

# Environment and Sustainability Committee

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Meeting Venue:

**Committee Room 2 – Senedd**

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Meeting date:

**Thursday, 5 June 2014**

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Meeting time:

**09.20**

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Cynulliad  
Cenedlaethol  
Cymru

National  
Assembly for  
Wales



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## Agenda

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**Informal pre-meeting (09:20 – 09:30)**

### **1 Introductions, apologies and substitutions**

### **2 Inquiry into the public forestry estate in Wales (09:30 – 10:30) (Pages 1 – 49)**

E&S(4)-14-14 paper 1 : Maelor Forest Nurseries

E&S(4)-14-14 paper 2 : UPM Tilhill

E&S(4)-14-14 paper 3 : BSW Timber

E&S(4)-14-14 paper 4 : Confor

Mike Harvey, Director, Maelor Forest Nurseries

Peter Whitfield, UPM Tilhill

Gavin Adkins, Purchasing Director, BSW Timber

Martin Bishop, National Manager for Wales, Confor

**Break (10:30 – 10:40)**

**3 Inquiry into the public forestry estate in Wales (10:40 – 11:40) (Pages 50 – 80)**

E&S(4)-14-14 paper 5 : Coed Cadw, The Woodland Trust

E&S(4)-14-14 paper 6 : CLA

E&S(4)-14-14 paper 7 : Woodland Strategy Advisory Panel

Rory Francis, Communications Officer, Coed Cadw, The Woodland Trust

Andrew Bronwin, CLA

David Edwards, Woodland Strategy Advisory Panel

**4 Motion under Standing Order 17.42 to resolve to exclude the public from the meeting for item 5 (11:40)**

**Private session**

**5 Consideration of issues for scrutiny of the Minister for Natural Resources and Food (11:40 – 12:10)**

**Break (12:10 – 13:15)**

**Public session**

**6 Inquiry into the public forestry estate in Wales – Evidence from Natural Resources Wales (13:15 – 14:15) (Pages 81 – 106)**

E&S(4)-14-14 : paper 8

Ceri Davies, Executive Director for Knowledge, Strategy and Planning

Trefor Owen, Executive Director for National Services

**7 Papers to note**

**Biodiversity – Paper from State of Nature partners (Pages 107 – 112)**

E&S(4)-14-14 : paper 9

**Natural Resources Wales – Further information following 7 May meeting (Pages 113 – 118)**

E&S(4)-14-14 paper 10

**Inquiry into the Welsh Government’s proposals for the M4 around Newport : Letter from the European Commission – Strategic Environmental Assessment Directive (Pages 119 – 122)**

E&S(4)-14-14 : paper 11

# Agenda Item 2

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**Maelor Forest Nurseries Limited**

**Submission of evidence to the National Assembly for Wales' Environmental and Sustainability Committee's inquiry into the Public Forest Estate in Wales.**

1. Maelor Forest Nurseries Limited is an independent company located in Wales just south of Wrexham. The nursery's output of planting stock (saplings) for the current season is expected to exceed 22 million. The nursery employs approximately 110 FTE's (full time equivalent) personnel. The nursery is involved in joint projects with universities in Wales and Forest Research as well as with forest research institutions overseas.

**The commercial operations and focus of the NRW**

2. Within our own sector of the industry we have been unable to discover NRW's procurement procedures i.e. for the purchase of planting stock. We have been informally advised that there is a "3 year rolling" supply contract with the nurseries in England and Scotland owned by FCGB. If this is the case then it would be very difficult for us to offer NRW a competitive alternative; unless we too were offered the opportunity of a similar contract.
3. We are concerned at the depletion of timber reserves in Wales and the long term adverse effect this will have on the economy and employment in Wales. The Woodland for Wales Indicators 2012-13 state that there has been a decrease in productive forest area in Wales of 17,000 hectares since 2001. We would estimate, based on a 40 year rotation, that this represents an annual loss of timber production from the Welsh economy of 150,000 tonnes pa. equating to approximately 25% of NRW's current annual production. We believe that the majority of this lost timber resource is on the WG estate.
4. The NRW has been actively pursuing the planting of "alternative species" in restocking at a significant level. We are concerned that a lot of this material has not been tested for suitability as a commercial crop e.g. correct provenances for current and predicted climatic and environmental conditions, suitability for use as timber, resistance to disease and pests and etc. Just planting alternative species does not necessarily increase resilience of the forest and may in fact reduce it.

**Delivery of business advice and support to the forestry sector in Wales**

5. With the FCW there was a clear remit from WG, included within that remit was the responsibility for delivering the WG's forestry policy. We are unclear what the remit is from WG to NRW in this regard.
6. We believe the NRW should be an "exemplar" of best practice (this was traditionally the case with the Forestry Commission whose original remit was to support the forest industry); however there is little engagement with the private sector by NRW on silviculture matters.

7. We are disturbed to hear there has been the creation of an “Enforcement Committee” within NRW to (amongst other duties) issue proceedings for illegal fellings. Does that mean NRW’s will now have a “key performance indicator” for the number of illegal felling prosecutions? How can this possibly be justified as being in the public interest, given that there were only one referral for prosecution in the 2 years from 2011 to 2013? This becomes even more concerning when we are informed that the NRW does not impose such regulatory control over its own operations.
8. Our customers have made us aware of onerous and foolish NRW imposed conditions on felling licence applications. One particular example is a requirement on species choice. Apparently a condition on restocking (as part of the conditions of the felling licence) is that at least 10% should be with unproductive native broadleaves; rather than the condition imposing the sensible requirement that the forest as a whole should be 10% of native broadleaves. As it is usually only productive conifer areas that are felled, then clearly over time such a requirement would totally remove the productive element of the forest!
9. In a paper entitled “How Cost-Effective Is Forestry for Climate Change Mitigation”(published in “Challenges and Opportunities for the World’s Forests in the 21<sup>st</sup> Century”,2014) Valatin and Price make the point that unless action is taken immediately (using afforestation as a cost effective means of carbon sequestration and substitution) for the international target of limiting temperature increases due to anthropogenic causes to 2 degrees C cannot be met; furthermore that with temperate forests many years will elapse before carbon sequestration rates are maximised. Therefore from an environmental perspective one would hope that NRW would not only maintain its productive resource of timber but seek to increase it and to encourage the private sector to do like-wise. Given that this is in fact WG policy, why is it not the case?
10. Not to have a none-executive forestry expert on the main board of NRW to hold the executives to account on forestry matters is a serious omission. In terms of NRW’s overall budget forestry may be a minor part, but in terms of the environment in Wales and in terms of minimising Wales’ ecological foot print forestry is hugely important.
11. The “Eskadalemuir Report” (Appendix1) produced by Scottish Agricultural Colleges for Confor, identifies the huge benefits to the upland economy by changing land-use from sheep farming to forestry. The “bullet points” of the report include:-
  - Forestry produces three times the economic output of farming before subsidy
  - Forestry’s spending in the local economy is double that of farming
  - Forestry supports the same number of jobs as farming

- Hill sheep farming requires a direct payment subsidy ( $\approx 60\%$  of output before subsidy) to survive, whilst forestry currently receives a small ( $\approx 3\%$  of output) grant contribution towards environmental and forest improvement.

NRW should consider producing a similar report in Wales to promote forestry in the uplands if in fact delivering WG forestry policy is within its remit.

**Progress made by NRW to deliver the recommendations of the Wales Audit Office.**

We have no comment.

## **Eskdalemuir**

A comparison of forestry  
and hill farming; productivity  
and economic impact

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# Executive Summary

## Comparisons

- **This study makes a specific economic comparison between an established productive conifer forest at Eskdalemuir and agriculture on an equivalent area of land. These findings may not necessarily apply to other situations and regions of Scotland.**
- The forest of Eskdalemuir covers 20,000ha of former hill sheep grazing land in the south of Scotland. This study sets out to compare the output and employment achieved on this land as it is now, in forestry, compared to the output of an equivalent area of land remaining in hill sheep farming today.

## Productivity

- **Forestry produces three times the economic output of farming before subsidy**
- **Forestry's spending in the local economy is double that of farming**
- **Forestry trades at a significant surplus, farming at a loss, before subsidy**
- The results of the study indicate that once in a sustainable production cycle, forestry generates around three times the economic output of hill sheep farming before subsidy payment. Forestry also results in almost double the level of spending in the local economy as agriculture.

## Employment

- **Forestry supports the same number of jobs as farming**
- Forestry at Eskdalemuir is currently generating 11% more direct employment and 30% more total employment (direct and indirect) than agricultural use (on an equivalent land area). These results reflect the higher physical and financial output of the forestry activity at present.
- Future modelling shows that timber output and restocking activity will drop to a lower but more sustainable long term level as the forest approaches a 'normalised' 40 year rotation. Employment will also drop to the same level as agricultural use.

## Public subsidy

- **Farming requires a public subsidy of £22,600 per FTE to survive – Forestry receives a modest contribution (one sixth that of farming) towards the provision of public benefits**
- Hill sheep farming requires a direct payment subsidy at ~60% of output before subsidy to survive, whilst forestry currently receives a small (~3% of output) grant contribution towards environmental and forest improvement.
- Once established forestry is also much less dependent on annual subsidy payments to maintain viability. Forestry generates a significant trading surplus before subsidy whilst hill farming trades at a loss.

**Table 1: Estimated costs and returns for different land uses on 20,000ha of land at Eskdalemuir.**

	Forestry - normalised 40yr rotation			Agriculture – specialised sheep SDA		
	£ Total	£ per ha	£ per employee	£ Total	£ per ha	£ per employee
Output	10,073,795	503.69	122,047	3,085,305	154.27	37,110
Less Input costs	7,000,220	350.01	84,810	3,523,651	176.18	42,382
Surplus or (deficit)	<b>3,073,575</b>	<b>153.68</b>	<b>37,237</b>	<b>(438,346)</b>	<b>(21.92)</b>	<b>(5,272)</b>
Grants and subsidies	315,134	15.76	3,918	1,882,001	94.10	22,637

Source: SAC Consulting

# 1.0 Introduction and Objectives

## 1.1 Introduction

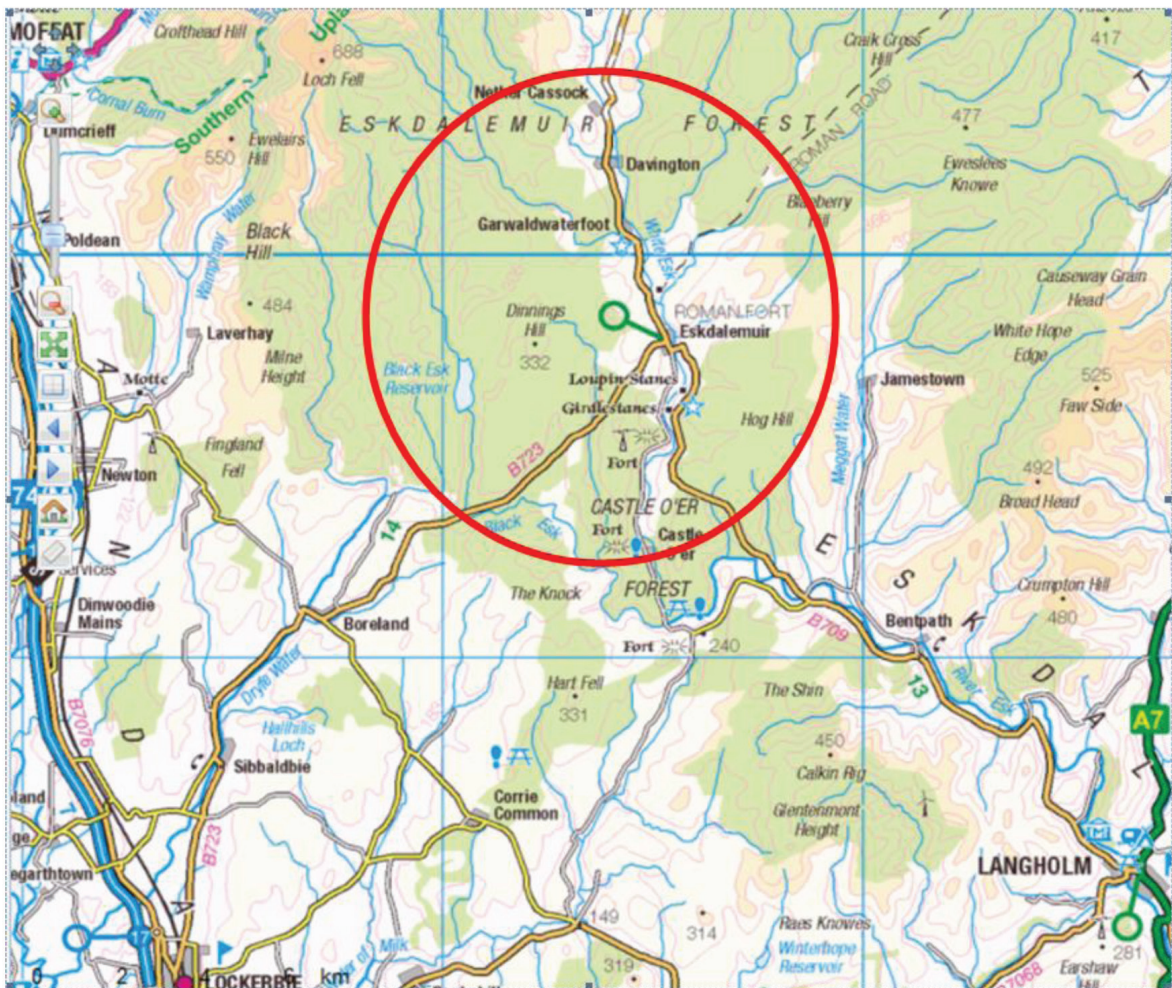
SAC Consulting has been commissioned by Confor to undertake a study comparing the economic and employment effects of different land uses on hill land in the Eskdalemuir area to the north east of Lockerbie in south west Scotland.

Agricultural data on income, subsidy payments and input costs has been obtained from the annual Scottish Government Farm Accounts Scheme for the South of Scotland area based on the Specialist Sheep SDA farm type.

Forestry data on timber sales and prices, management costs and grant income has been obtained from a survey of forest managers at Eskdalemuir.

The forestry figures have then been used to develop a longer run modelling exercise for the 20,000 ha of private forestry at Eskdalemuir. This analysis estimates average annual economic and employment effects over the 40 year forestry production cycle to compare with agricultural production.

Figure 1: Location of Eskdalemuir study area



Source: Ordnance Survey under licence

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## 1.2 Objectives

1

Identify approximate current (2011 and 2012) annual production from forestry, value at forest gate, value delivered to market, and amount of public subsidy.

3

Provide an easily read comparison of financial and employment outputs from forestry and farming use of the area – i.e. how many jobs is forestry supporting at Eskdalemuir now, and how does this figure compare with how many jobs the same land would support if under agriculture?

5

Assuming farming had continued today at Eskdalemuir over the full 20,000 ha area, identify at today's prices, similar agricultural production and values to (1) and (2) above.

2

Identify approximate current (2011 and 2012) number of jobs in forestry and delivered to market – covering establishment, ongoing management, deer & pest control, harvesting and haulage.

4

Provide a comparison of how much public money went into forestry at Eskdalemuir last year, compared with what would have been paid in agricultural subsidies.



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# 2.0 Forestry survey and model

## 2.1 Forest survey

The area of private forestry in Eskdalemuir is estimated at around 20,000ha following establishment in the 1970s and 1980s. The area is split into a number of separately owned forests and managed by a number of different forest management companies.

In order to determine current management activity, financial performance and employment effects SAC Consulting prepared a survey and with the assistance of Confor staff sent it to all known forest managers of the constituent forests in the area.

The response from forest managers at Eskdalemuir was extremely good, with all nine managers representing 100% of the forest area responding.

Survey results were then compiled to provide representative figures for the forest as a whole. The key data determined for use in the following forestry model were as follows;

- Average timber yield in tonnes per ha at felling
- Average timber prices in £ per tonne standing and delivered to processor
- Average costs of forest operations in £ per ha including;
  - Restocking
  - Establishment
  - Harvesting
  - Haulage
  - Pest control
  - Management and professional fees
- Average employment levels by activity

## 2.2 Forest modelling assumptions

As a relatively young forest, established over a period of a decade or so, the production profile of the forest at Eskdalemuir has yet to reach a steady state. Currently the harvested area and timber output is at a relatively high level and this will continue for 5 to 10 years before dropping back again for another decade or so while younger restocked forests mature. Within 20 years it is expected the forest will move close to a more stable long term production profile.

In order to present figures more representative of the forest in the medium to longer term, a model has been developed. The assumptions behind this model are as follows;

### Productive forest area

- When established the total forest area of 20,000ha would have comprised 10% bare land and 90% (18,000ha) productive conifer forest. This would have been compliant with the UKFS<sup>1</sup> of the day and the majority of the crops being harvested would be certified under FSC<sup>2</sup>. In future a smaller proportion will be established as productive conifer under today's UKFS. However, total timber volumes produced in the future from the productive conifer crop may not decrease significantly due to the use of significantly improved genetic planting stock, the benefits of localised shelter arising from a more diverse forest structure and improved silvicultural techniques. The forest will also give additional public value for biodiversity, water protection and recreation.

<sup>1</sup> UK Forest Standard

<sup>2</sup> Forest Stewardship Council

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## Timber output

- The forest at Eskdalemuir was mainly established over a relatively short period of around 10 years in the 1970s and early 1980s. The productive lifespan of commercial conifers in the area is typically around 40 years with a range between 30 and 50 years depending on the site. Currently much of the forest is at, or approaching, maturity and felling volumes are elevated as a result. Timber production will be maintained at this level for most of the next decade before levelling out into a more consistent annual felling pattern.
- The average rotation length achieved of 40 years will then result in felling of 1/40th of the productive forest per year which equates to 450 ha per year
- This area of felling will yield an annual timber crop of 435t per ha (the average from the survey) giving a total timber output across the 450ha felled of 195,722t
- The average timber price achieved for this will be the same as averaged from the survey of £27.54/t standing and £51.47/t delivered processor.
- The annual value of timber sales will therefore equate to £5.39m at the forest gate and £10.07m delivered to the processor.

## Subsidy income

- It is assumed that public subsidy to the forest will continue at the same rate per ha as obtained from the survey of £15.76 per ha of total forest estate (including bare land) to give a total annual subsidy income across the 20,000ha of £315,134 pa.
- Subsidy to the forest takes the form of a contribution towards the public benefit of restructuring the forest, whereby at considerable cost to the forest owner, uneven ages of crop are created, with more diverse tree species, and open ground is left for wildlife and biodiversity

## Input costs

- It is assumed that the costs of forest operations will continue at the same rate per ha as obtained from the survey as detailed below. Average costs of forest operations in £ per ha including;
  - Restocking on 450 ha - £1,819 per ha – total cost £0.819m pa
  - Establishment on 1,350 ha (3yrs) - £170.76 per ha – total cost £231k pa
  - Deer and pest control on 20,000 ha - £5.05 per ha – total cost £101k pa
  - Harvesting on 450 ha - £5,971 per ha – total cost £2.686m pa
  - Haulage on 450 ha - £4,443 per ha – total cost £1,999 m pa
  - Roading on 20,000 ha - £21.56 per ha – total cost £431k pa
  - Management and professional fees on 20,000 ha - £17.57 per ha – total cost £351k pa
- Out with the survey of forest managers, additional costs have been added to reflect the notional land rental costs for land at Eskdalemuir. While forestry land is seldom if ever rented, the farming input costs include a cost for rent and borrowings and accordingly for better comparison this notional cost is included against forestry. The figure used has been taken from Scottish Government survey results; Tenanted Agricultural land in Scotland 2012, where the 2011 average rent paid for LFA land was £19 per hectare.

Full details of the results are contained in the following section.

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## 2.0 Forestry survey and model

### 2.3 Forest modelling results

**Table 2: Eskdalemuir timber output**

Year	Felled (ha)	Yield (t/ha)	Quantity (t)
A) 2011	641	450.88	279,524
B) 2012	690	18.99	288,979
C) Annual normalised 40 yr rotation	450	434.94	195,722

**Table 3: Eskdalemuir timber sales and revenue**

Year	Timber price basis	Value (£)	Price (£/t)
A) 2011	Standing	7,756,800	27.75
	Delivered processor	14,465,384	51.75
B) 2012	Standing	7,897,799	27.33
	Delivered processor	14,795,729	51.20
C) Annual normalised 40 yr. rotation	Standing	5,390,175	27.54
	Delivered processor	10,073,795	51.47

**Table 4: Eskdalemuir grant income**

Year	Total (£)	Total (£/ha)
A) 2011	239,945	12.64
B) 2012	374,190	18.71
C) Annual normalised 40 yr. rotation	315,134	15.76

Source: SAC Consulting survey of forest managers

**Table 5 – Eskdalemuir forestry expenditure**

Forest operation	A) 2011	B) 2012	C) Annual normalised 40 year rotation
Restocking	1,093,516	1,000,658	818,605
Establishment	202,621	302,252	231,873
Deer and pest control	96,751	100,184	101,054
Harvesting	3,959,956	3,974,426	2,686,746
Haulage	2,978,069	2,924,139	1,999,413
Roading	379,042	461,139	431,126
Management & professional	328,036	356,780	351,403
Notional land rental*			380,000
<b>TOTAL</b>	<b>9,037,991</b>	<b>9,119,578</b>	<b>7,000,220</b>

Source: SAC Consulting survey of forest managers, except \* calculated by SAC Consulting using average rental values from the Scottish Government survey Tenanted Agricultural Land in Scotland, 2012 See Appendix 1 for full details.

## 2.4 Additional costs financing restocking and establishment

The costs and returns detailed in the previous pages do not account for the opportunity cost of forest planting and establishment which must be made up to 40 years in advance of the main income stream from final felling.

In the past the cost of financing the planting of forests at Eskdalemuir was met by a combination of government grants, tax incentives and private capital. Looking ahead to the next 40 years, the cost of restocking of commercial forest areas must now be met by private capital. This carries a financing cost which has been calculated in the following way.

The annual cost of financing restocking and establishment has been calculated on a capital and interest repayments basis over the period; 40 years for restocking and 38 years (for establishment). The interest rate has been taken as the average of the Bank of England base rate over the last 10 years to December 2013 which equals 2.65%. The results are shown in Table 6 which reveals an annual financing cost of £657,798. This cost could be met from the annual surplus expected to be generated by the forestry activity of £3.453m (before subsidy). Alternatively this cost may be met separately by the private forest owners who may benefit from tax benefits on their forest investment.

