emissions reductions; and allows retail companies to report GHG emission removal.

SUMMARY - what makes this case study distinctive?

The Woodland Carbon Code (WCC) provides standards for the creation of woodland with the aim of removing atmospheric carbon dioxide (CO₂). The WCC operates in the UK voluntary carbon market, where it seeks to bolster market confidence in forest carbon projects, thereby increasing private investment in forest creation. By the end of 2012, a total of 89 projects, covering 3,011 hectares, had been registered under the WCC and it is estimated that these will sequester around 1.4 million tonnes of CO₂ over their lifetime. One such project is the Warcop Training Area (WTA) pilot scheme. This has been co-developed by the Ministry of Defence (MOD), who wished to develop new woodlands on its training areas; the Woodland Trust, who have knowledge of woodland creation and management; and retail companies wishing to mitigate for unavoidable greenhouse gas emissions through payments for carbon sequestration. The sale of sequestered carbon as a result of woodland creation and a significant contribution from the North Pennines AONB allowed the project to be 100% funded from sources not traditionally associated with woodland creation.

Type of habitat / land use

The project is located on the MOD owned Warcop Training Area, in the Eden Valley, Cumbria. A limestone escarpment splits the 9,550 ha site. Grass moorland and blanket bog cover the plateau above, whilst a more wooded area forms the landscape below. Warcop includes many conservation designations. Almost the entire training area lies within the North Pennines Area of Outstanding Natural Beauty (AONB). Other areas within the site have Site of Special Scientific Interest (SSSI) or Special Area of Conservation (SAC) status.

Type of ecosystem service

The main service purchased by the retail companies is sequestered carbon. The North Pennines AONB contributes to the project in order to see improvements made to Black Grouse habitat.

Type of provider / seller

The MOD has a long term objective to diversify the terrain available in its training areas. However, it was unable to secure the funding necessary to diversify the terrain before this opportunity to partner with the Woodland Trust became available. The MOD will retain ownership of the land on which the woodlands are created, but for the first 11 years they will be managed by the WT.

Type of intermediary

The Woodland Trust (WT) is a charity which wishes to see the extent of native tree cover in the UK doubled. In the case of Warcop, WT aims to increase native tree cover whilst generating the outcomes desired by the buyers and seller.

Type of buyer / financing source

The buyers are retail companies who wish to report carbon reduction actions taken in their greenhouse gas emissions statements and the North Pennines AONB wishing to support the extension of a specific habitat type.

How PES is coordinated & administrated

The Woodland Trust administers the project in partnership with the MOD DIO. Land management agreements are signed by the MOD and WT. The WT administers any funding from the sale of carbon to retail companies, or from the AONB.

<p>Who the beneficiaries are Direct beneficiaries include the MOD, which gains more diverse training grounds for troops; the North Pennines AONB, who gain black grouse habitat; and the WT, who benefit through movement towards native woodland targets. Indirect beneficiaries include the retail companies, who are able to include the CO₂ emissions savings over time when reporting their net GHG emissions and boost their 'brand image'. Also, local communities benefit through wider access to the countryside.</p>	<p>Type of contract and payment approach Based on ex-ante payment for predicted carbon sequestration over project lifetime. Also provision of enhanced habitat for Black Grouse. Longevity is ensured through the contracts. An 11 year management agreement with the MOD and the Forestry Act require woodlands to be restocked if felled.</p>
<p>Extent to which supply of ecosystem services is threatened Native woodland cover in the UK is below that of its European neighbours, and in the WTA area it was below the national average. The distribution of black grouse range has contracted 28% since the 1970s and population numbers have declined rapidly. This is linked to more intensive grazing and upland pasture improvement. If grazing had continued at previous levels in the WTA this habitat would have been lost.</p>	<p>Degree of <u>additionality</u> involved The woodland creation project on WTA relied entirely on the finance marshalled and brought into the project by the Woodland Trust. No woodland creation grant aid was paid to this project by the Forestry Commission; it is therefore 100% additional activity.</p>
<p>Any <u>packaging</u> of ecosystem services? The project layers woodland creation outputs associated with greenhouse gas benefits and improved black grouse habitat, together with many buyers receiving and paying for these benefits. Associated benefits of creating woodland e.g. flood management, potential wood and timber resources, and soil stabilisation are piggybacked within this project.</p>	<p>Any problems with <u>leakage</u> or potentially <u>perverse impacts</u> on other ecosystem services There is no issue of leakage from this project area to another area. The main perverse impact is potentially through reducing farmable land area and reduction of acid grass and moorland habitat.</p>
<p>Equity implications There are no specific equity implications within this project. The Woodland Carbon Code is a voluntary code to encourage woodland creation for carbon sequestration. Any landowner who wishes to contribute to climate change mitigation can undertake to manage their woodland according to the code.</p>	<p>Arrangements for <u>monitoring and evaluation</u> The project will be monitored by the WT and the MOD in the short and long term respectively. Carbon uptake will be measured using the carbon assessment protocol specified in the WCC Project Design Document and through 5-yearly verification.</p>
<p><u>Challenges, successes, lessons learnt</u> Successes: The project will be totally funded by payments for carbon sequestration and black grouse habitat improvements. An estimated 68,750 tCO₂e will be captured during the project. The WT has developed a suite of legal documents that can be used on other woodland carbon projects on land over which they do not have direct control. Challenges: Developing a new way of working between a central government department and a private charity was a challenge. This being the WT's first woodland carbon project, new contracts had to be drawn up for the delivery of carbon on land it did not own. Ensuring the longevity of woodland in a training zone will be an ongoing challenge. Lessons learnt: As part of the national WCC pilot programme, the WT project has demonstrated to the MOD an alternative way of funding woodland creation on their estates. It will be the precursor to further woodland creation projects across the UK on MOD owned land.</p>	
<p>Future considerations for the scheme The project at WTA is one of 12 WCC pilot projects. The FC is currently developing a group scheme to encourage wider participation in WCC, in particular to allow smaller schemes to group together to overcome certification costs. Further measures are being examined to encourage the forest carbon market in the UK, including the use of a carbon registry to improve information and transparency.</p>	<p>Other comments / background Carbon sequestration resulting from projects certified to the Code can be reported by companies under the Government's GHG Reporting Guidelines against their net emissions. However, the Code does not provide a route to compliance with regulatory carbon 'offsetting' schemes (e.g. the Carbon Reduction Scheme or EU Emissions Trading Scheme); or the generation of internationally tradable carbon credits linked to either the compliance or voluntary markets.</p>
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