**Table 6 – financing costs**

Activity	Expenditure (£)	Interest rate (%)	Term of loan (yrs.)	Total Interest cost (£)
Restocking	816,604	2.65	40	518,964
Establishment	231,876	2.65	38	138,834
<b>Total</b>				<b>657,798</b>

Source: SAC Consulting and Bank of England

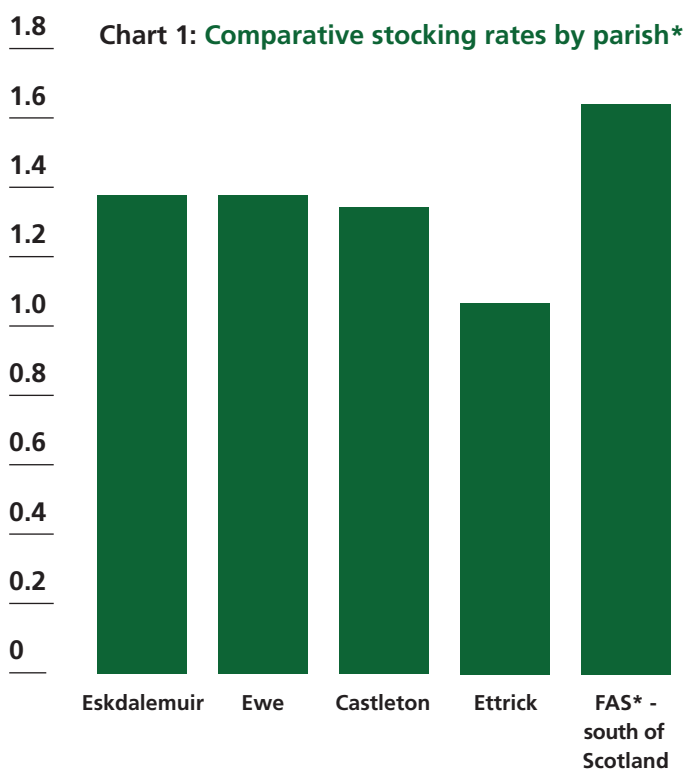
# 3.0 Agricultural output estimates

## 3.1 Farm Accounts Survey background

Physical and financial data for hill farming relevant to the Eskdalemuir area for this study was drawn upon the Scottish Government's annual Farm Accounts Survey (FAS) for Scotland. Annual data collection for the FAS is carried out by Scotland's Rural College (SRUC) on behalf of the Scottish Government (SG). Currently, around 500 fully-reconciled farm accounts are compiled each year, from information supplied by co-operating farmers. Data collected includes financial, economic and some physical information on outputs, inputs, income and balance sheets. The physical data was used to classify the farm according to its type and size. Full details of the survey methodology are given on the Scottish Government's web site<sup>3</sup>.

## 3.2 Farm data used in the study

For the purposes of this study, the most appropriate farm type within the FAS representative of farming in the Eskdalemuir and surrounding hill parishes is the Specialised Sheep SDA. FAS data is collated both nationally and by region. For this study data has been selected from farms in the south of Scotland only (Scottish Borders and Dumfries and Galloway) from the financial year 2010/11.



Source: Scottish Government June Census and Farm Accounts Scheme. Note – \* for specialised sheep SDA farms

<sup>3</sup> <http://www.scotland.gov.uk/Topics/Statistics/Browse/Agriculture-Fisheries/Publications/FASmethod/FASmethod2012>

This data was obtained from a total of 15 farms from across the region which averaged 445ha in size (further details of farm and enterprise physical parameters are given in Appendices 2 and 3). The average labour requirement was 1.2 Full Time Equivalents per farm. Average stocking per farm comprised 736 ewes, 8 suckler cows and 18 other cattle. Average ewe stocking rates were 1.65 ewe per ha from the survey which is considerably higher than the stocking rates seen in the remaining sheep farms in Eskdalemuir and surrounding parishes (Table 6 below). This suggests that the physical and financial performance of agriculture in Eskdalemuir is lower than the average seen across upland units in the south of Scotland.

The financial results from these farms have then been extrapolated to represent the impact of this type of farming on an area of hill land equivalent to the 20,000ha at Eskdalemuir. These results are displayed in Table 7.

### 3.3 Results

**Table 7 – agricultural financial output – specialised sheep (SDA)  
Hill area equivalent to Eskdalemuir 2011/12**

<b>FINANCIAL OUTPUT</b>	<b>£</b>
Total Crops	23,822
Cattle	318,387
Sheep	2,300,120
Other income	-7,666
Non farm income	450,642
<b>Total Output</b>	<b>3,085,305</b>
<b>Total Inputs</b>	<b>3,523,651</b>
<b>Trading surplus (deficit)</b>	<b>(438,346)</b>
<b>Total Grants &amp; Subsidies</b>	<b>1,882,001</b>
Of which:	
LFASS	416,007
Single Farm Payment	1,400,952
Other(£)	65,042
<b>FARM BUSINESS INCOME Published</b>	<b>1,494,732</b>

*Source: Scottish Government Farm Accounts Scheme – South of Scotland data set (Scottish Borders and Dumfries and Galloway)*

# 4.0 Comparison of forestry and agriculture

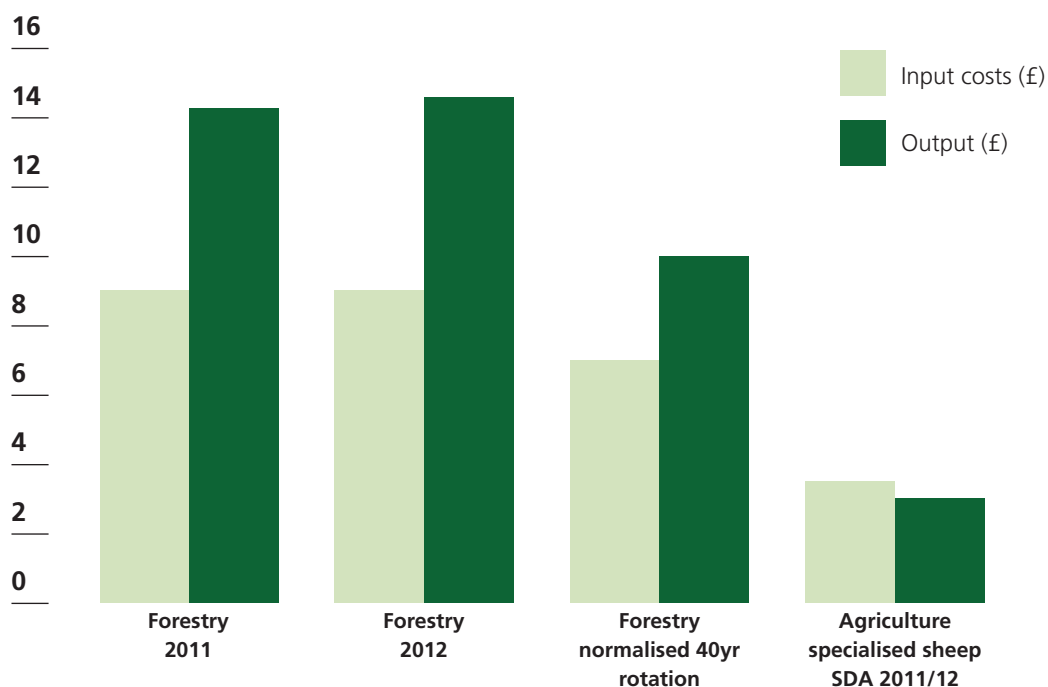
Financial results from the survey of forest managers at Eskdalemuir were then compared with those produced by hill sheep farms as recorded in the Farm Accounts Scheme for the south of Scotland (see chart 2 below).

These results indicate that in 2012 forestry generated output before subsidy of £14.8m which is four and a half times that generated by agriculture of £3.0m in 2011/12. In the future, once timber output settles at a lower and more consistent normalised rotation, forestry is expected to generate just over three times the economic output of hill sheep farming before subsidy payments.

Forestry also currently generates £9m of spending in the local economy; almost three times that of agriculture. Forestry spending will in future settle down under a normalised 40 year rotation at around double that of agriculture.

*For full results see Appendix 4.*

**Chart 2 – Equivalent financial input and output of agriculture and forestry at Eskdalemuir (£m)**



Source: SAC Consulting survey of forest managers and Scottish Government Farm Accounts Scheme for the south of Scotland

# 5.0 Employment

## 5.1 Outline of the employment effects

Estimates of direct employment were obtained from surveys of farming and forestry activities on an area of hill land comparable to that at Eskdalemuir. From this estimates have been generated of the wider employment impacts of the two sectors on the land itself as well as indirectly in the local economy.

## 5.2 Methodology

### Direct employment

Estimates of direct employment in forestry at Eskdalemuir were obtained from the survey of forest managers and broken down by forest activity (restocking, establishment, harvesting etc.).

Estimates of direct employment in agriculture on an area of hill land equivalent to Eskdalemuir were obtained from the Farm Accounts Scheme 2011/12. This survey details the level of direct employment per farm which was aggregated up to represent at area of 20,000ha.

### Indirect employment

Employment multipliers were used to extrapolate the employment effects on the wider economy. These multipliers

give an estimate of how many indirect jobs are generated by the creation of each direct job by sector. Relevant employment multipliers for each sector and activity were taken from the latest Scottish Input-Output tables<sup>4</sup> (Type I). The full details are given in Appendix 5.

## 5.3 Results

This analysis illustrates that forestry (Scenario A) is currently generating 11% more direct employment and 30% more total employment (direct and indirect) than agricultural use (Scenario C) on an equivalent land area. These results reflect the higher physical and financial output of the forestry activity at present given the elevated timber felling and restocking activity occurring at this stage in the life cycle of the forest.

In the future, timber output and restocking activity will drop to lower but more sustainable long term level as the forest approaches a 'normalised' 40 year rotation (Scenario B). Employment will also drop to the same level as that achieved by agricultural land use on an equivalent land area. Forestry employment will be sustainable at a much lower level of public subsidy per employee estimated to be £3,818 per FTE for forestry compared to £22,637 for agriculture.

**Table 8 – Summary of employment effects of land use at Eskdalemuir**

Activity	Area (ha) of activity per FTE	Area (ha) of activity	Direct employment (FTE)	Direct and indirect employment (FTE)
<b>FORESTRY</b>				
(A) Eskdalemuir - average 2011 and 2012	184	20,000	61.79	108.72
(B) Eskdalemuir - normalised 40 yr. rotation	242	20,000	47.37	82.54
<b>AGRICULTURE</b>				
(C) Farm Account Scheme 2011/12 data for Specialised sheep farming	241	20,000	55.43	83.14

Source: SAC Consulting survey of forest managers, employment multipliers from Scottish Government Input-Output tables latest 2009  
<sup>4</sup> [www.scotland.gov.uk/Topics/Statistics/Browse/Economy/Input-Output/Downloads/IO1998-2009latest](http://www.scotland.gov.uk/Topics/Statistics/Browse/Economy/Input-Output/Downloads/IO1998-2009latest)



# Appendix 1: Eskdalemuir forestry expenditure

YEAR	FOREST OPERATION	TOTAL COST (£)	AREA (HA)	COST (£/HA)	COST £/T
<b>A) 2011</b>	Restocking	1,093,516	552	1,980.36	
	Establishment	202,621	1,022	198.33	
	Deer and pest control	96,751	18,980	5.1	
	Harvesting	3,959,956	641	6,179	13.7
	Haulage	2,978,069	641	4,647	10.31
	Roading	379,042	18,980	19.97	
	Management & professional	328,036	18,980	17.28	
<b>TOTAL</b>		<b>9,037,991</b>			
<b>B) 2012</b>	Restocking	1,000,658	599	1,670.49	
	Establishment	302,252	1,918	157.6	
	Deer and pest control	100,184	19,997	5.01	
	Harvesting	3,974,426	690	5,763	13.75
	Haulage	2,924,139	690	4,240	10.12
	Roading	461,139	19,997	23.06	
	Management & professional	356,780	19,997	17.84	
<b>TOTAL</b>		<b>9,119,578</b>			
<b>C) ANNUAL NORMALISED 40 YR. ROTATION</b>					
	Restocking	818,605	450	1,819.12	
	Establishment	231,873	1,350	171.76	
	Deer and pest control	101,054	20,000	5.05	
	Harvesting	2,686,746	450	5,971	13.73
	Haulage	1,999,413	450	4,443	10.22
	Roading	431,126	20,000	21.56	
	Management & professional	351,403	20,000	17.57	
	Notional land rental	380,000	20,000	19	
<b>TOTAL</b>		<b>7,000,220</b>	<b>20,000</b>		

Source: SAC Consulting survey of forest managers

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## Appendix 2: Agricultural physical output

### Hill area equivalent to Eskdalemuir 2011/12

AGRICULTURAL PHYSICAL DATA	
Area covered (hectares)	20,000
Number of farms	46
Average size of businesses (Standard Labour Requirement)	–
Average size of farm (hectares)	433
Area of Fodder (hectares)	9
Area of Grass (hectares)	3,036
Number of ewes	31,386
Number of suckler cows	421
Number of other cattle	832

PHYSICAL OUTPUT – SAC FMH system (excl cull stock)	
<b>Blackface ewes</b>	<b>31,386</b>
Young weaned (per dam)	–
Young weaned (total nos)	28,875
Live weight lambs (kg per head)	–
Live weight lambs (total kg)	981,764
<b>Hill suckler cows</b>	<b>421</b>
Young weaned (per dam)	–
Young weaned (total nos)	378
Live weight calves (kg per head)	–
Live weight calves (total kg)	132,463

Source: SAC Consulting Farm Management Handbook and Scottish Government Farm Accounts Scheme for south of Scotland

# Appendix 3: Agricultural enterprise margins

## Hill Breeding Ewes – store lamb production (limited inbye) physical data

Breeds	Blackface	Blackface	North C Cheviot	South C Cheviot
Region	NW & W Highlands	Grampian & S Uplands	North	Border
Ewe hogs wintered	Away	Home	Away	Home
Lamb crops per ewe (avg)	5	4	4	5
Ram flock life (seasons)	3	3	3	3
	<b>/100 ewes tupped</b>			
Rams (no.)	3	3	3	3
Lamb numbers:				
marked	70	95	95	95
weaned/disposed	65	92	92	92
sold finished	0	15	7	15
sold store	40	49	57	54
for flock replacement	25	28	28	23
Ewe numbers:				
draft/cast	15	22	21	18
death	10	5	6	4
Wool sales (kg)	160	180	220	260
Ewe feeding:				
concentrates (kg)	1,875	1,875	1,875	1,875
Tup feeding:				
concentrates (kg)	200	200	200	200
Hay reserve (/annum) (kg)	3,000	3,000	3,000	3,000

### Basis of data:

1. Lambs are assumed sold at or by the autumn sales (estimated price).
2. The range of performance levels on hill farms is very wide, and the aim is to try to reflect the average of these.
3. Finished lambs – assume 34 kg liveweight (15 kg carcass weight).
4. North Country Cheviots may be first tupped as 'young ewes' (two shear), or as (one shear) 'Gimmers'.
5. Mortality in ewe hogs is assumed to be 3%.
6. Ewe concentrate feeding – 18% CP, ideally a balanced compound with feeding of ewes selected on the basis of scanning results. Assumes self feed blocks are used on less accessible hills but expensive per unit of energy, ME range 8.5 to 12 MJ/kg DM, total block intake can range from 25-100 blocks/ 100 ewes.
7. Higher performance can result from better winter nutrition and provision of improved summer grazing for selected ewes, particularly those nursing twins.

## Hill Suckler cows physical data

	Calving period	
	Spring (Feb-Apr)	Autumn (Sept-Nov)
Calves weaned	90%	90%
Month of weaning	October	July
Days to weaning	220	270
Month of sale	October	October
Livewt of calves: at weaning (kg)	235	270
Livewt of calves: at sale/transfer (kg)	235	335
Herd life of cows (years)	7	7
Herd life of bulls (years)	4	4
Cow mortality (%)	1	1
Calf mortality (%)	4.5	4.5
Cow:bull ratio (:1)	35	35
<b>Feeding/cow and calf (winter days):</b>	180	200
silage (t)	5.4	7.5
straw (kg)	–	–
creep feed (kg) (incl. pre sale)	–	250
cow concentrates (kg)	50	200
cow cobs (kg)	50	50
grazing (hill/rough pasture)	>0.5	>0.6
Silage fertiliser (kg N/ha)	125	125
<b>Silage:</b>		
yield (t/ha from 1-cut)	20	20
DM quality (g/kg)	220	220
ME quality (MJ/kg DM)	10	10
Rough grazing (ha)	>0.6	>0.5
Silage & aftermath grazing (ha)	0.27	0.375
<b>Housing system: In cubicles*</b>		
Straw for general use incl. calving pens	0.33	0.42
Straw bedding (if in bedded courts) (t)	1.25	1.50

### Assumptions:

1. Grazing is assumed to be hill grazing with some improvements, carrying a maintenance charge of £50/ grazing livestock unit.
2. Approximate value of Scottish Beef Calf Scheme entered. Based on 90 calves for 100 cows to the bull in 2010.

*Farm Management Handbook  
2011/12*

Cost @ £100/t based on bought in straw.

\*Amend bedding costs for cows outwintered or housed on straw.

## Appendix 4: Equivalent financial input and output of agriculture and forestry at Eskdalemuir

	Forestry 2011	Forestry 2012	Forestry - normalised 40yr rotation Av. 2011/12	Agriculture - specialised sheep SDA 2011/12
<b>£ TOTAL</b>				
Timber output	14,465,384	14,795,729	10,073,795	
Agricultural output				3,085,305
Less Input costs	9,037,991	9,119,578	7,000,220	3,523,651
Surplus (deficit) before subsidy	5,427,393	5,676,151	3,073,575	(438,346)
Grants and subsidies	239,945	374,190	315,134	1,882,001
<b>£ PER HA</b>				
Timber output	723.27	739.79	503.69	
Agricultural output				154.27
Less Input costs	451.90	455.98	350.01	176.18
Surplus (deficit) before subsidy	271.37	283.81	153.68	(21.92)
Grants and subsidies	12.00	18.71	15.76	94.10

Source: SAC Consulting survey of forest managers and Scottish Government Farm Accounts Scheme for the south of Scotland

# Appendix 5: Employment estimates

## A) Eskdalemuir forestry - employment - average 2011/12

Activity	Area (ha) of activity per FTE	Area (ha) of activity	Direct employment (FTE)	Employment multiplier*	Direct and indirect employment (FTE)
Restocking	59	576	9.85	1.5	14.77
Establishment	418	1,728	4.13	1.5	6.20
Deer and pest control	8,145	20,000	2.46	1.5	3.68
Harvesting	31	665	21.37	1.9	40.59
Haulage	48	665	13.79	1.9	26.20
Roading	4,054	20,000	4.93	1.9	9.37
Management, professional (FTE)	3,797	20,000	5.27	1.5	7.90
<b>TOTAL (FTE)</b>	<b>422</b>	<b>20,000</b>	<b>61.79</b>		<b>108.72</b>

Source: SAC Consulting - Confor survey

## B) Eskdalemuir forestry - employment - normalised 20,000ha - 40yr rotation

Restocking (FTE)	59	450	7.69	1.5	11.54
Establishment (FTE)	418	1,350	3.23	1.5	4.84
Deer and pest control (FTE)	8,145	20,000	2.46	1.5	3.68
Harvesting (FTE)	31	450	14.46	1.9	27.47
Haulage (FTE)	48	450	9.33	1.9	17.73
Roading (FTE)	4,054	20,000	4.93	1.9	9.37
Management, professional (FTE)	3,797	20,000	5.27	1.5	7.90
<b>TOTAL (FTE)</b>	<b>422</b>	<b>20,000</b>	<b>47.37</b>		<b>82.54</b>

Source: SAC Consulting - Confor survey

## C) Agriculture - employment - 2011/12 Farm Account Scheme data for Specialised sheep farming on 20,000ha of hill land

	Average farm size (ha)	Nos of farms per 20,000 (ha)	Average nos of FTE per farm	Employment multiplier*	Direct and indirect employment (FTE)
Agriculture	433	46	1.20		
Direct (FTE)			55.43	1.5	83.14

Source: Scottish Government Farm Accounts Scheme (FAS)

Notes FTE = Full Time Equivalent; 1,900 hrs pa

\* - Employment multiplier (Type II) from Scottish Government Input-Output tables 2009

**Prepared for:**

Confor: Promoting forestry and wood

**Prepared by:**

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*February 2014*



## National Assembly for Wales Consultation: Inquiry into the Public Forest Estate (WGE) in Wales

UPM Tilhill is the largest Forest Management Company operating within Great Britain with 200 000 hectares of woodland under active management. Of this more than 20 000 ha is in Wales making UPM Tilhill second only to NRW in the area of Welsh woodland which it manages. Our harvesting and marketing operation in Wales annually secures and markets over 500,000 tonnes of round timber

Within the Public Forest Estate UPM Tilhill purchase approximately 200 000 tonnes of timber and undertake annual contract activity valued in excess of £300 000

Of the 200,000 tonnes timber harvested over 90% is marketed within Wales, supporting existing businesses, promoting growth and developing new enterprises. The continuity of material from the Public Forest Estate underpins the whole timber industry within Wales and as such meets the wider Welsh Government objectives of supporting the rural economy and sustainable employment.

### **Commercial operations & focus of NRW**

Wales benefits from some of the best growing conditions in UK for the growing of commercial timber. It has a well-developed processing sector close to the main markets for home-grown timber. NRW are the custodians of a tremendous natural and truly sustainable resource that can be managed for the benefit of the people of Wales. The opportunity offered by focussing on the commercial operations of NRW can contribute significantly to the rural economy of Wales

- There is great unutilised potential within the WGE and NRW have the ability to drive more revenue from this asset
- The Forestry 'arm' of NRW are the only partner within the organisation that can realise a true financial return to WG but still they are regarded as the 'poor relation' to the former CCW and EAW element
- The focus to support the industry through the award of Long Term Contracts (LTCs) is commendable but more could be done to improve the operational efficiency of these.
- To the industry there seems to be a lack of "forestry leadership" within NRW and this has contributed to a lack of motivation within the staff
- Is the correct recruitment and training evident within NRW or are staff being re-located within the organisation to meet short term targets rather than to improve efficiency?
- We are concerned that NRW are not achieving best value for services they contract out



- The procurement process is neither transparent or consistent in the way tenders are evaluated
- Having to retender with detailed Risk Assessment & Method Statements when already qualified for a Framework Agreement is an unnecessary burden on suppliers
- There is no recognition for previous experience of working for FCW or NRW and suppliers have to repeatedly go through the Pre-Qualification Questionnaire process for each contract award
- We do not believe the tender process always results in best value to NRW and tax payers
- There is an opportunity to increase NRW efficiency of delivery by amalgamating smaller contracts into larger packages. An obvious example is to contract the felling and restocking within a management unit as a combined operation rather than as at present having the work broken down into separate contracts for each operation. This “scaling” up of operations could be included within harvesting LTCs

### **Delivery of business advice & support**

NRW is not an overtly commercial organisation and is not best placed to provide business advice but they have the opportunity to provide support and just as importantly the ability to undermine the Private Sector (PS) through inappropriate enforcement of regulation

- Forward planning in respect of eSales and Long Term Contracts (LTC) volume is paramount in order for the industry to invest in harvesting and processing
- NRW should be open to advice and guidance from the industry, in particular in relation to commerciality
- We are not aware of any advice being delivered by NRW and on the contrary advice from the PS is not acted on
- There is currently no mechanism for dispensing advice. NRW no longer employ Woodland Officers to advise and this “service” is delivered through WG by Glastir and through Forest Research which is a GB organisation
- We believe implementation of “best practice” for managing Felling Licence Applications, Deep Peat, Acidification and Environmental Impact Assessments is arbitrary and more engagement with stakeholders is required
- NRW demonstrate no flexibility for amending existing grant schemes eg to re-allocate under spent budgets or to make changes in response to *Phytophthora ramorum* (P ram). NRW appear to have given up on Better Woodlands for Wales (BWW) although this is by far the most active grant scheme in delivering activity on the ground and remains within control of NRW
- There has been a perceived increase in enforcement of regulation on the PS by NRW and it is difficult to see where the “public interest” test has been applied

- There is a suspicion NRW are quick to prosecute as they see numbers of prosecutions as a readily quantified performance indicator
- A real issue for the PS is the lack of balance in how NRW regulate themselves compared to the PS. It is not clear NRW even monitor for breaches in compliance within their own Forest Design Plans and certainly no sanctions are applied due to “crown immunity”
- NRW are responsible for delivering the WG Forest Strategy, Woodlands for Wales (WfW). Delivery has been haphazard with emphasis on “environmental” improvements and not the balanced approach of maintaining the productive capacity of Welsh Woodlands by compensating for environmental gain with woodland expansion as defined by WfW
- An excellent example of collaborative working and support between PS, 3 Unitary Authorities and NRW has been the formation of the Tywi Timber Transport Forum initiated by NRW and promoting the use of WGE forest roads to relieve pressure on fragile local highways and divert timber traffic away from vulnerable rural communities. There is potential for similar schemes elsewhere in Wales

### **Management of Disease Outbreaks**

The most significant disease outbreak has been *Phytophthora ramorum* and NRW have failed to effectively manage the spread of this disease within Wales. There has been a failure to engage effectively with the PS to find solutions. Management of the disease within Scotland appears to have learned from the failures evident in Wales

- There has been a slow response to the P ram outbreak. Good intentions at the onset of the disease prior to the formation of NRW but the focus has been lost with a lack of leadership and no sense of urgency
- It appears to be now widely recognised within NRW that management of P ram has been an abject disaster
- There has been a lack of any deliverable strategy in the last 3 years
- Attempts to develop an effective strategy have always been playing “catch-up” and have been rendered ineffective by the progress of the disease
- The latest P ram strategy although it took far too long to get agreed at least makes sense and can potentially adapt to development of the disease so long as NRW is able to respond quickly to change
- NRW's failure to self-regulate and comply with notices to deal with infected trees on WGE has led to a risk of spore build up within the main South Wales area of infection and there is potential for P ram to mutate into a form that could infect and sporulate on other commercially valuable species with even more serious consequences
- How can NRW have credibility to enforce Statutory Plant Health Notices in rest of Wales going forward? There is potential for serious reputational damage within farming and forestry community

- The processing industry quickly equipped themselves to handle the volume of Larch infected by P ram in what is traditionally a white-wood industry but volumes of Larch have been too slow and erratic in coming to market
- There has been a lack of guidance from NRW on compliance with dealing with infected material

**WAO report**

UPM Tilhill has no comment to make on progress made by NRW to deliver the recommendations of the Wales Audit Office

16<sup>th</sup> May 2014

Environment and Sustainability Committee,  
National Assembly for Wales,  
Cardiff Bay,  
CF99 1NA.

Dear Sirs,

### **Inquiry into the public forestry estate in Wales**

Thank you for the opportunity to respond on behalf of BSW Timber. We are a primary sawmilling group, with operating sites throughout UK and one of our major mills is here in Newbridge-on-Wye, Powys.

#### ***Introduction***

BSW employs 1000 people across 6 locations across Scotland, England and Wales as well as one plant in Latvia with a turnover over in excess of £180m. BSW Timber's British mills have a production capacity of over 1,000,000m<sup>3</sup> of sawn timber per year and they produce over 30% of the UK's softwood output.

BSW have almost completed a five-year £70m investment programme, including erecting a new sawmill in Fort William and installing 26MWs of biomass capacity across three sites which utilises sawmills' own lowest value wood co-products for fuel. Our sawn timber products are mostly used for construction, pallet, packaging, DIY, fencing and gardens. Co-products are also used for paper, panel board and energy markets. We distribute timber products throughout the UK and export to the Middle East, China, South Korea and Japan. BSW Timber is a member of the Timber Trades Federation and the UK Green Building Council. We are a supporter of the Wood for Good campaign and the Grown in Britain



initiative. We have strong relationships with the Forestry Commission, Natural Resources Wales, private growers, customers, NGOs and banks.

### ***BSW in Wales***

BSW has invested over £6m in its Newbridge sawmill alone over the past six years, employing 140 staff – making it the largest single site sawmill in Wales. The BSW Board has approved a plan to invest in additional and replacement capacity at the Newbridge sawmill based on the conclusion of contract signing with NRW for the long term supply of sawlogs.

The Newbridge sawmill is located on a 10 ha site in the heart of Wales, close to the spa town of Llandrindod Wells. The sawmill can process lengths from 3.0 - 4.8 metre lengths and operates on a treble shift pattern. Annual input is 260,000 cubic metres of sawlogs and it produces 150,000 cubic metres of sawn timber. The investment proposal will raise the annual input potential to 400,000 cubic metres of sawlogs.

It has been a particularly challenging time for the Welsh forestry sector with regard to the impact of tree disease on larch. BSW have been working hard to develop new outlets to process and market the product of plant health felling to try and support value to the growers.

This year BSW have broken new ground by beginning to supply Welsh-grown timber to two Welsh timber frame manufacturers in direct substitution for imported timber, destined for much-needed house building in Wales.

### ***BSW and forestry***

BSW in Wales is the largest consumer of softwood sawlogs, cutting predominantly Sitka spruce but also significant quantities of other species. It works closely with forest owners and managers including NRW and also with the complementary markets for other wood products.

There is sufficient potential sawlog supply for the next twenty years according to forestry inventories. However, the complete lack of productive softwood woodland creation in Wales in the last fifteen years will lead to a sharp decline in availability after 2030. Long-term decline of supply and of our business and the Welsh forestry sector can only be arrested by the commitment on the ground to creating new productive softwood woodlands at scale.

***Inquiry to consider how Natural Resources Wales (NRW) has both managed the public forest estate and delivered forestry services to the sector in Wales since its creation in April 2013.***

## **The Commercial Operations and Focus of NRW**

The experience of BSW is one of frustration with a lack of operational focus from NRW. This ranges from:

- a) Poor levels of response to telephone calls and emails. We are often left chasing NRW staff for resolution of issues ranging from stock availability to contract drafting. There does not appear to be much urgency or customer focus about their approach.
- b) Low visibility of NRW's production plan at a lot by lot basis. A forest portfolio the size that NRW has at its disposal should have numerous coupes identified and prepared to work in order to provide consistent uninterrupted supply to major contracts. This does not appear to be the case as we consistently experience delays in supply.
- c) Poor procurement process of harvesting services delaying delivery. The procedure of tendering harvesting operations for individual coupes only after the parcel is sold is often causing delays to the start date of contracts. With an annual direct production volume in excess of 400,000m<sup>3</sup> one would expect a pool of harvesting resources to be retained in order to ensure prompt commencement of contracts which are often sold 3 months ahead of the proposed start date.

There is a concern within the industry that the morale of forestry staff within NRW is at a very low level and this is impacting on the delivery of commercial forestry activities.

## **Delivery of business advice and support to the forestry sector in Wales**

We are pleased to report positive support from the NRW board in the form of long term supply agreements to investment proposals at our Newbridge sawmill. The intention to support ongoing investment in efficient sawmilling capacity in Wales which will benefit both the public and private forest estates is laudable.

However we remain concerned for the future supply potential in Wales following the recently released 50 year availability forecast published by National Forest Inventory, which shows that the available volume of softwood in Wales reduces by 50% of current levels within 30 years. This reduction is reflected in both the



public and private forestry estates. With current restocking guidelines reducing the density of conifer planting by 30 -40% and a lack of significant new conifer planting in Wales for the past 10 years, unless significant efforts are made to dramatically increase planting of conifers now, it is unlikely that there will be continued investment in the next generation of timber processing capacity in Wales.

There is a real requirement for NRW to take a strong lead in both an advisory and facilitator role to Welsh Government, Public Forest Estate and the Private Sector Forestry Industry to ensure that significant new planting schemes are bought forward. To that end we are concerned that there is a lack of commercial forestry experience on the NRW board to steer this course.

### ***Management of disease outbreaks on the public forestry estate***

BSW welcome the approach that NRW have made to dealing with the Phythopthora Ramorum disease in Larch by offering long term contracts to offer consistent supply to timber processors in order that they can confidently build market for this material. However slow contract negotiation process, poor planning and preparation of working coupes are frustrating our ability to access consistent supplies that these contracts were designed to facilitate.

### ***Conclusion***

BSW welcome the positive intentions towards forestry and timber processing shown by NRW but are increasingly frustrated by operational inefficiencies within the organisation that result in a disappointingly fragile supply chain.

Yours sincerely



Gavin Adkins  
Purchasing Director  
[gavin.adkins@bsw.co.uk](mailto:gavin.adkins@bsw.co.uk)



## **National Assembly for Wales' Environment and Sustainability Committee inquiry into the Public Forest Estate in Wales**

### **Submission from Confor Wales.**

**May 16<sup>th</sup> 2014**

Confor (the Confederation of Forest Industries) represents the commercial forest sector in Wales and in the rest of the UK. This submission is based upon the management of the public forest estate in terms of sustainable wood production.

#### **1. The commercial operations and focus of the NRW**

It is difficult forming a view on the NRW's performance in managing the commercial operations relating to wood production because of the lack of transparent reporting of its activities. There is insufficient disclosure to establish whether NRW are operating sustainably on an economic basis. Taking the latest published report of FCW to 31 March 2013 the following details are recorded:-

Volume of clearfell	Cubic metres	622828
Area of clearfell	Hectares	1661
Volume of thinning	Hectares	178204
Standing sales	Cubic metres	400707
Direct production	Cubic metres	400325
Area of restocking after felling	Hectares	1012

Book value of felled timber £000's 5598

From the Forestry Commission National Statistics the following data on FCW is recorded for the year ended 31 March 2013:-

Harvest and haulage costs £ million 9.9

Timber income £ million 13.5





This was the only published data we were able to obtain from published reports on the commercial performance (economic sustainability) of the FCW (now NRW) relating to its wood production activities. To enable a proper assessment of the NRW's performance there needs to be publication of the following data:-

- Timber income split between thinning and clearfell, and then sub-divided between standing sales and direct production; likewise for harvesting and haulage costs.
- Restocking costs associated with the area of restock, with beat up costs of previous restocks reported separately.
- An allocation of overheads reflecting the “on-costs” of the restock and felling operations.
- Income from sales and costs of felling and restocking of diseased trees due to *P.ramorum* recorded separately

Without such data it is not feasible to form an opinion on NRW's performance; other than to conclude that if the data disclosed above is true and fair then wood production on the public forest estate has been run at a substantial loss. Appendix 1 illustrates a comparison of the net earnings per tonne (before overheads, value of stock felled, and replanting costs) between public forest estates in England (£18.11), Scotland (£13.25), and Wales (£5.43) NB:these figures are before any significant removal of diseased larch trees. It does appear from the published data reproduced in Appendix 1, that the FCW (now NRW) are generating significant deficits on timber operations on the WG forest estate (a similar picture to the previous year)- an approximate loss of £2million in 2012/13 before overheads, restocking and beat-up costs. This loss to WG may be due to a number of causes e.g. poor silvicultural practices in the past resulting in poor crops, harvesting in particularly difficult terrain, inefficient harvesting, poor supervision, and low prices. The problem is that no improvement can be made and the situation reversed without data pinpointing where the losses are being made. It is basic commercial management. We are concerned that there seems to be an over emphasis as a success criteria on increased volumes being marketed rather than on the financial return to WG.

A further concern of ours is the depletion of the productive resource on the WG forest estate. The figures above indicate a significant discrepancy between the area restocked (1012 hectares) to the area felled (1661 hectares). Whilst such a discrepancy may exist in any one year, cumulatively the figures should be similar. There is a worrying trend in the FCW's reported accounts, over the past three years 3069 hectares have been restocked out of 4341 hectares clear felled with the cumulative five year production ending in those three years being relatively static; this therefore indicates a significant loss of commercial productive woodland. The Nation's timber reserve is an important resource underpinning substantial economic activity and employment in the rural economy; if this resource is not maintained there will be economic decline with the consequent adverse effect on rural employment.





# Confor

Promoting forestry and wood  
Hyrwyddo coedwigaeth a choed

Where there has been removal of commercial productive woodland for restoration of habitats or development, the WG woodland policy is clear that there should be compensatory woodland creation. Practically all woodland creation over the past few years has been of commercially unproductive native woodlands.

## **2. Delivery of business advice and support to the forestry sector in Wales**

Our members report that the NRW provides little support and that on the contrary it acts in a heavy handed and bureaucratic way. Please see enclosed copies of correspondence (Appendix2) illustrating the NRW's response to:-

- our request for more flexibility in the handling of grants in the face of exceptional circumstances (as happens elsewhere in the UK),
- our complaint of mistreatment in the administration of felling licences, and
- our complaint of NRW's lack of transparency in the management of long-term contracts. In a balanced market no supplier would sell at a loss, but within the wood supply market in Wales there is no confidence that that is the case particularly with sales from the public estate. NRW's failure to respond by engaging with the private sector growers undermines confidence and has an adverse impact on woodland management within Wales.

Even though Confor had written to the highest level within NRW; NRW failed to appreciate the adverse effect their heavy handed and inflexible behaviour is having on the industry and to take our complaints seriously. NRW clearly failed to recognise that they have a supportive role to play or that they should facilitate as well as regulate. This we believe is a cultural problem needing strong leadership within NRW to change attitudes.

The problems are compounded by the fact that NRW acts as both a competitive operator and regulator in the forest industry. It enforces practices upon the private sector which it does not enforce upon its own management of the public estate. Given the dominant position NRW has in the wood supply industry (supplying approximately 60% of the market in Wales) we regard this as an abuse of a dominant position. NRW claim that they do not have to comply with the onerous conditions of felling licences on the public estate since they have been advised by legal advisers that they are a "Crown Body" – we would question this given that they now operate at arms-length from the Welsh Government and would suggest that the SEC examines that legal opinion. Please refer to Appendix 4 which is e-mail correspondence from NRW as regulator concerning a felling licence application, to a private sector operator with his reply. Clearly NRW are insisting on additional conditions which are not spelt out in the application form for the felling licence; and rather than amend the process the regulator is threatening obstruction and prosecution. Is this really in the public interest?



**Confor**  
Promoting forestry and wood  
Hyrwyddo coedwigaeth a choed

The lack of any meaningful levels of woodland creation in Wales does not seem to generate any urgency within NRW to address this serious issue. NRW seems totally detached from any sense that it should be seeking to help deliver on WG woodland and forestry policy. This seeming detachment is accentuated by the lack of clear leadership within NRW on forestry issues. As an example please see enclosed Appendix 5; a copy an e-mail below from a Confor member who had tried and failed to get grant support for a woodland creation scheme.

### **3. Management of disease outbreaks on the public forest estate**

Unfortunately *P. ramorum* struck on the public estate at a time of transition (from FCW to NRW), and there seemed to be a lack of leadership in dealing with the disease. Please refer to the enclosed correspondence (Appendix3) between Confor and NRW in which Confor highlighted the lack of urgent remedial work in the infected areas on the public estate i.e. the felling of diseased trees upon which Special Plant Health Notice equivalents had been served. It was emphasised by experts that the only chance of containing the disease was by carrying out rapid containment as illustrated by the work of Tim Widmer (USDA) in Oregon. After the initial correspondence referred to, there was much better communication between NRW and the private sector and a sensible strategy has been put in place to try and slow down the spread of the disease.

We are concerned that there is a potentially valuable resource which might be left to decay in the woodlands (WFBP estimates that the WG could construct around 50,000 new homes from the larch timber that will become available as the disease progresses).

### **4. Progress made by NRW to deliver the recommendations of the Wales Audit Office**

It is particularly pertinent to this submission of evidence that the 2008 WAO report specifically mentioned BWW as a significant challenge to be addressed:-

“The FCW has recently introduced the Better Woodlands for Wales (BWW) grant scheme. It needs to develop effective performance reporting systems that focus on securing its long-term objectives and outcomes and provide appropriate support to the high volume of applicants to overcome known barriers affecting the approval of schemes”.

The WAO follow up report supports our view that the scheme is still not being administered as effectively as it might be:-

“Where FCW has sought to learn lessons from its implementation of its Better Woodlands for Wales grant scheme, it has not done this as effectively as it might have done.”

In relation to what we believe is the NRW’s over emphasis on timber volumes (as opposed to profitability) the WAO endorses this view:-





# Confor

Promoting forestry and wood  
Hyrwyddo coedwigaeth a choed

“The FCW last reviewed its *Timber Marketing Strategy* in 2010. The strategy covers the five-year period from 2011. The FCW told us that it measures the success of this strategy through progress against two of its corporate performance measures: Gross Value Added in the forestry sector and proportion of timber harvested in Wales. However, the timber strategy has a range of objectives which are not all directly linked to these corporate measures, for example, ‘securing best value from the sale of timber’, and for which FCW has not set performance indicators.”





COED CADW  
WOODLAND  
TRUST

**SUBMISSION BY COED CADW (THE WOODLAND TRUST) TO THE  
ENVIRONMENT AND SUSTAINABILITY COMMITTEE'S INQUIRY INTO THE  
PUBLIC FORESTRY ESTATE  
May 2014**

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### **Introduction**

Coed Cadw (The Woodland Trust) welcomes the opportunity to feed in to this inquiry. The comments that follow are delivered on behalf of Wales' leading woodland conservation charity. We achieve our purposes through a combination of acquiring woodland and sites for planting and through wider advocacy of the importance of protecting ancient woodland and trees, enhancing its biodiversity, expanding woodland cover and increasing public enjoyment. We have over 1,000 sites in our care covering approximately 20,000 hectares (50,000 acres). These include over 100 sites in Wales, with a total area of 1,580 hectares (3,900 acres). We have 300,000 members and supporters across the UK. Coed Cadw has three key aims: i) To plant native trees and woods with the aim of creating resilient landscapes for people and wildlife; ii) To protect ancient woodland which is rare, unique and irreplaceable and; iii) The restoration of damaged ancient woodland, bringing precious pieces of our natural history back to life.

### **General comments**

Coed Cadw spoke out in favour of creating a new, single environmental body, believing that it was wrong in principle to perpetuate an artificial divide between woodland and the rest of the environment, or indeed biodiversity and protection of the landscape and the rest of the environment and the other dimensions of sustainable development. We believed then as we do now that there is huge potential for synergy between all these elements. For us, a key question is whether this potential synergy has been realised. We would not claim that it has, as yet, but just over a year after the New Body was created, it would be unrealistic to expect this. Overall, we believe the new body has made a good start, though, of course, much remains to be done.

### **The Management of the Public Forestry Estate**

The view of Coed Cadw is that it is vital that the Public Forestry Estate should fulfil a number of different objectives, environment and social as well as economic, which taken together, should make its forests an exemplar of sustainable development. So NRW's management of the public forest estate should not be judged purely on its performance in growing and marketing timber, as important as this is, but also on the provision of social and environmental benefits. The outrage that resulted when the Westminster Government proposed to sell off much of the Public Forest Estate in England in 2011 provides an indication of just how important these other benefits are.

The public forest estate in Wales contributes in many ways to the delivery of Welsh Government policies, including for example those relating to water resource management, tourism, biodiversity and community development. The lack of mention of the forest estate in some recent consultation documents suggests that this understanding is not yet embedded in some departments within the Welsh Government.

### **Certification of Welsh Government Forest Estate**





For this reason we believe it is vital that NRW continues to have its forests independently certified as sustainably managed through UKWAS/FSC, and we strongly welcome the fact that it has continued.

### **The Woodland Strategy**

Coed Cadw strongly welcomes the fact that, as we understand it, the Woodlands for Wales Strategy remains the policy framework under which the Welsh Government charges NRW to manage the Welsh Public Forestry Estate. The Strategy contains a balance of environmental, social and economic objectives, which are really important. This includes the restoration of ancient woodland, the creation of new woodland where appropriate and the provision of a high quality environment for healthy outdoor recreation as well as the continued promotion of a vibrant and prosperous timber and timber processing and marketing industry. In general it is our perception that NRW strives to achieve all of these benefits and we welcome this, though there is a lack of clarity as to the extent of the success achieved. We therefore believe it would be helpful for NRW to publish regular reports on progress made in delivering key policies with regard to the Welsh Public Forestry Estate, such as the implementation of policies and commitments on the restoration of ancient woodland in section 6 of the Woodland Strategy.

### **Ancient Woodland Restoration**

Ancient Woodland is irreplaceable and the restoration of Plantations on Ancient Woodland Sites (PAWS) is urgently needed to secure the future of the habitat. The Welsh Government estate comprises a significant proportion of Wales' Ancient Woodland and we urge that NRW prioritise its sensitive restoration, in accordance with the Woodland Strategy and UKWAS. Best practice restoration comprises a gradual process, avoiding clear-felling and destructive infrastructure "improvements", mindful of protection of Ancient Woodlands' remnant flora, soils and surviving native trees and deadwood habitat. The Welsh Government Forest Estate has a significant role to demonstrate exemplar restoration for the industry and all owners of ancient woodland.

### **Tree diseases**

Clearly, the tsunami of tree diseases that have reached these shores is a huge challenge for NRW, both in terms of monitoring the spread of diseases and, more specifically, felling larch where necessary. In general it is our perception that NRW has coped with this huge challenge as well as could be expected, not just felling huge areas of infected larch, but also replanting other species quickly to restore woodland cover. We commend this. Coed Cadw believes that best practice on PAWS sites affected by *Phytophthora* felling is to restock rapidly with native broadleaves not susceptible to the disease. This can avoid the damaging effects of potential desiccation and/or invasion of coarse vegetation to the detriment of surviving Ancient Woodland remnant features. Given the already harsh disturbance caused by the rapid felling, it is also essential that no inappropriate preparatory restocking techniques such as scarifying or mounding are undertaken which are extremely damaging to Ancient Woodland soils. We urge NRW to adopt these practices as exemplary for the industry and as part of a long term response plan that will increase the diversity and resilience of the forest estate.

### **The Movement of the grant function to the Welsh Government**

Clearly, a huge part of the Woodlands for Wales Strategy does not relate directly to the public forest estate and depends, in effect, on grants and advice to private landowners. This function was of course transferred to Welsh Government at the time when NRW was created and is not therefore the role of NRW. This transfer of responsibilities has perhaps contributed to perceptions of a failure to deliver by NRW and has deprived NRW of one of the key means of delivering its purposes. If the public are to benefit from the effective delivery of the Woodland Strategy, it is vital



that the Welsh Government continues to follow the Strategy in exercising its grant and advice functions relating to woodland and trees. The two priorities that the Trust is particularly keen to see energetically pursued are:

- a) The benefit of creating new woodland in appropriate places across the landscape, both to capture carbon from the atmosphere and to create landscapes that are more resilient to climate change, particularly flooding.
- b) The need to restore areas of irreplaceable ancient woodland that were planted with conifers during the last century. Ancient woodland is rare and precious and cannot be recreated. But there are thousands of hectares of coniferised ancient woodland just waiting for restoration. What's more, the target is urgent as the conifer crops on much of this woodland will reach maturity over the next ten years, and planting another crop of conifers, should it become grant-aidable, should be hugely damaging. Whilst Glastir Woodland Management provides incentives to begin restoration, there is a serious omission in the scheme's ability to support sensitive gradual restoration over several uneconomic interventions, and it includes encouragement to implement inappropriate and damaging solutions such as infrastructure installation and clear felling.

Both of the above will, of course require grant systems which both offer realistic incentives, and do not entail an excessive bureaucratic burden. The latter has often been an issue in the past.

A challenge for the Welsh Government is to ensure that what is identified as best practice is applied with equal diligence on both on its own forest estate and in private woodland through grants and regulation.

### **Resilient landscapes**

One of the key synergies which the creation of NRW was supposed to help create was the creation of resilient landscapes, enhancing and adapting the landscape of Wales to meet such challenges as climate change and flooding, nitrogen deposition, resource depletion and land use intensification. This thinking was enshrined in Living Wales and is starting to be applied in river catchment planning. Whilst it is clearly too early for NRW to be delivering on this agenda on a significant scale, we would welcome signs of a more proactive approach on this, both involving the Welsh Government's Forest Estate, and its more general powers.

### **The Commercial Operations of NRW**

As has been made clear in this submission, the commercial aspect of NRW's management of the Welsh Government's Forest estate is not the Woodland Trust's key focus. Nevertheless, we are strongly in favour of a vibrant and profitable forestry sector in Wales and therefore strongly favour NRW marketing Welsh timber and other woodland products effectively. This does not necessarily imply more emphasis on bulk softwood production; the wider consequences of intensive plantation management, such as on water acidification, must be factored in. And while coniferous forests can yield greater quantities of timber, hardwoods can command higher prices per tonne. And the effective marketing of timber from the Welsh Government's Forest Estate may well entail developing new, higher value markets for specific types of timber, maybe substituting for materials such as metal and concrete which have a higher carbon footprint. The Trust would support this approach.

### **Progress made by NRW to deliver the recommendations of the Wales Audit Office**

Coed Cadw strongly favours NRW working closely with forest businesses, making staff accessible, responding promptly to emails and providing digital accessibility through its website. From our perspective it is too early to say whether NRW is doing this effectively.





**COED CADW  
WOODLAND  
TRUST**

Glastir Woodland Creation and Management are of course now administered directly by the Welsh Government, but we believe these should offer attractive incentives to plant and manage commercially viable woodlands. Nevertheless, grant aid should not be offered for activities which are positively damaging to the environment, such as replanting conifers on an ancient woodland site or planting on other habitats of importance. And where tree planting has the potential to offer particular environmental benefits, such as creating a shelter belt on a sloping hillside that could reduce run-off of flood water into rivers and streams, then we believe there should be additional support for this, even though timber production may not be the principle aim. See „The Pontbren Project“ page 23.

**Simplification of NRW regulations**

Coed Cadw is aware that the Welsh Government has established a Task and Finish Group looking at improving the protection of ancient and heritage trees in Wales. We understand that this group is looking at the possibility of combining felling licences with Tree Preservation Orders. While there is no firm proposal on the table, we recognise the benefits to all of simplifying regulations and we would support proposals which gave great protection to individual ancient and heritage trees, believing these trees are not adequately protected at present.

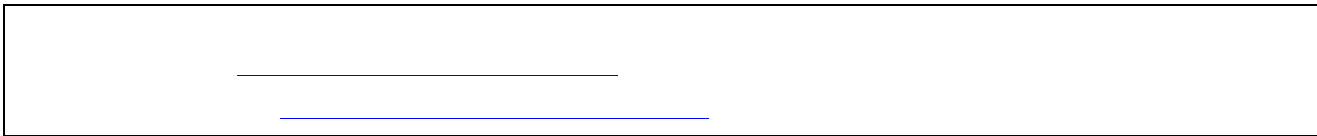
**Clarity and separation of decision-making**

A key concern in the run-up to the creation of NRW was that one department of the new body would be responsible, in effect, for regulating another. Coed Cadw agreed with the provisions made for internal separation between regulation and operations. The first year of operation of NRW has given us no particular concerns that these are not working. In general we believe there needs to be more transparency and better communication of forest level decision making, including showing that forest level decisions are consistent with the Welsh Government’s own policy commitments.

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[www.coedcadw.org.uk/cymru](http://www.coedcadw.org.uk/cymru)

[www.woodlandtrust.org.uk/wales](http://www.woodlandtrust.org.uk/wales)







# The Pontbren Project

A farmer-led approach to sustainable land management in the uplands

## Prosiect Pontbren

Dull o reoli tir yn gynaliadwy yn yr ucheldiroedd, sy'n cael ei lywio gan ffermwyr





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WTPLU/Rory Francis

The Pontbren Project takes its name from the stream which drains this small headwater catchment of the River Severn.

Mae Prosiect Pontbren yn cael ei enw o'r  
nant sy'n draenio dalgyloch rhagnant fach o'r  
Afon Hafren.

## Foreword

by Roger Jukes, Pontbren farmer



Roger Jukes

Helping to prepare this report has allowed us to reflect on the origins and progress of our project. Although we have always known each other as friends and neighbours, it was only in 1997 that we first sat down to consider what was happening to our industry. Through our hard work and willingness to embrace schemes which encouraged higher production, we had increased stock numbers and quality by introducing continental breeds. We had drained and reseeded our pastures and erected new buildings to feed and house them. It was at this stage we realised that we were on a treadmill. Although we were getting more for our stock our fertilizer and feed bills were growing too. We were completely dependent on the brown envelope and we knew even then that this was not sustainable. We began to explore ways in which we could reduce our costs, add value to our products and market them more effectively.

**"We were left with no other option than to develop our own scheme"**

We began by considering keeping hardier stock which could spend less time indoors and require less supplementary feeding. To do this, we knew we would need to restore and extend the network of hedges and copses which provided shelter on the farms. Each of us worked up a plan for our farm then we all sat down to pull the ten plans together. Our next step was to look for support for our programme which by this stage was accurately mapped and costed. It quickly became clear that none of the existing schemes were appropriate. They were too inflexible and it was not possible for us to enter as a group. We were left with no other option than to develop our own scheme and seek funding from other sources. We succeeded.

Working together through all the trials of foot and mouth and TB has created a strength in our community which extends far beyond the work described here. We have had fun together and enjoyed bringing people to our farms to see what has been achieved. Our one abiding frustration is that we have not been able to make it easier for other farmers to follow our lead.

## Rhagair

Gan Roger Jukes, un o ffermwyr Pontbren

Mae helpu i baratoi'r adroddiad hwn wedi caniatáu i ni feddwl am ddechreuad a chynnydd ein prosiect. Er ein bod bob amser wedi adnabod ein gilydd fel cyfeillion a chymdogion, dim ond yn 1997 y gwnaethom eistedd i lawr i ystyried beth oedd yn digwydd yn ein diwydiant. Drwy ein gwaith caled a'n parodrwydd i gofleidio cynlluniau oedd yn annog cynhyrchu mwy, roeddem wedi codi niferoedd ac ansawdd y stoc drwy gyflwyno bridiau tramor. Roeddem wedi draenio ac ail hadu ein profa ac wedi codi adeiladau newydd i fwydo a diogelu ein da byw. Yn y fan hon y gwnaethom sylweddoli ein bod ar felin draed. Er ein bod yn cael mwy am ein stoc, roedd ein biliau gwrtaith a bwydo hefyd yn cynyddu. Roeddem yn gyfangwbl ddibynnol ar yr amlen frown ac fe wyddem hyd yn eod yr adeg honno nad oedd hyn yn gynaliadwy. Dechreuasom ymchwilio i ffyrdd fyddai'n gostwng ein costau, yn ychwanegu gwerth i'n cynnyrch ac yn ein galluogi i'w marchnata'n fwy effeithiol. Dechreuasom ystyried cadw stoc wytnach allai dreulio llai o amser dan do ac angen llai o fwydo ychwanegol.

Ond i wneud hyn gwyddem y byddai angen i ni adfer ac ymestyn y rhwydwaith o wrychoedd a llennyrch oedd yn darparu cysgod ar y ffermydd. Fe wnaeth pob un ohonom weithio allan gynllun i'n ffermydd ein hunain ac wedyn fe ddaethom â'r cwbl at ei gilydd. Ein cam nesaf oedd chwilio am gymorth i'n rhaglen oedd erbyn hyn wedi'i mapio a'i chostio'n ofalus. Yn fuan iawn, daeth yn amlwg nad oedd yr un o'r cynlluniau presennol yn addas. Roeddynt yn rhy anhyblyg ac nid oedd yn bosibl i ni wneud cais fel grwp. Nid oedd gennym ddewis ond datblygu ein cynllun ein hunain a chwilio am gyllid o ffynonellau eraill. Llwyddasom.

Mae gweithio gyda'n gilydd drwy holl dreialon clwy'r traed a'r genau a'r diciâu (TB) wedi rhoi nerth i'n cymuned sy'n ymestyn ymhell y tu hwnt i'r gwaith a ddisgrifir yma. Cawsom hwyl gyda'n gilydd ac rydym wedi mwynhau dod â phobl i'n ffermydd i weld yr hyn a gyflawnwyd. Ein un rhwystredigaeth fawr yw nad ydym wedi gallu gwneud pethau'n haws i ffermwyr eraill ddilyn ein hesiampl.





We were left with no other option than to develop our own scheme.  
Nid oedd gennym ddewis ond datblygu ein cynllun ein hunain.

## What is the Pontbren Project?

The Pontbren Project is an innovative approach to using woodland management and tree planting to improve the efficiency of upland livestock farming, led by a group of neighbouring farmers in mid-Wales. They went on to develop new on-farm uses for woodland products, and when it became clear that tree planting had not just improved farm businesses and wildlife habitats, but had also reduced water run-off during heavy rain, they invited scientists to investigate. Supported by government funding, this internationally important research has revealed why strategically located belts of trees are so effective at reducing the amount of water running off improved upland grasslands. The scientific data from Pontbren is now being used to study the effects of land use on bigger catchments prone to flooding.

The Pontbren Project takes its name from the stream which drains this small headwater catchment of the River Severn. It is set in a rolling upland landscape of predominantly grassland farms about 10 miles to the west of Welshpool, in one of the wettest areas of the UK. Like most of upland Wales, the structure of farming changed during the 19th and 20th centuries. There was a shift from small-scale mixed farming to predominantly sheep farming on grassland, with suckler beef and a few small dairy enterprises. The farms had become fewer and larger, and the workforce had shrunk. This had the effect of simplifying the landscape and providing fewer habitats for wildlife, as field structures were rationalised and farm woodland lay unused.

## Beth yw Prosiect Pontbren?

Mae Prosiect Pontbren yn ddull arloesol o ddefnyddio rheoli coetir a phlannu coed i wella effeithlonrwydd ffermio anifeiliaid pori yr ucheldir, wedi ei arwain gan grŵp o ffermwyr sy'n gymdogion yng Nghanolbarth Cymru. Aethant ymlaen i ddatblygu defnyddiau newydd ar fferm i gynnwch coetir, a phan ddaeth yn amlwg fod plannu coed nid yn unig wedi gwella busnes y fferm a chynefinoedd bywyd gwylt, ond hefyd wedi gostwng dŵr ffo yn ystod glaw trwm, gwahoddwyd gwyddonwyr i ymchwilio i hyn. Wedi eu cynorthwyo gan gyllid y llywodraeth, mae'r gwaith ymchwil rhyngwladol pwysig hwn wedi dangos pam fod lleiniau o goed wedi'u lleoli'n strategol mor effeithil wrth ostwng faint o ddŵr ffo oedd yn rhedeg oddi ar lastiroedd wedi'u gwella yn yr ucheldir. Defnyddir y data gwyddonol o Pontbren ar hyn o bryd i astudio effeithiau defnydd tir ar ddalgylchoedd mwy sy'n dueddol o ddiodeff llifogydd.

Mae Prosiect Pontbren yn cael ei enw o'r nant sy'n draenio dalgylch rhagnant fach o'r Afon Hafren. Mae'n sefyll yn nhirwedd tonnog yr ucheldir sy'n cynnwys ffermydd glaswelltir yn bennaf tua 10 milltir i'r gorllewin o'r Trallwng, yn un o ardaloedd gwlypaf y DU. Fel y rhan fwyaf o ucheldir Cymru, mae strwythur ffermio wedi newid yn ystod y 19eg a'r 20fed ganrif. Roedd symudiad o ffermio cymysg ar raddfa fach i ffermio defaid yn bennaf ar laswelltir, gyda gwartheg sugno eidion ac ychydig o fentrau llaeth. Prinbau gwnaeth y nifer o ffermydd llai tra bod eu tir yn cael eu llyncu gan ffermydd eraill i gynyddu eriau. Yn sgil hyn bu buddsoddiad mewn technoleg a pheirianwaith modern ac i'r perwyl hwn, lleihau ddaru'r gweithle.



The structure of farming changed during the 19th and 20th centuries.  
Mae strwythur ffermio wedi newid yn ystod y 19eg a'r 20fed ganrif.

1950s



1960s

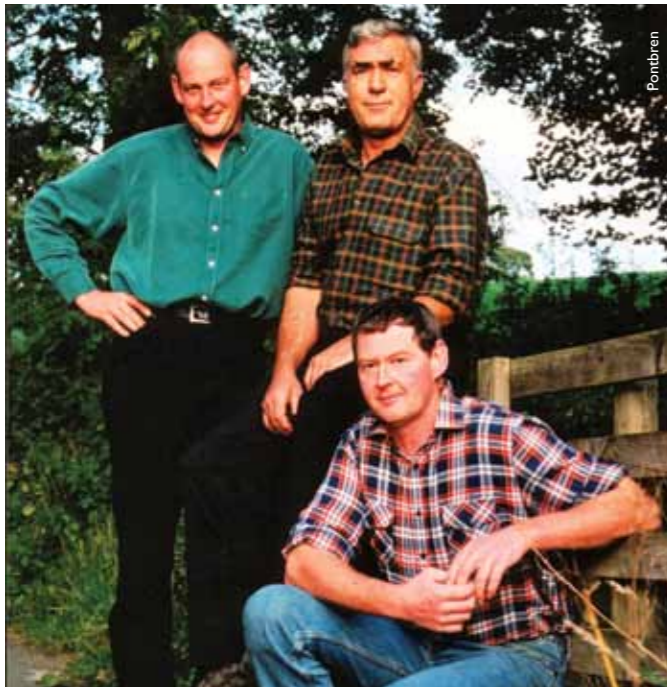


1990s



The impetus for the project came from three neighbouring farmers, who in 1997 were trying to make their farm businesses more sustainable by planting hedges and trees to provide more shelter for livestock grazing the steep, windswept land. The results and the evident benefits of a collaborative approach attracted neighbouring farmers, who joined the first three. In 2001 the Pontbren farmers came together as a group of ten, managing a total of 1,000 ha of farmland across the catchment. Since then they have worked on a wider range of collaborative environmental ventures, and continue to meet as a group and work together. Over the past 15 years the Pontbren farm woodland innovations have been the focus of more field research on the environmental benefits of farm woodland than anywhere else in the UK. The key factor in the success of Pontbren has been the farmers – collaborating as a group, cooperating with the scientists, but each remaining firmly in control of the management decisions on their own land.

Trees and woods are now an integral part of farm management in Pontbren and there is a growing body of scientific evidence confirming the benefits for upland livestock farming, water management, wildlife and landscape. Here we look at the achievements and results of the first ten years and show how the Pontbren approach could be the model for other upland catchments.



The impetus for the project came from three neighbouring farmers. Daeth yr ysgogiad i'r prosiect gan dri ffermwr.



The key factor in the success of Pontbren has been the farmers.

Y ffactor allweddol yn llwyddiant Pontbren fu'r ffermwyr.

Gydag erwau'r fferm a niferoedd stoc yn cynyddu, y nod oedd canolbwyntio ar effeithlonrwydd a hwylustod gwaith y fferm. Effaith hyn oedd symleiddio'r dirwedd drwy gynyddu maint y caeau a gyfrannodd at gynefinoedd fywyd gwyllt yn lleihau a dirywio ac fel roedd strwythur y caeau yn cael eu rhesymoli, hefyd, aeth defnydd ymarferol y coedlannau yn angof.

Daeth yr ysgogiad i'r prosiect gan dri ffermwr oedd yn gymdogion oedd, yn 1997 yn ceisio gwneud busnes eu ffermydd yn fwy cynaliadwy drwy blannu gwrychoedd a choed i ddarparu mwy o gysgod i'r anifeiliaid oedd yn pori'r tir anghysbell a brochus ei thywydd. Y canlyniadau a lles amlwg y dull cydweithrediadol hwn oedd denu ffermwyr cyfagos, a ymunodd â'r tri cyntaf. Yn 2001 daeth ffermwyr Pontbren at ei gilydd fel grŵp o ddeg, yn rheoli cyfanswm o 1000 ha o dir fferm ar draws yr ardal. Ers hynny maent wedi gweithio ar amrywiaeth ehangach o fentrau amgylcheddol cydweithrediadol ac maent yn parhau i gyfarfod fel grŵp a gweithio gyda'i gilydd. Dros y 15 mlynedd mae menter coetir fferm Pontbren wedi bod yn ffocws mwy o waith ymchwil maes ar les amgylcheddol coetir fferm nag unrhyw le arall yn y DU. Y ffactor allweddol yn llwyddiant Pontbren fu'r ffermwyr – yn cydweithio fel grŵp, yn cydweithio gyda'r gwyddonwyr, ond pob un yn gwneud eu penderfyniadau rheoli tir eu hunain.

Mae coed a choetiroedd erbyn hyn yn rhan hanfodol o reoli fferm ym Mhontbren ac mae corff o dystiolaeth wyddonol gynyddol i'r lles wrth ffermio anifeiliaid pori'r ucheldir, rheoli dŵr, bywyd gwyllt a thiriogaeth. Yma rydym yn edrych ar lwyddiannau a chanlyniadau'r deng mlynedd cyntaf ac yn dangos sut y gall dull Pontbren fod yn fodel i ddalylchoedd eraill yn yr ucheldir.

## Farmer-led improvements to livestock production

At the end of the 1990s the first group of three Pontbren livestock farmers decided to change the way they farmed. The aim was to reduce costs, make their farming systems more economically and environmentally sustainable in the longer term, and improve prospects for the next generation on these family farms. The key to these changes was to improve shelter by tree planting and restoring neglected woodland and hedges. Since then the collaborative efforts of the larger group of ten Pontbren farmers have gone much further, reinstating woodland management as an integral part of successful modern upland livestock farming systems, developing wood chip bedding systems applicable throughout Wales, and improving not just the economic value of their land but the environment in which they live and work.

A key change was a shift from crossbred ewes to hardier, local sheep breeds that would not always need to be housed at lambing time or during the long winters. Although breeds such as the improved Welsh Mountain, Lleyn and Speckled Face are better adapted to grazing improved upland grassland at 300m it was evident that they would need more shelter on the pastures, particularly for the lambs. Most of the shelter on the farms had been removed decades earlier, as hedges were taken out when farms were amalgamated and grassland management intensified.

## Gwelliannau i gynnyrch da byw wedi eu harwain gan y ffermwyr

Gwelliannau i gynnyrch da byw wedi eu harwain gan y ffermwyr.

Ar ddiwedd y 1990au penderfynodd tri o ffermwyr da byw Pontbren newid eu dulliau ffermio. Y bwriad oedd gostwng eu costau, gwneud eu systemau ffermio yn fwy cynaliadwy yn economaidd ac amgylcheddol yn yr hirdymor, a gwella'r rhagolygon i'r genhedlaeth nesaf ar y ffermydd teuluol hyn. Yr allwedd i'r newidiadau hyn oedd gwella cysgod drwy blannu coed ac adfer coedlannau a gwrychoedd oedd wedi eu hesgeuluso. Ers hynny mae ymdrechion cydweithio gan grŵp o ddeg o ffermwyr Pontbren wedi mynd gryn dipyn ymhellach. Maent wedi adfer rheoli coetir fel rhan anhepgor o systemau ffermio da byw modern, sy'n llwyddiannus yn yr ucheldir, datblygu systemau haenau sglodion pren sy'n gymwys ledled Cymru, a gwella nid yn unig gwerth economaidd y tir ond hefyd yr amgylchedd ble maent yn byw ac yn gweithio.

Newid allweddol oedd symud o famogiaid a groes fridiwyd i fridiau defaid lleol, gwynnach na fyddai angen eu rhoi dan do bob amser yn ystod wyna neu yn ystod y gaeafau hir. Er fod bridiau fel y Dafad Fynydd Cymru, Defaid Llŷn a'r Wyneb Brych amgen wedi addasu'n well i bori ar laswelltir yr ucheldir oedd wedi'i wella, roedd yn amlwg y byddent angen mwy o gysgod ar y borfa, yn enwedig ar gyfer yr ŵyn. Roedd y mwyafrif o'r cysgod ar y ffermydd wedi ei dynnu ddegawdau yn ôl wrth i'r gwrychoedd gael eu tynnu pan oedd y ffermydd yn cael eu cyfuno a rheoli glaswelltir yn cael ei ddwysau.



A key change was a shift to hardier stock which could spend less time indoors and require less supplementary feeding.

Newid allweddol oedd symud o famogiaid a groes fridiwyd i fridiau defaid lleol, gwynnach a fyddai angen llai o fwydo ychwanegol.





Choosing locations for the new shelterbelts and hedges was an opportunity to rationalise some awkward field boundaries.

Roedd dewis lleoliadau newydd ar gyfer lleiniau cysgod a gwrychoedd newydd yn gyfle i resymoli rhai ffiniau caeau anodd.

The hedges running along the contours were often the first to go, to make it easier to cultivate up and down the slope. Although the farmers had planted some coniferous shelterbelts in the 1970s, these had become gappy and prone to windblow, and the livestock tended to seek shelter instead in the older unfenced woodland on steep-sided valleys where they were more difficult to manage.

The collaborative process was simple and effective.

The farmers met every week and initially each was given a large-scale map of their own farm on which to plan the improvements. This eventually led to the group forming a cooperative which took on other business ventures such as meat marketing, but the key element has been informal collaborative working among a group of like-minded neighbours, not the legal processes. With most of the environmental improvements completed the group continues to meet, and they are now jointly researching the history of their farms. The farmers did need outside help with planning the new woodland and the details of woodland management, skills which most of them had not required before. Coed Cymru staff have provided this skilled support throughout the project and, crucially, have guided the farmers through the sometimes complex administration. Often Coed Cymru has acted as mediator between the farmers and the government authorities responsible for agricultural and forestry funding and regulation.

Y gwrychoedd oedd yn dilyn y cyfuchlinau oedd y cyntaf i fynd fel rheol, gan ei gwneud yn haws i amaethu i fyny ac i lawr y llechwedd. Er fod y ffermwyr wedi plannu rhai lleiniau cysgod coniferaidd yn ystod y 1970au, roedd y rhain yn fylchog ac yn tueddu i gael eu dymchwel gan y gwynt. Roedd y da byw yn tueddu i chwilio am gysgod yn yr hen goetir oedd heb ei ffensio ar lechweddau serth y dyffrynnoedd, ble roedd yn anoddach i'w rheoli.

Roedd y broses cydweithredu yn syml ac effeithiol. Roedd y ffermwyr yn cyfarfod bob wythnos, ac i ddechrau fe gawsant fap ar raddfa fawr map o'r fferm eu hunain er mwyn iddynt gynllunio gwelliannau. Arweiniodd hyn maes o law at y grŵp yn ffurfio cwmni cydweithredol wnaeth gychwyn mentrau busnes eraill fel marchnata cig, ond y brif elfen oedd y cydweithio anffurfiol rhwng grŵp o gymdogion o'r un feddylfryd, nid y broses gyfreithiol. Gyda'r mwyafrif o'r gwelliannau amgylcheddol wedi eu cwblhau mae'r grŵp yn dal i gyfarfod, ac maent nawr yn cydweithio ar ymchwilio i hanes eu ffermydd.

Roedd y ffermwyr angen cymorth o'r tu allan gyda phlannu coetir newydd a manylion am reoli coetir, sgiliau nad oedd y mwyafrif ohonynt wedi bod eu hangen o'r blaen. Darparodd staff Coed Cymru y cymorth sgiliau hwn drwy gydol y prosiect ac, yn hanfodol, maent wedi arwain y ffermwyr

The farmers knew where shelter was needed, and either did the fencing and planting themselves or employed local contractors to ensure that they supported local jobs. Suitable species of broadleaf shrubs and trees were chosen which provided the effective, slightly wind-permeable shelter needed throughout the year. Choosing locations for the new shelterbelts and hedges was an opportunity to rationalise some awkward field boundaries, fence out land that was difficult to manage such as steep valley sides, and improve access for stock gathering at the same time. Biosecurity was also an important consideration, and hedges or strips of woodland along farm boundaries had the additional benefit of reducing the risks of contact with other herds and flocks.

Rather than attempt to improve the drainage of persistently wet patches of grassland where it was difficult to harvest silage and there were risks of liver fluke and foot rot, the farmers chose to fence off these areas and excavate ponds. Now there are 12 ponds across the Pontbren farms, which provide an additional supply of water piped to troughs in nearby fields; in one case the material excavated to create the pond was used to construct the bank of a new hedge.

As more farmers joined the group the woodland and hedgerow renovation work produced a steady supply of woody material of varying quality. Where it was not suitable for sawmilling or firewood, the waste wood was chipped.



Now there are 12 ponds across the Pontbren farms which provide an additional supply of water.

Erbyn hyn mae 12 o byllau dŵr ar draws ffermydd Pontbren sy'n darparu cyflenwad ychwanegol o ddŵr.



Woodland along farm boundaries had the additional benefit of reducing the risks of contact with other herds and flocks.

Lain o goed ar hyd ffiniau fferm gyda'r lles ychwanegol o leihau y perygl o gyswllt â buchesau a gyroedd a diadelloedd eraill.

drwy beth oedd ambell dro yn weinyddu cymhleth. Roedd Coed Cymru yn aml yn ymddwyn fel canolwr rhwng y ffermwyr ac awdurdodau'r llywodraeth oedd yn gyfrifol am amaethyddiaeth a chyllido a rheoleiddio coedwigaeth.

Gwyddai'r ffermwyr ble roedd angen y cysgod, ac roeddynt naill ai'n gwneud y ffensio a'r plannu eu hunain neu'n cyflogi contractwyr lleol er mwyn sicrhau eu bod yn cefnogi swyddi yn lleol. Dewiswyd rhywogaethau addas o lwyni a choed oedd yn darparu cysgod effeithiol, oedd yn caniatáu ychydig o wynt drwyddo oedd ei angen gydol y flwyddyn. Roedd dewis lleoliadau newydd ar gyfer lleiniau cysgod a gwrychoedd newydd yn gyfle i resymoli rhai ffiniau caeau anodd, i ffensio tir oedd yn anodd i'w reoli fel llethrau dyffrynnoedd serth, a gwella mynediad i gasglu stoc ar yr un pryd. Roedd bioddiogelwch hefyd yn ystyriaeth bwysig, ac mae gwrychoedd neu lain o goed ar hyd ffiniau fferm gyda'r lles ychwanegol o leihau y perygl o gyswllt â buchesau a gyroedd a diadelloedd eraill.

Yn hytrach na cheisio gwella draeniad clytiauw gwyb o laswelltir ble roedd yn anodd cynaeafu silwair a ble roedd perygl o lyngyr yr iau a chlwy'r traed, dewisodd y ffermwyr osod ffens o gwmpas yr ardaloedd hyn a chloddio'r pyllau dŵr.



Like most other livestock farms in Wales, the Pontbren farmers relied on bought-in straw as winter bedding for cattle and sheep, sometimes brought from as far away as Lincolnshire. They decided to try using woodchip as livestock bedding. This had not been done before but, after a process of trial and error, it proved to be a successful alternative to straw. The keys to success are the moisture content and size of the woodchips, but the type of timber does not seem to matter. The woodchip must be dry, less than 20% moisture content, and of the right size because if too small it tends to cake together, particularly under sheep, and if too large it is not sufficiently absorbent. One of the big advantages of woodchip bedding is that, unlike straw, it can be composted, screened and reused several times. The heat of the composting process kills pathogens and weed seeds and when it finally breaks down, after three or more cycles of accumulating nutrients as livestock bedding, it provides a fertile peat-free growing material.

These pioneering efforts at Pontbren were followed up by controlled trials of woodchip bedding and compost by universities and research centres in other parts of Wales, which confirmed it is a good alternative to straw as livestock bedding, promoting high standards of health and cleanliness in sheep and cattle<sup>1</sup>. One of the Pontbren farmers went a stage further in recycling, and used the final woodchip compost as the basis of a tree nursery growing plants for the other farmers in the group, and marketing the surplus.

At the request of Welsh Government, seven of the farms conducted an experiment to assess the effect of reducing sheep numbers on farm finances. The farmers kept open accounts during this period, showing the costs of integrating woodland management into upland farming and the benefits to their farm businesses, and these have been made available to government researchers. The business benefits are not confined to the improved efficiency of the livestock enterprises. The farmers feel that the successful integration of woodland management into upland livestock farming has also 'future-proofed' their farms, by improving the capital value of the land, making it more resilient to the effects of severe weather events as the climate changes, and substantially reducing the risk of accidental breaches of biosecurity and water pollution standards.

Erbyn hyn mae 12 o byllau dŵr ar draws ffermydd Pontbren, sy'n darparu cyflenwad ychwanegol o ddŵr wedi ei gludo â phibau i gafnau mewn caeau cyfagos; mewn un achos defnyddiwyd y deunydd a gloddiwyd o'r pwll dŵr i adeiladu'r clawdd i wrych newydd.

Wrth i fwy o ffermwyr ymuno â'r grŵp cynyddu wnaeth y gwaith o adnewyddu'r coetir a'r cloddiau ac yn ei dro ddarparodd gyflenwad cyson o gynnyrch a deunydd coediog o wahanol ansawdd. Ble nad oedd yn addas ar gyfer melinau llifio neu goed tân, roedd y coed gwastraff yn cael ei asglodi. Fel gyda'r rhan fwyaf o ffermydd anifeiliaid pori eraill yng Nghymru, roedd ffermwyr Pontbren yn dibynnu ar wellt wedi ei brynu fel gwasarn gaeaf i wartheg a defaid, weithiau wedi ei brynu o gyn belled â Swydd Lincoln. Penderfynwyd ceisio defnyddio sglodion coed fel gwasarn i'r anifeiliaid. Nid oedd hyn wedi ei wneud o'r blaen ond, ar ôl proses o brofi a methu, profodd i fod yn ffordd amgen i wellt. Yr allwedd i lwyddiant yw cynnwys lleithder a maint y sglodion, ond nid yw'r math o goed yn bwysig. Rhaid i'r sglodion pren fod yn sych, llai na 20% o leithder ac o'r maint cywir oherwydd os yw'n rhy fach mae'n tueddu i grawennu, yn arbennig dan ddefaid, ac os yw'n rhy fawr nid yw'n ddigon amsugol. Un o fanteision mawr gwasarn sglodion coed yw, yn annhebyg i wellt, y gellir ei gompostio, ei sgrinio a'i ail ddefnyddio sawl gwaith. Mae gwres y broses gompostio yn lladd pathogenau a hadau chwyn, a phan ei fod yn y diwedd yn torri i lawr, ar ôl tri neu fwy o gylchrediadau o faetholion sy'n cronni fel gwasarn anifeiliaid, mae'n darparu deunydd tyfu ffrwythlon sy'n rhydd o fawn.

Dilynwyd yr ymdrechion arloesol hynny ym Mhontbren gan brofion dan reolaeth o wasarn sglodion pren a chompost gan brifysgolion a chanolfannau ymchwil mewn rhannau eraill o Gymru, oedd yn cadarnhau ei fod yn ddewis amgen da i wellt fel gwasarn i anifeiliaid, gan hybu safonau iechyd a glendid uwch mewn defaid a gwartheg<sup>1</sup>. Aeth un o ffermwyr Pontbren gam ymhellach wrth ailgylchu, a defnyddio'r compost sglodion pren olaf un fel sylfaen i'w ddefnyddio mewn meithrinfa goed yn tyfu planhigion i ffermwyr eraill yn y grŵp, a marchnata'r gweddill.

Ar gais Llywodraeth Cymru, cynhaliodd saith o'r ffermydd arbrawf i asesu effaith gostwng niferoedd defaid ar gyllid y ffermydd. Cadwodd y ffermwyr eu cyfrifon ar agor drwy'r cyfnod hwn, gan ddangos costau integreiddio rheoli coetir i ffermio'r ucheldir a'r manteision i'w busnes fferm, ac roedd rhain ar gael i ymchwilwyr y llywodraeth.

Opportunities for game shooting have improved at Pontbren along with the woodland and wetland habitats, and could be a potential source of additional income in the future, if the farmers chose to let the shooting rights.



After a process of trial and error, woodchip bedding proved to be a successful alternative to straw.

Ar ôl proses o brofi a methu, profwyd fod sglodion coed yn ddewis amgen llwyddiannus fel gwasarn i'r anifeiliaid, yn lle gwellt.

Nid yw'r manteision busnes yn cael eu cyfyngu i wella effeithiolrwydd y mentrau anifeiliaid pori. Mae'r ffermwyr yn teimlo fod yr integreiddio llwyddiannus o reoli coetir i ffermio anifeiliaid yr ucheldir wedi gwneud eu ffermydd yn ddiogel i'r dyfodol, trwy wella gwerth cyfalaf y tir, ei wneud yn fwy gwydn i effeithiau digwyddiadau eithafol y tywydd fel mae'r hinsawdd yn newid, ac yn gostwng yn sylweddol y risg o doriadau damweiniol yn safonau bioddiogelwch a llygredd dŵr. Mae cyfleoedd helwriaeth wedi gwella ym Mhontbren ynghyd â chynefinoedd coetir a gwlypdir, a gall hyn fod yn ffynhonnell posibl o incwm ychwanegol yn y dyfodol, pe bai'r ffermwyr yn dewis gosod yr hawliau saethu.



Growing conditions can be harsh in the uplands of Wales, and planting shelterbelts and hedges is a long-term investment.

Gall amgylchiadau tyfu fod yn llym yn ucheldiroedd Cymru, ac mae plannu lleiniau cysgodol a gwrychoedd yn fuddsoddiad hirdymor.





New ponds benefited both farming and biodiversity.

Pyllau dŵr newydd lles ffermio a bioamrywiaeth.

## Woodland, wildlife and landscape – achievements of the first 10 years

The woodland improvements at Pontbren were carefully designed to achieve the farmers' agricultural objectives by creating woodland cover that was as natural as possible, and would be long-lived and easy to maintain after the initial establishment period. The hedgerow planting and management took a similar approach, and new ponds were created which benefitted both farming and biodiversity. This required a rather unconventional approach to woodland establishment, necessarily very different from that of a forester planting a timber crop. The details have been refined over the years at Pontbren, using planting stock grown by the farmers in their own tree nursery and other local suppliers. A range of different sources of funding supported this environmental work, which did not fit easily into

## Coetiroedd, bywyd gwylt a thirwedd – llwyddiannau'r 10 mlynedd cyntaf

Cynlluniwyd gwelliannau coetir ym Mhontbren yn ofalus i gyflawni bwriadau amaethyddol y ffermwyr trwy greu gorchudd coetir oedd mor naturiol â phosibl, ac a fyddai'n byw'n hir ac yn hawdd i'w gynnal ar ôl y cyfnod sefydlu cychwynnol. Roedd plannu gwrychoedd a rheoli yn gofyn am yr un dull, a chrëwyd pyllau dŵr newydd oedd er lles ffermio a bioamrywiaeth. Roedd hyn yn gofyn am ddull anghonfensiynol o sefydlu coetir, o anghenraid yn wahanol iawn i goedwigwr yn plannu cnwd o goed. Mae'r manylion wedi eu mireinio dros y blynyddoedd ym Mhontbren, gan ddefnyddio stoc plannu wedi eu tyfu gan y ffermwyr yn eu meithrinfa goed eu hunain a gan gyflenwyr lleol eraill. Cefnogwyd y gwaith amgylcheddol gan amrywiaeth o ffynonellau cyllido, nad oedd yn ffitio'n hawdd i ofynion cynlluniau grantiau safonol.

the requirements of standard grant schemes. The wildlife benefits are impressive for both woodland and wetlands, and the process of landscape simplification has been reversed. When the tree planting began only 1.5% of the Pontbren land was woodland, mostly neglected riparian woodland and small areas of larch, but 10 years later 120,000 new trees and shrubs have been planted, 16.5 km of hedges have been created or restored and nearly 5% of the Pontbren land is now woodland. This is a major achievement in just 10 years, with no loss of agricultural productivity. The Pontbren farmers have not finished yet. They intend to continue planting trees and hedgerows and managing their woodland, increasing the potential for long-term environmental benefits on these upland farms.

Growing conditions can be harsh in the uplands of Wales, and planting shelterbelts and hedges is a long-term investment. The Pontbren farmers realised that it was just as important to choose hardy woodland plants well adapted to the local conditions as it had been to invest in native sheep breeds. With advice from Coed Cymru\* the farmers planted a range of broadleaf species suited to the ground conditions, with the aim of creating more natural mixed woodland. This would provide all-year-round shelter, new wildlife habitats and landscape diversity, and be more resilient to the challenges of a changing climate in future.

\*<http://www.coedcymru.org.uk/>

Mae'r manteision i fyd natur yn drawiadol i goetir a gwlypdiroedd, ac mae'r broses o symleiddio'r tirwedd wedi ei wrth-droi. Pan ddechreuwyd ar blannu coed dim ond 1.5% o dir Pontbren oedd yn goetir, y rhan fwyaf yn goetir glannau afon wedi ei esgeuluso ac ardaloedd bach o goed llarwydden, ond ddeng mlynedd yn ddiweddarach mae 120,000 o goed newydd a llwyni wedi eu plannu. Mae 16.5 km o wrychoedd wedi eu creu neu eu hadnewyddu ac mae bron i 5% o dir Pontbren bellach yn goetir. Mae hyn yn llwyddiant mawr mewn dim ond 10 mlynedd heb golli dim cynnyrch amaethyddol. Nid yw ffermwyr Pontbren wedi gorffen eto. Maent yn bwriadu plannu coed a gwrychoedd a rheoli eu coetiroedd, gan gynyddu'r potensial i fanteision amgylcheddol ar y ffermydd hyn yn yr ucheldir.

Gall amgylchiadau tyfu fod yn llym yn ucheldiroedd Cymru, ac mae plannu lleiniau cysgodol a gwrychoedd yn fuddsoddiad hirdymor. Roedd ffermwyr Pontbren yn sylweddoli ei fod yr un mor bwysig i ddewis planhigion coetir gwydn wedi eu haddasu'n dda i amgylchiadau lleol, ag yr oedd i fuddsoddi mewn bridiau defaid cynhenid. Gyda chynghor gan Goed Cymru\* plannodd y ffermwyr ystod o rywogaethau llydanddail oedd yn gweddu i amodau'r tir, gyda'r bwriad o greu coetir mwy naturiol gymysg. Fe fyddai hwn yn darparu gwarchodfa gydol y flwyddyn, cynefinoedd byd natur newydd ac amrywiaeth o dirwedd, ac fe fyddai hefyd yn fwy gwydn i her newid hinsawdd yn y dyfodol.

\*<http://www.coedcymru.org.uk/>



High density mixed planting requires very careful maintenance in the first three years.

Mae plannu cymysg, dwysedd uchel yn gofyn am gynnal gofalus yn ystod y dair mlynedd gyntaf.



Because the primary aim was not to grow a crop of timber there was no need to follow the traditional geometry or silvicultural systems of plantation forests. Instead, shelterbelts of mixed broadleaved trees were planted at unconventionally high densities together with a large proportion of shrubs.

Typical woodland species are planted in the centre, with hedge species on either side to provide shelter quickly before the new woodland understory develops. They are easily coppiced to maintain this function in the longer term. Species used in the mixed planting at Pontbren fall into three broad groups, each with a particular role in the woodland:

- Quick-growing pioneer tree species which thrive in open conditions such as silver birch (*Betula pendula*), downy birch (*B. pubescens*), rowan (*Sorbus aucuparia*) and in wetter areas black alder (*Alnus glutinosa*), and for the most exposed sites aspen (*Populus tremula*) and willow (*Salix spp.*), but planting the latter away from field drains which the roots might block;

Oherwydd mai nid y bwriad cyntaf oedd tyfu cnwd o goed nid oedd angen dilyn geometreg traddodiadol neu systemau coedamaeth fforestydd planhigfa.

Yn hytrach, plannwyd lleiniau cysgodol o goed cymysg llydanddail ar ddwyyster uchel iawn, anghonfensiynol ynghyd â chyfartaledd uchel o lwyni. Mae cynefinoedd coetiroedd nodweddiadol yn cael eu plannu yn y canol, gyda rhywogaethau gwrychoedd ar bob ochr i gynnig lloches cyflym cyn bod isdyfiant y coetir newydd wedi datblygu ac wedyn gallant gael eu prysgoedio'n hawdd i gynnal y swyddogaeth hon yn y tymor hir. Mae'r rhywogaethau a ddefnyddir yn y plannu ym Mhontbren yn syrthio i dri grŵp eang, bob un â rhan arbennig yn y coetir:

- Rhywogaeth coed arloesol sy'n tyfu'n gyflym ac yn ffynnu mewn amgylchiadau agored er enghraifft y fedw arian (*Betula pendula*; silver birch), y fedw lwyd (*B. Pubescens*; downy birch), y griafolen (*Sorbus aucuparia*; rowan) ac ar dir gwlypach y wernen (*Alnus glutinosa*; alder), ac ar gyfer y mannau mwyaf agored yr aethnen (*Populus tremula*; aspen) a'r helyg (*Salix spp.*), ond gan blannu'r olaf oddi wrth traeniau'r cae gan y gall y gwreiddiau flocio traeniau;



Funding from government grant schemes had to be adjusted as a special case to accommodate the innovative approach, in particular the high cost of fencing long, narrow strips of woodland.

Bu'n rhaid addasu gofynion cynlluniau grant y llywodraeth fel achos arbennig i ymgymhwyso ar gyfer y dull arloesol yma o sefydlu coetir, yn arbennig y gost uchel o ffensio lleiniau hir, cul o goetir.



Administering the Enfys fund on behalf of the Wales Council for Voluntary Action involved setting up a self-regulating system of accounting and quality control.

Dderbyniodd y prosiect gyllid oddi wrth Enfys, a symbylodd hyn y grŵp i ffurfio cwmni cydweithredol, a fu'n gweinyddu'r cyllid ar ran Cyngor Gweithredu Gwirfoddol Cymru.

- Long-lived but slower-growing large trees that will provide timber in 40–100 years' time, for example sessile oak (*Quercus petraea*), the native oak of the western uplands of Wales, ash (*Fraxinus excelsior*) an important woodland species which survives at higher altitudes than oak in Wales, and sweet chestnut (*Castanea sativa*);
- Easily coppiced shade tolerant shrubs that will do well inside the wood, especially hazel (*Corylus avellana*) and holly (*Ilex aquifolium*), and on the edges where there is more light, bird cherry (*Prunus padus*), field maple (*Acer campestre*), hawthorn (*Crataegus monogyna*) and blackthorn (*Prunus spinosa*).

Experience has shown that these mixtures do best if planted all at the same time, but high density mixed planting of this type requires very careful maintenance in the first three years, and particular attention to weeding. The other critical issue is using planting stock of the right provenance, suited to the more challenging growing conditions above 240m.

- Coed sy'n byw'n hir ond sy'n goed mawr yn tyfu'n arafach ac a fydd yn darparu coed mewn 40–100 o flynyddoedd, er enghraifft derw digoes (*Quercus petraea*; sessile oak), derwen gynhenid ucheldir gorllewinol Cymru, yr onnen (*Fraxinus excelsior*; ash) rhywogaeth coetir pwysig sy'n goroesi ar uchderau uwch na'r dderwen yng Nghymru, a'r castanwydden bêr (*Castanea sativa*; sweet chestnut);
- Prysgwydd a wnaiff brysgoedio'n hawdd ac sy'n goddef cysgod a fydd yn gwneud yn dda y tu fewn i'r coed, yn arbennig y gollen (*Corylus avellana*; hazel) a'r celyn (*Ilex aquifolium*; holly), ac ar yr ymylon ble mae mwy o olau, coed ceirios yr adar (*Prunus padus*; bird cherry), masarnen fach (*Acer campestre*; field maple), y ddraenen wen (*Crataegus monogyna*; hawthorn) a'r ddraenen ddu (*Prunus spinosa*; blackthorn).

Mae profiad yn dangos fod y cymysgedd hwn yn gwneud orau os ydynt wedi eu plannu ar yr un pryd, ond mae plannu cymysg, dwysedd uchel o'r math yma yn gofyn am gynnal gofalus yn ystod y dair mlynedd gyntaf, a thalu sylw arbennig i'r chwynnu. Y mater arall sydd o bwys mawr yw defnyddio stoc plannu o'r tarddiad cywir, sy'n gweddu i amodau tyfu mwy heriol uwchben 240m.



**Problems with plants supplied of the wrong provenance encouraged the farmers to set up their own tree nursery.**

Un o'r rhesymau a hybodd y ffermwyr i ddechrau eu meithrinfa goed eu hunain oedd y problemau gyda phlanhigion a gyflenwyd o'r tarddiad anghywir.



Problems with plants supplied of the wrong provenance, which were not detected until these failed to establish, was one of the reasons that encouraged the farmers to set up their own tree nursery. Here they propagated trees and shrubs from seed and vegetative material gathered on the farms, successfully providing for their own needs plus a surplus to sell. When central and local government grants for tree and hedge planting on farms were curtailed, the Pontbren and other small nurseries supplying local farmers closed (although the nursery beds of composted woodchip continue to produce fine crops of vegetables at Pontbren).

The costs of the initial woodland planting and hedge restoration projects were borne entirely by the farm businesses, but scaling up the environmental improvements across 10 farms was only possible with additional funding. The first came from LEADER, followed by Scottish Power's Rural Care Scheme. Funding for hedgerows, ponds and wetlands came from the lottery-funded programme Enfys and this prompted the group of 10 to form a cooperative, which administered the Enfys fund on behalf of the Wales Council for Voluntary Action. This involved setting up a self-regulating system of accounting and quality control. Woodland work was supported by funding from government grant schemes, but the requirements

Un o'r rhesymau a hybodd y ffermwyr i ddechrau eu meithrinfa goed eu hunain oedd y problemau gyda phlanhigion a gyflenwyd o'r tarddiad anghywir na chawsant eu canfod nes iddynt fethu â sefydlu. Yma roeddynt yn tyfu a lluosogi coed a llwyni o hadau a deunydd llystyfiannol a gasglwyd ar y ffermydd, gan ddarparu'n llwyddiannus ar gyfer eu hanghenion eu hunain a gyda choed dros ben i'w gwerthu. Pan gwtogwyd grantiau'r llywodraeth i blannu coed a gwrychoedd ar ffermydd, caewyd meithrinfa Pontbren a meithrinfeidd bach eraill oedd yn cyflenwi ffermwyr lleol (er bod y gwelyau meithrinfa sglodion coed wedi eu compostio yn parhau i gynhyrchu cnydau da o lysiau ym Mhontbren.

Busnesau'r fferm fu'n dwyn costau prosiect plannu cychwynnol y coetir ac adnewyddu'r gwrychoedd yn gyfangwbl, ond doedd mynd i'r afael â gwelliannau amgylcheddol dros 10 fferm ddim ond yn bosibl gyda chyllid ychwanegol. Daeth y cyntaf o LEADER, wedi ei ddilyn gan gyllid Cynllun Gofal Gwledig Scottish Power. Daeth y cyllid ar gyfer y gwrychoedd, y pyllau dŵr a'r gwlypdiroedd gan Enfys, rhaglen wedi ei chyllido gan y loteri, a symbylodd hyn y grŵp o 10 i ffurfio cwmni cydweithredol, a fu'n gweinyddu cyllid Enfys ar ran Cyngor Gweithredu Gwirfoddol Cymru. Roedd hyn yn golygu sefydlu system hunan-reoledig o gyfrifyddu a rheoli ansawdd. Cafodd gwaith yn y coetir ei gynorthwyo gan gyllid cynlluniau grantiau'r llywodraeth, ond bu'n rhaid addasu'r gofynion fel achos arbennig i ymgymhwyso ar gyfer

had to be adjusted as a special case to accommodate the innovative approach to woodland establishment at Pontbren, in particular the high cost of fencing long, narrow strips of woodland.

The existing woodland was thinned where necessary and enriched with native species such as oak, with the aim of long-term management as continuous cover. The old hedges were coppiced, gapped up and restored as stockproof boundaries and effective shelter. Considerable efforts were made to find the best use for the timber produced from restoring old woodland and hedgerows. Some went for sawmilling, providing enough material to build an extension to one of the farmhouses, and much of the sycamore was sold to local woodworking craftsmen. After this initial surplus the productivity of the woodland declined sharply, but it will continue to provide a small supply of fuel and woodchip from coppiced material.

The wildlife benefits of the new and improved habitats within the farmed landscape became evident to the farmers very quickly, and were not confined to the woodland. Fencing the riparian woodlands meant that stock no longer had access to the streams. The reduced disturbance allowed bankside vegetation to develop and the streams to resume a more natural profile with riffles and pools, which are used by trout and otters.

y dull arloesol o sefydlu coetir ym Mhontbren, yn arbennig y gost uchel o ffensio lleiniau hir, cul o goetir.

Teneuwyd coetiroedd oedd eisoes yn bodoli ble roedd hynny'n angenrheidiol a chawsant eu cyfoethogi gan rywogaethau cynhenid, er enghraifft coed derw, gyda'r bwriad o reoli hirdymor fel yswiriant parhaol.

Prysgoediwyd yr hen wrychoedd drwy fôn docio, cau'r bylchu a'u hadnewyddu fel terfynau diogel rhag anifeiliaid ac fel lloches effeithiol.

Gwnaed ymdrechion sylweddol i ganfod y defnydd gorau o'r coed a gynhyrchwyd o adnewyddu'r hen goetir a gwrychoedd. Aeth peth i felin lifio, gan ddarparu digon o ddeunydd i godi estyniad i un o'r tai fferm, a gwerthwyd llawer o'r sycamorwydden i grefftwy'r coed lleol. Ar ôl y gormodedd ar y cychwyn dirywiodd cynnyrch y coetiroedd yn arw, ond byddant yn parhau i ddarparu cyflenwad bach o danwydd a sglodion coed o'r prysgoedio.

Daeth y manteision i fyd natur o'r cynefinoedd newydd a'r rhai oedd wedi'u gwella ar dirwedd y ffermydd yn amlwg i'r ffermwyr yn gyflym iawn, ac nid oeddent wedi'u cyfyngu i'r coetir. Roedd ffensio y coetiroedd glannau'r afon yn golygu nad oedd gan yr anifeiliaid bellach agoriad i'r nentydd. Roedd yr ymyrraeth cyfyngedig yn caniatáu i llystyfiant glan yr afon i ddatblygu ac i'r nentydd gael proffil mwy naturiol gyda chrychdonnau a phyllau, a ddefnyddir gan frithyll a dyfrgwn.



**The old hedges were coppiced, gapped up and restored as stockproof boundaries and effective shelter.**

Prysgoediwyd yr hen wrychoedd drwy fôn docio, cau'r bylchu a'u hadnewyddu fel terfynau diogel rhag anifeiliaid ac fel lloches effeithiol.



There have also been sightings of one of the UK's most endangered mammals, the water vole. Pontbren is home to many wild birds including 12 species of particular conservation importance – hen harrier, skylark, linnet, barn owl, lapwing, snipe, kingfisher, curlew, red kite, cuckoo, stonechat and woodcock. The farmers believe that their efforts to control some troublesome predators, including magpies, have helped to improve the breeding success of ground nesting birds.

The landscape changes at Pontbren are interesting because the woods, hedges and ponds have restored some of the landscape pattern and diversity that had been lost during the 20th century. That said, the work has formed a fully functioning 21st century landscape, and was not an attempt to recreate an historic landscape that was the product of a very different farming system and social structure.

The farmers have researched the history of their farms over the past 170 years and this shows just how much the land use has changed.



The wildlife benefits of the new and improved habitats within the farmed landscape became evident to the farmers very quickly,

Ddaeth y manteision i fyd natur o'r cynefinoedd newydd a'r rhai oedd wedi'u gwella ar dirwedd y ffermydd yn amlwg i'r ffermwyr yn gyflym iawn



Pontbren is home to many wild birds including 12 species of particular conservation importance.

Mae Pontbren yn gartref i lawer o adar gwyllt gan gynnwys 12 rhywogaeth o bwysigrwydd cadwriaethol arbennig.

Gwelwyd hefyd un o famaliaid sydd mewn mwyaf o berygl o ddfodiant, y llygoden ddŵr. Mae Pontbren yn gartref i lawer o adar gwyllt gan gynnwys 12 rhywogaeth o bwysigrwydd cadwriaethol arbennig – boda tinwyn, ehedydd, llinos, tylluan wen, cornchwiglen, giach, glas y dorlan, gylfinir, barcud coch, y gog, clochdar y cerrig a'r cyffyllog.

Cred y ffermwyr fod eu hymdrechion i reoli rhai ysglyfaethwyr trafferthus, gan gynnwys piod, wedi helpu i wella llwyddiant magu adar sy'n nythu ar y llawr.

Mae'r newidiadau yn y tirwedd ym Mhontbren yn ddiddorol, oherwydd mae'r coed, y gwrychoedd a'r pyllau dŵr wedi adfer peth o batrwm ac amrywiaeth tirwedd a gafodd ei gollu yn ystod yr 20fed Ganrif. Ond, wedi dweud hynny, mae'r gwaith wedi creu tirwedd ymarferol llawn ar gyfer yr 21ain Ganrif. Nid oedd yn ymdrech i ail-greu tirwedd hanesyddol a oedd yn gynnyrch system oes wahanol iawn o ffermio a strwythur

At the time of the Tithe Survey in 1842, there were 26 farms and smallholdings in the Pontbren area. The land that is now Pontbren was then owned mainly by two large estates and, except for some areas of woodland, was worked by tenant farmers. The census returns of 1841 give a total of 151 people living and working there. By the early 20th century the pattern of land ownership had changed, the large estates were breaking up and the farm holdings were being sold off, very often to the occupying tenants. The number of holdings decreased, as the smaller ones were gradually amalgamated with larger neighbours. The extensive areas of common grazing, or sheep walks, were also divided up and added to the individual holdings. This trend of increasing size of farms has continued into the 21st century. Today the average size of a Pontbren holding is 101 hectares, compared to just 21.6 hectares in 1842. There are now ten owner-occupied farms and 34 individuals living at Pontbren. Half of the farms have been occupied by the same family for generations.

Pontbren has not always been grassland. In 1842 around 40% of the Pontbren land was classed as arable, and oats were grown to 'fuel' the working horses. Today there is no arable land at Pontbren and no cereals are grown for the local corn mills, and modern machinery and diesel have replaced the horses and the oats.



The changes at Pontbren have restored some of the landscape diversity lost during the 20th century while also creating a landscape fit for farming today.

Mae'r newidiadau ym Mhontbren wedi adfer peth o batrwm ac amrywiaeth tirwedd a gafodd ei gollu yn ystod yr 20fed ganrif tra'n creu tirwedd ymarferol llawn ar gyfer yr 21ain ganrif.

cymdeithasol. Mae'r ffermwyr wedi ymchwilio hanes eu ffermydd dros y 170 mlynedd diwethaf ac mae hyn yn dangos gymaint mae defnydd y tir wedi newid.

Adeg Arolwg y Degwm yn 1842 roedd 26 o ffermydd a thyddynnod yn ardal Pontbren. Roedd y rhan fwyaf o'r tir sydd bellach ym Mhontbren ym meddiant dwy stad fawr ac, ar wahân i rai ardaloedd o goetir, yn cael eu gweithio gan denantiaid o ffermwyr. Mae canlyniadau cyfrifiad 1841 yn rhoi cyfanswm o 151 o bobl yn byw ac yn gweithio yno. Erbyn blynyddoedd cynnar yr 20fed Ganrif roedd patrwm meddiant y tir wedi newid, roedd y stadau mawr yn chwalu ac roedd y tyddynnod yn cael eu gwerthu, yn aml iawn i'r tenantiaid oedd yn byw ynddyn nhw. Aeth y nifer o dyddynnod yn llai fel roedd y rhai lleiaf yn cael eu cyfuno â chymdogion mwy. Roedd yr ardaloedd eang o dir comin neu'r cynefinoedd defaid hefyd yn cael eu rhannu a'u hychwanegu at dyddynnod unigol. Bu i'r duedd o faint ffermydd yn cynyddu barhau i'r 21ain Ganrif. Heddiw maint tyddyn Pontbren ar gyfartaledd yw 101 hectar, o'i gymharu â dim ond 21.6 hectar yn 1842. Erbyn hyn mae deg fferm yn berchen ddeiliad a 34 unigolyn yn byw ym Mhontbren. Mae hanner y ffermydd wedi bod ym meddiant yr un teulu ers cenedlaethau.

Nid yw Pontbren bob amser wedi bod yn lastir. Yn 1842 roedd tua 40% o dir Pontbren yn cael ei ddsbarthu fel tir â'r a thyfwyd ceirch yno fel 'tanwydd' i geffylau gweithio. Heddiw nid oes tir â'r ym Mhontbren ac ni thyfir grawnfwyd ar gyfer y melinau corn lleol, ac mae peiriannau cyfoes a disel wedi cymryd lle'r ceffylau a'r ceirch.





## Innovative research on the role of woods in catchment management

The farmers observed that their tree planting had unexpected benefits in reducing water run-off from improved grassland, and they were keen to have this confirmed by independent research. Their interest led to a major hydrological research programme at Pontbren, which has provided important new evidence of the role of trees in flood control. The Pontbren data is now being used elsewhere in the UK to develop better ways of predicting the impact of upland land use on flooding. This is important because predictive climate models suggest that in future Wales will see more frequent storms with intense rainfall, as well as an overall increase in precipitation. The Pontbren results have shown conclusively that strategically planted narrow, fenced shelterbelts of trees across slopes capture surface run-off from the pasture land above and allow it to soak more rapidly into the soil. Detailed research is providing new insights into how different species of tree improve water absorption.



The infiltration rates inside the woodland were 60 times those on the pasture ten metres away.

Graddfeydd yr ymdreiddiad y tu fewn i'r coetir yn 60 gwaith y rhai ar y borfa ddeng metr i ffwrdd.

## Ymchwil arloesol ar rôl coetir wrth rheoli dalgylch

Sylwodd y ffermwyr fod plannu'r coed wedi cael manteision annisgwyl wrth ostwng y dŵr ffo ar y glastir oedd wedi'i wella, ac roeddent yn awyddus i gael hyn wedi ei gadarnhau gan ymchwil annibynnol. Arweiniodd eu diddordeb at brif raglen ymchwil hydrolegol ym Mhontbren, a ddarparodd dystiolaeth bwysig newydd o rôl coed yn y gwaith o reoli llifogydd. Mae data Pontbren bellach yn cael eu defnyddio mewn mannau eraill yn y DU i ddatblygu dulliau gwell o ragweld effaith defnydd tir yr ucheldir ar lifogydd. Mae hyn yn bwysig oherwydd mae modelau hinsawdd argymhellol yn awgrymu y bydd Cymru yn y dyfodol yn gweld stormydd amlach gyda glawiad trymach, yn ogystal â chynnydd cyffredinol mewn gwlybanaeth. Dangosodd ganlyniadau Pontbren yn derfynol fod lleiniau cysgodol cul o goed wedi eu ffensio a'u plannu'n strategol ar draws llethrau yn dal y dŵr ffo oddi ar wyneb y borfa uwchben ac yn caniatáu iddo amsugno'n gyflymach i'r pridd. Mae gwaith ymchwil manwl yn darparu mewnwelediad newydd i sut mae gwahanol rywogaethau o goed yn gwella amsugniad dŵr.

Bu'r ffermwyr ynghlwm wrth y gwaith ymchwil drwyddo draw a buont o gymorth i ddatblygu'r offer delweddu wedi'i seilio ar System Gwybodaeth Ddaearyddol (GIS) y gellir ei ddefnyddio i gynorthwyo trafodaethau ar sut i optimeiddio'r defnydd o dir yn y dyfodol i gynhyrchu amrywiaeth o wasanaethau ecosystem o ffermydd cynhyrchiol yr ucheldir.

Wedi'r llifogydd trwm yng Nghymru a Lloegr yn ystod 2000 a 2001 roedd pryder y gallai'r achosion gynnwys cywasgiad pridd o ganlyniad i ddulliau ffermio cyfoes. Credwyd y gallai'r effaith fod yn debyg i adeiladau a phalmentydd ychwanegol mewn ardaloedd dinesig, gan leihau cynhwysedd y pridd i amsugno dŵr mewn glaw trwm. Gall hyn yn ei dro arwain at ddŵr ffo yn llifo'n gyflym i nentydd ac afonydd, ac at lifogydd lleol. Daeth astudiaeth gynhwysfawr o lenyddiaeth wyddonol yn 2004 i'r casgliad nad oedd digon o dystiolaeth ar effeithiau llifogydd ar newidiadau mewn defnydd a rheoli tir gwledig, a galwyd am fwy o waith ymchwil<sup>2</sup>



The Pontbren results have shown conclusively that strategically planted narrow, fenced shelterbelts of trees across slopes capture surface run-off from the pasture land above and allow it to soak more rapidly into the soil.

Dangosodd ganlyniadau Pontbren yn derfynol fod lleiniau cysgodol cul o goed wedi eu ffensio a'u plannu'n strategol ar draws llethrau yn dal y dŵr ffo oddi ar wyneb y borfa uwchben ac yn caniatáu iddo amsugno'n gyflymach i'r pridd.

**The farmers were closely involved throughout the research work and helped to develop a GIS based visualisation tool that can be used to support discussions of how to optimise future land use to deliver a range of ecosystem services from productive upland farms.**

After major floods in England and Wales during 2000 and 2001 there was concern that the causes might include soil compaction as a result of modern farming practices. It was thought the effect might be similar to that of additional buildings and paving within urban areas, reducing the capacity of the soil to absorb water in heavy rain. This in turn can lead to rapid run-off into streams and rivers, and local flooding. A comprehensive study of the scientific literature in 2004 concluded that there was insufficient evidence on the flood impacts of changes in rural land use and management, and called for more research<sup>2</sup>.

The huge research programme at Pontbren began with a chance observation by Coed Cymru's director, who was walking across sheep grazed pasture during heavy rain on a visit to one of the farms in 2001. He noticed that water running downhill across the grazed fields disappeared as soon as it reached the edge of the new woodland, and the farmers confirmed that they too had noticed this.



The Flood Risk Management Research Consortium set up an intensive hydrological research programme at Pontbren from 2004 to 2011 to build up a detailed picture of how rain falling on the farmland moved into the streams.

Gosododd y Consortiwm Ymchwil Rheoli Perygl Llifogydd (FRMRC) raglen ymchwil hydrolegol dwys ym Mhontbren o 2004 i 2011 er mwyn adeiladu darlun llawn o sut mae'r glaw sy'n syrthio ar dir fferm yn symud i'r nentydd.

Dechreuodd rhaglen ymchwil enfawr ym Mhontbren drwy sylw ar hap gan Gyfarwyddwr Coed Cymru, oedd yn digwydd cerdded ar draws porfa defaid yn ystod glaw trwm ar ymweliad ag un o'r ffermydd yn 2001. Sylwodd fod y dŵr oedd yn llifo i lawr allt ar draws y caeau oedd wedi'u pori yn diflannu cyn gynted ag y cyrhaeddodd ymylon y coetir newydd, ac i'r ffermwyr gadarnhau eu bod hwythau hefyd wedi sylwi ar hyn. Gwahoddwyd Canolfan Ecoleg a Hydroleg Bangor i ddilyn hyn gydag ymchwil syml o'r pridd, a chymerasant fesuriadau i gymharu cyflymder roedd y pridd dan y borfa a'r pridd yn y coetir oedd wedi ei ffensio, yn gallu amsugno'r dŵr. Roedd y canlyniadau'n drawiadol, gan ddangos fod graddfeydd yr ymdreiddiad y tu fewn i'r coetir yn 60 gwaith y rhai ar y borfa ddeng metr i ffwrdd, a bod yr effeithiau manteisiol yn ymestyn y tu draw i ymylon y coetir<sup>3</sup>. Roedd y rhesymau'n aneglur, a doedd yr ymchwil blaenorol fawr o help, oherwydd bod llawer ohono yn ymwneud â'r trofannau. Roedd yr ymchwil cyfyngedig yn Ewrop yn tueddu i ganolbwyntio ar goetir neu ar dir fferm neu, yn y DU, ar blanhigfeydd coniferaidd ar bridd mawnog wedi'i ddraenio. Roedd Pontbren yn gwbl wahanol, oherwydd roedd lleiniau o goed llydanddail cynhenid wedi'u plannu ar lastir ar ogwydd wedi ei wella. Cytunodd y ffermwyr yn barod iawn i waith ymchwil mwy manwl, gydag offer monitro wedi ei godi ac arbrofion wedi eu trefnu ar eu tir, er y byddai hyn yn golygu peth ymyrraeth â'u gwaith a mynediad rheolaidd gan y staff gwyddonol.



Centre for Ecology and Hydrology (CEH) Bangor was invited to follow this up with a simple soil investigation, and they took measurements comparing the speed at which the soils under the pasture and those in the fenced off woodland could absorb water. The results were striking, showing that the infiltration rates inside the woodland were 60 times those on the pasture ten metres away, and that the beneficial effect extended beyond the edge of the woodland<sup>3</sup>. The reasons were unclear, and previous research was little help, because much of it applied to the tropics, and the limited body of research in Europe tended to focus on woodland or farmland or, in the UK, on coniferous plantations on drained peat soils. Pontbren was quite different, because strips of native broadleaf woodland had been planted within sloping, improved grassland. The farmers readily agreed to more detailed research, with monitoring equipment installed and experiments set up on their land, although this would mean some disruption to their work and regular access by the scientific staff.

The government-funded Flood Risk Management Research Consortium (FRMRC) set up an intensive hydrological research programme at Pontbren from 2004 to 2011, collecting data on the interaction of water, soils, slope and vegetation at several scales from 12 metre square plots to the 1,000 hectare catchment to build up a detailed picture of how rain falling on the farmland moved into the streams, and to measure the effect of trees on these processes. This required intensive monitoring of water flows through the soil and in a network of drains, ditches, and streams to understand the generation of river flows, and data collection from specially designed field experiments. The second aim of the research was to develop physically based computer models, reproducing the experimental observations at Pontbren, which could be used to predict catchment scale effects of land-use change. The data collection required installing an array of different types of monitoring equipment. The field experiments measured soil infiltration rates over a period of 18 months on 12m x 12m plots of three types – grassland grazed by sheep, grassland from which the sheep were excluded, and planted broadleaf woodland from which sheep were excluded.

The data on water movement showed that in grassland grazed by sheep the overland water flow can be a more important runoff pathway than the field drains. This occurs where



The data on water movement showed that in grassland grazed by sheep, the overland water flow can be a more important runoff pathway than the field drains.

Dangosodd y data fod llif y dŵr dros y tir ar lastir a borir gan ddefaid yn gallu bod yn llwybr pwysicach i redeg y dŵr na thraeniau cae.

Gosododd y Consortiwm Ymchwil Rheoli Perygl Llifogydd (FRMRC) sydd wedi ei gyllido gan y Llywodraeth, raglen ymchwil hydrolegol dwys ym Mhontbren o 2004 i 2011, gan gasglu data ar y rhyngweithio rhwng dŵr, priddoedd, llethr a llystyfiant ar wahanol raddfeydd o leiniau 12 metr sgwâr i ddalgylch 1,000 hectar, er mwyn adeiladu darlun llawn o sut mae'r glaw sy'n syrthio ar dir fferm yn symud i nentydd, ac i fesur effaith coed ar y prosesau hyn. Gofynnodd hyn am fonitro dwys dŵr yn llifo drwy'r pridd ac mewn rhwydwaith o ddraeniau, ffosydd a nentydd i ddeall cychwyn llif afonydd, a chasglu data o arbrofion maes a gafodd eu cynllunio'n ofalus. Ail fwriad y gwaith ymchwil oedd datblygu modelau cyfrifiadurol yn seiliedig ar waith ymchwil a wnaed ar y tir, yn atgynhyrchu'r arsylwadau o arbrofion ym Mhontbren, y gellir eu defnyddio i ragweld effeithiau graddfeydd dalgylch o newid defnydd tir. Roedd y data yn gofyn am osod rhes o wahanol fathau o offer monitro. Roedd yr arbrofion maes yn mesur graddau treiddiad pridd dros gyfnod o 18 mis ar leiniau 12m x 12m o dri math – glastir wedi ei bori gan ddefaid, glastir ble roedd y defaid wedi'u cau allan, a choetir ble roedd coed llydanddail wedi eu plannu a'r defaid wedi eu cau allan.

Dangosodd y data ar symudiad dŵr fod llif y dŵr dros y tir ar lastir a borir gan ddefaid yn gallu bod yn llwybr pwysicach i

there is a relatively impermeable soil layer near the surface that causes the soil above it to become saturated quickly<sup>4</sup>. At Pontbren this can happen for prolonged periods in a normal year (although in the hot dry summer of 2006 the dried out soil cracked, temporarily opening up quite different routes for water flow). Within the tree-planted areas, from which sheep were excluded, there was significantly less overland flow and the upper 80 cm of soil was much drier, with a greater number of larger soil pores which drain easily and are thus available for incoming water. The belts of trees planted on the pasture land had rapidly improved the soil structure and sent roots deeper into the soil, allowing more water to be absorbed, moving more quickly into deeper layers of soil. Researchers were surprised to find that trees begin to have this effect as early as two years after planting<sup>5</sup>.

The original measurements of water infiltration rates on the experimental plots have been repeated during 2012. When these results are published they are likely to show that, compared to sheep-grazed grassland, excluding sheep produces on average a five fold improvement in infiltration rates, but excluding sheep **and** planting broadleaved trees is on average 67 times more effective than improved, grazed grassland at absorbing surface run-off<sup>6</sup>.

Other studies have investigated sediment transport and the detailed relationship between tree growth and water transport.



The belts of trees planted on the pasture land had rapidly improved the soil structure and sent roots deeper into the soil. Researchers were surprised to find that trees begin to have this effect as early as two years after planting.

Roedd y lleiniau o goed a blannwyd ar y borfa wedi gwella strwythur y pridd yn gyflym a gyrru'r gwreiddiau'n ddyfnach. Roedd ymchwilwyr wedi synnu i ganfod fod coed yn dechrau cael yr effaith hyn mor gynnar â dwy flynedd ar ôl y plannu.



Strategic woodland planting may help to mitigate sediment loss by reducing peak flows and hence erosion within the natural channel network.

Mae plannu coetir strategol yn gallu helpu lliniaru colli gwaddod drwy ostwng anterth y llif ac felly erydiad.

redeg y dŵr na thraeniau cae. Mae hyn yn digwydd ble mae haen o bridd anhydraidd yn ymyl y wyneb sy'n achosi'r pridd uwch ei ben i fynd yn soeglyd yn gyflym<sup>4</sup>. Ym Mhontbren gall hyn ddigwydd am gyfnodau hirfaith mewn blwyddyn gyffredin (er yn haf poeth sych 2006 bu i'r pridd sych hollti, gan agor gwahanol lwybrau i'r dŵr lifo dros dro). Oddi fewn i'r ardaloedd ble plannwyd y coed, ble roedd defaid wedi eu cau allan, roedd yn arwyddocaol llai o lif dros y tir ac roedd 80 cm uchaf y pridd yn llawer sychach, gyda nifer mwy o fandyllau yn y pridd sy'n draenio'n hawdd ac sydd felly ar gael i'r dŵr sy'n llifo i mewn. Roedd y lleiniau o goed a blannwyd ar y borfa wedi gwella strwythur y pridd yn gyflym a gyrru'r gwreiddiau'n ddyfnach i'r haenau o bridd. Roedd ymchwilwyr wedi synnu i ganfod fod coed yn dechrau cael yr effaith hyn mor gynnar â dwy flynedd ar ôl y plannu<sup>5</sup>.

Mae mesuriadau gwreiddiol graddau treiddiad y dŵr ar y lleiniau arbrofol wedi eu hailadrodd yn ystod 2012. Pan gyhoeddir y canlyniadau hyn maent yn debyg o ddangos fod, o'i gymharu â glastir a borwyd gan ddefaid, yr ardal cadw defaid allan yn cynhyrchu ar gyfartaledd gwelliant o bum gwaith yng ngraddfeydd yr ymdreiddiad, ond mae gadael y defaid allan a phlannu coed llydanddail yn 67 gwaith mwy effeithiol na glastir wedi ei wella a'i bori am amsugno dŵr sy'n llifo allan ar wyneb y tir<sup>6</sup>.





The pathways tree roots provided for water were strongly influenced by tree species.

Mae'r llwybrau roedd gwreiddiau'r coed yn eu darparu i ddŵr wedi eu dylanwadu'n gryf gan rywogaeth y coed.

Sediment in streams not only reduces their efficiency but also interferes with biological processes and of course represents an irreversible loss of soil from the land. The Pontbren researchers found that sediment from agriculturally improved pastures reached the streams via surface water run-off and field drains, and also came from eroding ditch and stream banks<sup>7</sup>. FRMRC suggests that strategic woodland planting may help to mitigate sediment loss by reducing peak flows and hence erosion within the natural channel network<sup>8</sup>. Another study examined the way rainwater flowed through small channels in the soil (using simulated rain, coloured blue with food dye) and found that water flowed along the pathways provided by living tree roots, rather than through earthworm channels and other cracks in the soil. This overturned existing theories that suggested water flowed only along channels left by dead tree roots. The experiment with dyed water showed that the pathways tree roots provided for water were strongly influenced by tree species. Birch trees have a spherical root structure and this caused the water to be channelled into a bulb-like area at the top of the soil; ash trees have horizontal surface roots from which vertical roots extend down into the soil. Water here was channelled along these vertical roots in finger-shaped patterns to a greater depth<sup>9</sup>.

Another study investigated the influence of the tree shelterbelts on the amounts and patterns of rainfall reaching the ground both directly underneath, and on the leeward side of the plantings. Differences in seasonal

Mae astudiaethau eraill wedi ymchwilio i drosglwyddo gwaddod a'r berthynas fanwl rhwng tyfiant coed a throsglwyddo dŵr. Mae gwaddod mewn nentydd nid yn unig yn gostwng eu heffeithiolrwydd ond hefyd yn ymyrryd gyda'u prosesau biolegol ac wrth gwrs yn golygu colled ddi-droi'n-ôl o bridd o'r tir. Canfu ymchwilwyr Pontbren fod gwaddod o borfeydd wedi eu gwella'n amaethyddol yn cyrraedd y nentydd drwy ddŵr ffo yn llifo a draeniau caeau, a hefyd o erydiad ffosydd a glannau afonydd<sup>7</sup>.

Mae FRMRC yn awgrymu fod plannu coetir strategol yn gallu helpu lliniaru colli gwaddod drwy ostwng anterth y llif ac felly erydiad yn y rhwydwaith sianelau naturiol<sup>23</sup>.

Archwiliodd astudiaeth arall y ffordd mae dŵr glaw yn llifo drwy sianelau bach yn y pridd (gan ddefnyddio glaw ffug, a liwiwyd yn las gyda lliw ddefnyddir ar gyfer bwyd) a chanfod fod dŵr yn llifo ar hyd llwybrau a ddarparwyd gan wreiddiau byw'r coed, yn hytrach na thrwy sianelau pryf genwair (neu fwydod) a chraciau eraill yn y pridd.

Fe wnaeth hyn wydroi'r damcaniaethau oedd yn bodoli ac yn awgrymu nad oedd dŵr ddim ond yn llifo ar hyd sianelau oedd wedi eu gadael gan wreiddiau coed marw. Dangosodd yr arbrawf gyda dŵr wedi'i liwio fod llwybrau roedd gwreiddiau'r coed yn eu darparu i ddŵr wedi eu dylanwadu'n gryf gan rywogaeth y coed.

Mae gan y fedwen strwythur sfferaidd i'w gwreiddyn ac mae hyn wedi achosi i'r dŵr gael ei sianelu i le tebyg i fwlb ar ben y pridd; mae gan yr onnen wreiddiau ar yr wyneb ac o'r rhain mae gwreiddiau llorweddol yn ymestyn i lawr i'r pridd. Roedd dŵr yma'n cael ei sianelu ar hyd y gwreiddiau llorweddol hyn mewn patrymau siâp bys i ddyfnder mwy<sup>9</sup>.

Archwiliodd astudiaeth arall ddylanwad lleiniau cysgodol y coed ar y cyfansymiau a phatrymau glaw yn cyrraedd y tir yn uniongyrchol oddi tan ac ar ochr gysgodol y planhigfeydd. Sylwyd ar y gwahaniaethau ym mhatrymau glaw tymhorol ac roedd y rhain yn perthyn i wahaniaethau yng nghyflymder y gwynt a dwyster y glaw. Dangoswyd yn ystod y gaef fod gwyntoedd uchel yn chwythu dafnau bach o law mewn cyfeiriad bron yn llorweddol ar draws y llain gysgodol. Roedd effaith y lloches hon yn arwain at lai o law yn uniongyrchol dan ganopi'r coed a dros led sy'n gyfartal ag uchder coeden arferol, o gwr yr ochr gysgodol. I'r gwrthwyneb, mae cyflymder isel y gwynt a dafnau mawr o law yn ystod yr haf yn syrthio bron yn fertigol yn uniongyrchol ar y canopi gan achosi ychydig neu ddim disbyddiad o law ar yr ochr gysgodol<sup>10</sup>.



A detailed inventory of the plant life in all the fields was prepared by Montgomeryshire Wildlife Trust.

Paratowyd rhestr fanwl o fywyd gwyllt yn y caeau i gyd gan Ymddiriedolaeth Bywyd Gwyllt Sir Drefaldwyn.

rainfall patterns were observed and were related to differences in wind speed and rainfall intensity. It was shown that in winter, high wind speeds blow small raindrops in an almost horizontal direction across the shelterbelt. This sheltering effect led to less rainfall both directly underneath the tree canopy and over a width equal to the average tree height from the leeward edge. In contrast, low wind speeds and large raindrops in summer fall almost vertically, directly onto the canopy causing little or no rainfall depletion on the leeward side<sup>10</sup>.

The research at Pontbren has raised many interesting questions about farm woodland that are still to be answered, and farmers are keen to see the Pontbren studies extended to look at the effects of hedgerows on water infiltration on pastureland.

There have been three significant projects monitoring biodiversity on the Pontbren farms. A detailed inventory of the plant life in all of the fields was prepared by Montgomeryshire Wildlife Trust, providing a baseline data set for future botanical research. Two studies examined the distribution and diversity of fauna in the woodlands and grasslands, one of carabid beetles and the other of small mammals<sup>11</sup>.

Mae gwaith ymchwil Pontbren wedi codi nifer o gwestiynau diddorol am goetiroedd ffermydd sydd eto i'w hateb, ac mae ffermwyr yn awyddus i weld astudiaethau Pontbren yn cael eu hymestyn i edrych ar effeithiau gwrychoedd ar ymdreiddiad dŵr ar dir pori.

Bu tri phrosiect arwyddocaol yn monitro bioamrywiaeth ar ffermydd Pontbren. Paratowyd rhestr fanwl o fywyd gwyllt yn y caeau i gyd gan Ymddiriedolaeth Bywyd Gwyllt Sir Drefaldwyn, gan ddarparu data gwaelodlin i waith ymchwil botanegol yn y dyfodol. Archwiliodd dwy astudiaeth ddisbarthiad ac amrywiaeth y ffawna yn y coetiroedd a'r glastiroedd, un astudiaeth o chwilog carabid a'r llall o famaliaid bach<sup>26</sup>. Dechreuwyd ar raglen ymchwil ar fioamrywiaeth ddyfrol yn 2012.

Caniataodd natur aml raddfa arbrofion maes y modelau llif dŵr i gael eu codi i lefel dalgyllch gyda mwy o gywirdeb na'r hyn a gyflawnwyd fel arfer. Mae cyfnod cyntaf yr ymchwil yn dangos fod lefel yr is-dalgyllch y tra-arglwyddiaethu arno gan dir wedi'i wella'n amaethyddol, yn cael uchafbwynt llifogydd uwch na'r rhai sydd â thirwedd mwy naturiol, ac mae'r canlyniadau'n awgrymu petai lleiniau lloches o goed yn cael eu lleoli yn y manau iawn ar dir wedi'i wella, mae'n bosibl cael gostyngiad o 40% yn y llif uchaf<sup>27</sup>.



A programme of research on the aquatic biodiversity began in 2012.

The multi-scale nature of the field experiments allowed the water flow models to be scaled up to catchment level with greater accuracy than usually achieved.

The first phase of research shows that sub-catchments dominated by agriculturally improved land have higher flood peaks than those with more natural landscapes, and the results suggest that if tree shelter belts are located in the right place on improved land, reductions in peak flow of around 40% may be achievable<sup>12</sup>. The second stage of the FRMRC project examined more closely the reasons for these differences, looking at subsurface drainage, soil compaction, the role of unimproved grassland and how flood peaks from upland catchments combine as they move downriver.

There is an urgent need to find cost-effective ways of reducing future flood risk in the UK. In Wales alone the government already spends around £44 million each year to improve and expand the network of 2,900km of flood defences. The cost is expected to triple to £135 million a year by 2035 to cope with the risks of unsustainable land use and the changing climate<sup>13</sup>. This seems a high price to pay for what is essentially an 'end of pipe' solution, containing the problem where it occurs, usually far downstream. The time has come to consider the possibilities for managing rainwater where it falls, before it creates a flood risk.

The research at Pontbren suggests that integrated tree planting and agricultural management could have an important role in creating more sustainable land drainage systems in upland catchments. The modelling tools developed at Pontbren were also tested at a larger scale on the Hodder catchment in Lancashire and the upper Severn catchment, contributing to the development of a model that could be used throughout the UK and beyond. The hydrological data collected at Pontbren between 2004 and 2012 is now freely available as a resource for other researchers<sup>14</sup>.

The research work at Pontbren benefitted substantially from the active interest and support of the farmers, who not only offered their land for monitoring and setting up experiments, but also provided detailed information on past and current land management, which the scientists

Archwiliodd yr ail gam ym mhrosiect yr FRMRC yn agosach y rhesymau dros y gwahaniaethau hyn, gan edrych ar is wyneb draenio, cywasgiad pridd, rôl glastir heb ei wella, a sut mae uchafbwynt llifogydd o ddalgylchoedd yr ucheldir yn cyfuno wrth iddynt symud i lawr yr afon.

Mae brys i ganfod ffyrdd cost effeithiol o leihau perygl llifogydd yn y dyfodol yn y DU.

Yng Nghymru'n unig mae'r llywodraeth yn gwario tua £44 miliwn bob blwyddyn i wella ac ehangu rhwydwaith o 2,900 km o amddiffynfeydd rhag llifogydd. Disgwylir i'r gost dreblu i £135 miliwn y flwyddyn i ddygydd mod â risgiau defnydd tir anghynladwy a'r newid hinsawdd<sup>13</sup>. Mae hyn yn ymddangos yn bris uchel i'w dalu am yr hyn sy'n y pendraw yn 'ddatrysiaid diwedd y lein', yn dal y broblem ble mae'n digwydd, fel arfer ymhell i lawr yr afon. Daeth yr amser i ystyried hefyd y posibilrwydd o reoli dŵr glaw ble mae'n syrthio, cyn iddo greu perygl o lifogydd.

Mae'r gwaith ymchwil ym Mhontpren yn awgrymu y gall plannu coed a rheoli amaethyddol integredig fod â rôl bwysig wrth greu systemau draenio tir mwy cynaliadwy yn nalgylchoedd yr ucheldir. Profwyd hefyd offer modelu a ddatblygwyd ym Mhontpren ar raddfa fwy yn nalgylch Hodder yn Swydd Gaerhirfryn a dalgylch rhannau uchaf yr Hafren, gan gyfrannu at ddatblygiad model y gellir ei ddefnyddio drwy'r DU a thu hwnt. Mae'r data hydrolegol a gasglwyd ym Mhontpren rhwng 2004 a 2012 ar gael bellach yn rhad ac am ddim fel adnodd i ymchwilwyr eraill<sup>14</sup>.

Bu i'r gwaith ymchwil ym Mhontpren elwa'n sylweddol o ddiddordeb gweithredol a chefnogaeth y ffermwyr, a gynigiodd nid yn unig eu tir i fonitro a sefydlu arbrofion, ond hefyd a gynigiodd wybodaeth fanwl ar reoli'r tir yn y gorffennol a'r presennol, na fyddai'r gwyddonwyr wedi gwybod amdano oni bai amdanynt hwy. Datblygwyd y cydweithio hwn mewn edefyn arall o waith ymchwil Pontpren wedi'i fwriadu i helpu ffermwyr a gwneuthurwyr polisi i wneud penderfyniadau ar ddefnydd tir yn y dyfodol. Mae'r 1.7 miliwn ha o dir yng Nghymru mewn defnydd amaethyddol mewn rhyw ffurf neu'i gilydd yn darparu ystod eang iawn o wasanaethau ecosystem yn ogystal â chynhyrchu bwyd. Wrth benderfynu beth yw'r ffordd orau i reoli ardal benodol mae cyfaddawdu a rhyngweithio cymhleth rhwng gwahanol wasanaethau i'w cymryd i ystyriaeth. Yn aml mae ffurfwedd ofodol o nodweddion er enghraifft coetir, gwrychoedd, pyllau dŵr a gwlypdiroedd yn dyngedfennol i gyflenwad llawer o wasanaethau.

The research work at Pontbren benefitted substantially from the active interest and support of the farmers.

Bu i'r gwaith ymchwil ym Mhontpren elwa'n sylweddol o ddiddordeb gweithredol a chefnogaeth y ffermwyr.



would not otherwise have known. This collaboration was developed in another strand of Pontbren research aimed at assisting farmers and policy-makers to make decisions on future land use. The 1.7 million ha of land in Wales in some form of agricultural use provides a very wide range of other ecosystem services in addition to food production. When deciding how best to manage a specific area of land there are complex trade-offs and interactions between the different services to be taken into account. Often the spatial configuration of features such as woodland, hedgerows, ponds and wetlands is critical to the supply of many services. The Polyscape geographical mapping tool helps to prioritise where trees might be placed in the landscape to have an impact on different ecosystem services. These might include, for example, farm productivity, flood risk, sediment transport, carbon storage in vegetation and soils, and connectivity of woodland habitats. By combining different GIS layers the synergies and trade-offs can be illustrated and discussed. Polyscape is designed deliberately as a negotiation tool which incorporates farmers' detailed knowledge of their land with that of other experts, as well as taking into account the farmers' views on where they would or would not want trees<sup>15</sup>.

Mae offer mapio daearyddol Polyscape o gymorth i flaenoriaethu ble y gall coed gael eu gosod yn y tirwedd i gael effaith ar wahanol wasanaethau ecosystem. Gall rhain efallai gynnwys, er enghraifft, cynnyrch fferm, perygl llifogydd, trosglwyddo gwaddod, storio carbon mewn llystyfiant a phriddoedd, a chysylltedd cynefinoedd coetir. Drwy gyfuno gwahanol haenau GIS gall y synergedd a'r cyfaddawdu gael eu dangos a'u trafod. Mae Polyscape wedi'i ddylunio'n fwriadol fel offeryn trafod sy'n cynnwys gwybodaeth fanwl y ffermwyr o'u tir gyda gwybodaeth arbenigwyr eraill, yn ogystal â chymryd i ystyriaeth farn y ffermwyr ar ble y byddent neu na fyddent yn dymuno cael coed<sup>15</sup>.



The time has come to consider the possibilities for managing rainwater where it falls, before it creates a flood risk.

Daeth yr amser i ystyried hefyd y posibilrwydd o reoli dŵr glaw ble mae'n syrthio, cyn iddo greu perygl o lifogydd.



## Is Pontbren a model for other groups of livestock farmers in the uplands?

The undoubted success of Pontbren in agricultural, environmental, scientific and social terms has provided a well-tested new model for farmers and policy makers seeking a better way of delivering essential environmental services as part of productive upland livestock farming in the UK. The key to this lies in treating woodland and water management as an integral part of the farm business, and making strategic land use decisions based on sound scientific evidence.

The Pontbren project worked because it was led throughout by the farmers who actively took an innovative approach, and who were willing and able to interest and involve others in active collaboration,

## A yw Pontbren yn fodel i grwpiau eraill o ffermwyr da byw ar yr ucheldir?

Mae llwyddiant diamheuol Pontbren yn nhermau amaethyddol, amgylcheddol, gwyddonol a chymdeithasol wedi darparu model newydd sydd wedi'i brofi'n fodel da i ffermwyr a llunwyr polisïau sy'n chwilio am ffyrdd gwell o gyflawni gwasanaethau amgylcheddol hanfodol fel rhan o ffermio da byw cynhyrchiol ar yr ucheldir yn y DU. Yr allwedd i hyn yw trin y coetiroedd a rheoli dŵr fel rhan anhepgor o fusnes y fferm, a gwneud penderfyniadau defnydd tir strategol yn seiliedig ar dystiolaeth wyddonol gadarn.

Gweithiodd prosiect Pontbren am iddo gael ei arwain drwy gydol yr amser gan ffermwyr oedd yn cymryd agwedd arloesol, ac oedd yn gallu ac yn dymuno ennyn



If adopted more widely the Pontbren approach could help to reach key government targets for water management and greenhouse gas emissions.

Petai'n cael ei fabwysiadu'n ehangach byddai dull Pontbren yn gallu helpu i gyrraedd targedau allweddol y llywodraeth ar gyfer rheoli dŵr ac allyriadau nwyon tŷ gwydr



The Pontbren project worked because it was lead throughout by the farmers...

Fe lwyddodd Prosiect Pont am iddo gael ei lywio trwy gydol yr amser gan y ffermwyr...

particularly the research community and funding organisations. The role of Coed Cymru was crucial to their success, providing advice, support and above all guidance through the administrative obstacles facing a project which did not quite fit with the prevailing top-down prescriptive model of environmental improvement.

If adopted more widely the Pontbren approach could help to reach key government targets for water management and greenhouse gas emissions:

**Flood risk management:** strategic tree and hedgerow planting that moderates peak flows in upper catchments could reduce the scale of flood defences needed downstream or, in combination with flood defences, could improve the level of flood protection.

**Water Framework Directive:** tree planting that reduces agricultural run-off carrying soil sediments, nutrients and pesticides will help to deliver the 'good chemical status' of water courses that is required by the Water Framework Directive. Trees planted along streams will contribute to the required 'good biological status' by stabilising banks, and offering shade and shelter for wildlife<sup>16</sup>.

diddordeb mewn eraill a'u cael i gydweithredu'n weithredol, yn arbennig y gymuned ymchwil a'r sefydliadau cyllido. Roedd swyddogaeth Coed Cymru yn hanfodol i'w llwyddiant, cefnogaeth ac yn anad dim arweiniad drwy'r rhwystrau gweinyddol oedd yn wynebu'r prosiect ac nad oedd yn ffitio'n hollol â'r prif fodel rhagnodol o'r top i lawr o wella amgylcheddol.

Petai'n cael ei fabwysiadu'n ehangach byddai dull Pontbren yn gallu helpu i gyrraedd targedau allweddol y llywodraeth ar gyfer rheoli dŵr ac allyriadau nwyon tŷ gwydr:

**Rheoli'r perygl o lifogydd:** gallai plannu coed a gwrychoedd yn strategol gymedroli anterth y llif yn y dalgylchoedd uchaf, a gallai hyn ostwng maint yr amddiffynfeydd rhag llifogydd sydd eu hangen i lawr yr afon neu, drwy eu cyfuno ag amddiffynfeydd rhag llifogydd, gallent wella lefel diogelu rhag llifogydd.

**Y Gyfarwyddeb Fframwaith Dŵr:** bydd plannu coed sy'n gostwng dŵr ffo amaethyddol yn cario gwaddodion pridd, maeth a phlalladdwyr yn helpu i ddarparu'r 'statws cemegol da' mewn cyrsiau dŵr sydd ei angen gan y Gyfarwyddeb Fframwaith Dŵr. Bydd coed wedi eu plannu ar hyd ochrau.



Trees planted along streams will contribute to the required 'good biological status' by stabilising banks, and offering shade and shelter for wildlife.

Bydd coed wedi eu plannu ar hyd ochrau nentydd yn cyfrannu tuag at y 'statws biolegol da' drwy sefydlogi'r glannau, a chynnig cysgod a lloches i fyd natur.



**Greenhouse gas targets:** trees and shrubs planted within farmland increase carbon stores both above and below ground. In 2010 the Climate Change Strategy for Wales set an ambitious target of planting 5,000 ha of new woodland in appropriate locations in Wales every year for 20 years<sup>17</sup>. This requires a tenfold increase in recent planting rates, yet if all farmers in Wales followed the Pontbren example and planted up just 4.5% of their land with new broadleaf woodland, this would achieve more than three-quarters of the Welsh Government's 100,000 ha target. In 2012 the Climate Change Commission recommended that the Welsh Government should consider developing stronger levers and incentives if the uptake of Glastir and woodland creation grant are not in line with these targets<sup>18</sup>.

nentydd yn cyfrannu tuag at y 'statws biolegol da' drwy sefydlogi'r glannau, a chynnig cysgod a lloches i fyd natur<sup>16</sup>.

**Targedau nwyon tŷ gwydr:** mae coed a llwyni a blennir ar dir fferm yn codi storffeydd carbon uwchlaw a dan y ddaear. Yn 2010 gosododd Strategaeth Cymru ar y Newid yn yr Hinsawdd darged uchelgeisiol o blannu 5,000 ha o goetir newydd mewn lleoliadau addas yng Nghymru bob blwyddyn am 20 mlynedd<sup>35</sup>. Mae hyn angen cynnydd o ddengwaith mewn cyfraddau plannu diweddar, eto petai holl ffermwyr Cymru yn dilyn esiampl Pontbren ac yn plannu dim ond 4.5% o'u tir gyda choetir llydanddail newydd, byddai hyn yn cyrraedd mwy na thri chwarter targed Llywodraeth Cymru o 100,000 ha. Yn 2012 argymhellodd Comisiwn Cymru ar y Newid yn yr Hinsawdd y dylai Llywodraeth Cymru ystyried defnyddio lifers ac anogaeth cryfach os nad oedd derbyn grantiau Glastir a chreu coetir yn unol â'r targedau hyn<sup>18</sup>.

## Key lessons from the Pontbren Project

- Broadleaved woodland and shelterbelts can make the management of upland farms more efficient, and make them better places to live and work.
- Planting and management of woodland and hedgerows on improved upland grasslands can have far wider environmental benefits than was previously understood.
- A critical factor in achieving the potential environmental benefits of tree and hedgerow planting is the strategic and well-informed choice of locations, species and management.
- The scale and level of research investment at Pontbren is unusual, and the extensive evidence base it has provided will help to inform land use and policy decisions far beyond these 10 farms. The sometimes unexpected research findings illustrated how important field-based experiments and observations are in understanding complex hydrological and biological processes and in helping to develop and calibrate computer models that can be used more widely.

## Gwersi allweddol o Brosiect Pontbren

- Gall coetir llydanddail a lleiniau cysgodol wneud rheoli ffermydd yr ucheldir yn fwy effeithiol, a'u gwneud yn llefydd gwell i fyw a gweithio ynddynt.
- Gall plannu a rheoli coetir a gwrychoedd ar laswelltiroedd yr ucheldir sydd wedi'u gwella fod o fudd amgylcheddol llawer ehangach nag oedd wedi'i ddeall yn flaenorol.
- Ffactor allweddol wrth gyflawni budd amgylcheddol posibl plannu coed a gwrychoedd yw dewis strategol a arweiniwyd ar sail gwybodaeth am leoliadau, rhywogaeth a rheoli.
- Mae graddfa a lefel y buddsoddiad ymchwil ym Mhontbren yn anarferol, a bydd y sail tystiolaeth eang a ddarparwyd ganddo ein harwain ar sail gwybodaeth defnydd tir a phenderfyniadau polisi ymhell y tu hwnt i'r 10 fferm yma. Roedd canlyniadau'r ymchwil, oedd yn annisgwyl ambell dro, yn dangos pa mor bwysig oedd arbrofion ac arsylwadau yn y maes wrth ddeall prosesau hydrolegol a biolegol cymhleth ac wrth helpu i ddatblygu a graddnodi modelau cyfrifiadurol y gellir eu defnyddio'n ehangach.



The extensive evidence base gathered at Pontbren will help to inform land use and policy decisions far beyond these 10 farms.

Bydd y sail tystiolaeth eang a gasglwyd ym Mhontbren yn ddefnyddiol wrth lywio penderfyniadau defnydd tir a pholisi ymhell y tu hwnt i'r 10 fferm yma.



- Conventional agri-environment and woodland grant schemes do not have sufficient flexibility to support targeted, site-specific, collaborative environmental initiatives led by groups of farmers and landowners.

This is a potentially serious problem, given that 'landscape-scale' environmental management is a key government priority, especially for water catchments, habitat connectivity and the adaptation of woodland to climate change.

- Farmer-led groups who follow the Pontbren model will need access to the services of skilled facilitators and technical advisers who understand the objectives of the farm business on the one hand, and environmental needs and opportunities on the other. Farm-based Leader groups may be one way of funding this, and the experiences of well-established farmer environmental cooperatives in the Netherlands in using agri-environment funds could be relevant<sup>19</sup>.

There will be a new emphasis on climate proofing, agricultural innovation and co-operation in the 2014-20 Rural Development Programmes, which provide agri-environment and forestry funding in the UK. This offers an excellent opportunity to help other upland farmers adopt the Pontbren approach to farm and environmental improvement.



Farmer-led groups who follow the Pontbren model will need access to the services of technical advisers like Coed Cymru who understand the objectives of the farm business on the one hand, and environmental needs on the other.

Bydd y grwpiau a arweinir gan ffermwyr sy'n dilyn model Pontbren angen mynediad i wasanaethau hwyluswyr medrus a chynghorwyr technegol fel Coed Cymru sy'n deall amcanion busnes fferm ar un llaw, ac anghenion a chyfleoedd amgylcheddol ar y llaw arall.

- Nid oes gan gynlluniau grantiau confensiynol amaeth-amgylcheddol a choetir ddigon o hyblygrwydd i gefnogi mentrau amgylcheddol cydweithredol, penodol i safle, wedi'u targedu a arweinir gan grwpiau o ffermwyr a thirfeddianwyr.

Gall hyn fod yn broblem ddifrifol gan fod rheoli amgylcheddol ar 'raddfa tirwedd' yn flaenoriaeth allweddol i'r llywodraeth, yn arbennig ar gyfer dalgylchoedd dŵr, cysyllteddau cynefinoedd ac addasu coetiroedd i newid yn yr hinsawdd.

- Bydd y grwpiau a arweinir gan ffermwyr sy'n dilyn model Pontbren angen mynediad i wasanaethau hwyluswyr medrus a chynghorwyr technegol sy'n deall amcanion busnes fferm ar un llaw, ac anghenion a chyfleoedd amgylcheddol ar y llaw arall. Gall grwpiau Arwain sy'n seiliedig ar ffermydd fod yn un ffordd o gyllido hyn, a gallai profiadau rhaglenni cydweithredol ffermwyr sydd wedi'u hen sefydlu yn yr Iseldiroedd oedd yn defnyddio cyllid amaeth-amgylcheddol fod yn berthnasol<sup>19</sup>.

Bydd pwyslais newydd ar brawfesur o safbwynt yr hinsawdd, ac arloesi a chydweithredu amaethyddol yn Rhaglenni Datblygu Gwledig 2014-20 sy'n darparu cyllid amaeth-amgylcheddol a chyllid coedwigaeth yn y DU. Mae hyn yn cynnig cyfle ardderchog i helpu ffermwyr eraill yr ucheldir i fabwysiadu dull gweithredu Pontbren i wella fferm ac amgylchedd.

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# The Pontbren Project

## A farmer-led approach to sustainable land management in the uplands

This report outlines how ten neighbouring farms in Powys, covering an area of over 1,000 ha came together to improve the efficiency of their upland livestock farming, making innovative use of woodland management and tree planting.

Roger Jukes, founder member of the Pontbren farmers group explains:

*"Each of us worked up a plan for our farm. Our next step was to look for support for our programme. It quickly became clear that none of the existing schemes were appropriate. They were too inflexible and it was not possible for us to enter as a group. We were left with no other option than to develop our own scheme and seek funding from other sources. We succeeded."*

The report explains how this remarkable feat was achieved and considers the lessons that it offers to other farmers, to policy makers and all who are interested in finding a more sustainable way of managing our environment.

## Prosiect Pontbren

### Dull o reoli tir yn gynaliadwy yn yr ucheldiroedd, sy'n cael ei lywio gan ffermwyr

Mae'r adroddiad hwn yn amlinelli hanes deg fferm ym Mhowys a ddaeth at ei gilydd i wella effeithlonrwydd ffermio anifeiliaid pori yn yr ucheldir, a hynny trwy ddull arloesol o rheoli coetir a phlannu coed. Mae'r ffermwyr yn gymdogion i'w gilydd ac mae'r ffermydd fwy na 1,000 ha o ran maint.

Dywed Roger Jukes, un sefydlwyr Grwp Ffermwyr Pontbren:

*"Fe wnaeth pob un ohonom weithio allan cynllun i'n ffermydd ein hunain. Ein cam nesaf oedd chwilio am gymorth i'n rhaglen. Yn fuan iawn, daeth yn amlwg nad oedd yr un o'r cynlluniau amgylchedd amaeth presennol yn addas. Roeddant yn rhy anhyblyg ac nid oedd yn bosibl inni wneud cais fel tîm. Nid oedd gennym ddewis ond i ddatblygu ein cynllun ein hunain a chwilio am gyllid o ffynonellau eraill. Llwyddasom."*

Mae'r adroddiad hwn yn amlinelli sut y cyflawniwyd y gamp hon, gan ystyried y gwersi mae'n gynnig i amaethwyr eraill, i'r rhai sy'n llunio polisi ac i bawb sydd â'i fryd ar reoli'n hamgylchedd ni'n fwy cynaliadwy.

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This Report has been produced by the Woodland Trust in association with Coed Cymru and the Pontbren Farmers' Group, with support from the Royal Bank of Canada.

Cynhyrchwyd yr Adroddiad yma gan Goed Cadw mewn cydweithrediad â Coed Cymru a Grwp Ffermwyr Pontbren, gyda chefnogaeth Banc Brenhinol Canada.

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## **Inquiry into the public forestry estate in Wales**

### **Response from the CLA**

Country Land and Business Association (CLA) members own and/or manage a wide variety of woodland areas and types to fulfil a range of objectives. These range from large commercial plantations to small copses, and it is the CLA's role to represent its members' interests across this broad spectrum.

There is no advice or a 'vision' from either Welsh Government or Natural Resources Wales (NRW) as to the direction they want to take state-owned and privately owned woodland nor, it seems, drive to generate or maintain commercially viable forestry in Wales. It seems the ex FCW staff have little interest in promoting/supporting the private sector; it is seen as an irrelevance or competition. But NRW has a statutory duty to promote the forest sector and they are currently ignoring this duty.

Welsh Government needs to value the contribution forestry and woodland make to the landscape, biodiversity, and water and carbon management. What is certain is that if woodland management does not become profitable it will die. There is already a decline in skilled staff in forestry and a lack of job opportunities.

With such a significant portion of the forestry in Wales under the management of NRW, their management policies, priorities and commercial activities have a significant bearing on the profitability and performance of the rest of the forestry industry in Wales. There needs to be greater recognition of this throughout NRW and WG. NRW should demonstrate annually the financial results of the public forest estate against which private foresters have to compete. They must not be permitted to distort the market to the disadvantage of the private sector.

If woodland and forest areas make no financial return for their managers and owners, then it is inevitable they will be under-managed. This in turn will mean the public environmental services will either not be produced or will be significantly under-provided. Welsh Government and Natural Resources Wales need to understand and reverse this spiral of decline.

#### **The commercial operations and focus of NRW**

- NRW have recently consulted on their Corporate Plan. In compiling responses it has been hard to be positive, with very little detail to digest, and the words woodlands/forestry were notably absent.
- The Plan was swiftly followed by the Welsh Government's consultation on the Environment Bill, which is intended to tie up the many loose ends in environment legislation, and all matters concerning NRW. Again, it is hard to get to grips with any real facts and mention of the forestry industry was lacking. In some ways this is hardly surprising as the UK Forestry Act still reigns supreme, and until WG deals with this, we are in limbo.
- To date, bureaucracy seems to have taken over from the common sense that used to be available via the Forestry Commission private woodland officers, with a number of members feeding in comments along these lines. For example, the treatment of residue standing timber post wind-blow and the full three-month felling licence requirement, despite the practical problems this creates on site.



- The most concerning thing for the private sector is the way the ex Forestry Commission Wales staff seem to have been swamped by their new persona under NRW and by phytophthora. With the inter-play between the private sector and the state regarding timber sales, it is not a happy situation where one party is underselling their hard-won timber at prices that do not reflect the national market, but do impact on private sector sales in Wales. We must also be concerned about the impact of this policy on the NRW budget.
- There needs to be an informed debate about the relationship between the public and private sector which is honest and open. There needs to be much greater transparency with regard to the sale of public estate timber. NRW supply 60% of the conifer market and because they aren't particularly price sensitive they sell almost regardless of price which is something the private sector rarely does. As a result the private sector resource is under exploited and there is a substantial stored volume which doesn't come to the market. Added to this because of a generation of low prices private owners are very dependent on grants to make the woodland account balance. This is costly to the taxpayer so there is a double hit - the public estate needs an enormous amount of public money to stay afloat and the private sector is struggling to make the books balance and rely on public investment. This is not sustainable.
- Regulation is becoming a major issue. The zealous way regulation of the private estate is enforced is becoming a real hindrance to business. Prosecution is seen as the way forward regardless of whether it is in the public interest, for example TilHill mistakenly felled 1.5 ha of mature larch. They had a thinning licence but not a licence to fell. When they realised their mistake they contacted NRW to resolve the problem which is what would have happened in FCW days. Prosecution and a fine of £6000 plus £4000 costs. There is evidence that the regulating team are not applying the same rules to the public estate where undoubtedly there are similar breaches. NRW is claiming crown immunity, which we don't believe to be the case, but even if they do how can the public regulator impose a harsh interpretation of regulation on their competitor and let themselves off? We need clear guidance on the interpretation of guidelines, standards and legislation. A number of NRW staff are being allowed to make up the rules as they choose because there is no leadership and a desire to be seen to be imposing the 'law'.
- The current policy on grey squirrel control on public forestry land does not accurately reflect the threat posed and needs closer focus to reduce their numbers and range.

#### **Delivery of business advice and support to the forestry sector in Wales**

- This appears to have gone into limbo and be almost non-existent. Certainly, the NRW website has been reported as confusing and unhelpful, particularly when seeking information about grants and regulations with the exception of felling licences.
- We welcome the commitment given to extend the proportion of the RDP available for woodlands, noting specifically that woodland creation covers a multitude of circumstances from creation of on-farm shelter belts to the establishment of a commercial forest. Whatever the rationale, we believe that the landowner/farmer/forester needs advice and support and would seek a dedicated team of woodland/forestry experts to whom they can refer. Several of our members have, in recent times, commented on the loss of technical knowledge on woodland management within NRW. This being the case, we would urge Welsh Government to use the capacity of professional/experienced individuals to fill this vacuum. Membership comments also indicate that the current delays in the system, largely due to the absence of staff resource and knowledge, are also a barrier to take-up of Glastir Woodland. The traffic

light mapping system is not fit for purpose, the datasets used are out of date and there needs to be a wholesale overhaul of this system. The industry needs support at every level as recent events have further damaged the commercial viability of this sector.

- Certification has become a major burden when the UK Forest Standard compliance should be sufficient.

### **Management of disease outbreaks on the public forestry estate**

- We accept that P Ramorum is a very difficult disease to manage or control and that the distribution of larch in Wales makes this especially so. However, the attempts to manage P Ramorum in Wales were slow off the mark and inadequate. The significant spread of the disease last year was blamed on the weather which was partly true but it also down to the fact that the diseased trees hadn't been felled and therefore there was much greater sporulation.
- The sheer scale of the infections on the NRW estate, 5,000 hectares plus in 2013, has put continued pressure on the harvesting resources, and returns to NRW from this work have been low. We note that NRW are attempting to use Glastir money for some of this work, a totally new departure where Government agencies have never previously been able to tap into "private" grant schemes.
- The revised NRW guidelines for the removal of larch that distinguish between the chronically infected areas (the Valleys) and the occasional infection were welcomed, with the former allowing for less regulation in removal.

### **Progress made by NRW to deliver the recommendations of the Wales Audit Office**

- The recommendations from the Audit Office were established on the premise of the old Forestry Commission set up. As noted earlier, the creation of NRW has diluted the focus on forestry policy and delivery and thus reduced the ability for the new body to deliver on the Audit Office recommendations, namely strengthening core business processes and improving procedures around timber production and forecasting.

**Submission by Woodland Strategy Advisory Panel to NAW Environment and Sustainability Committee inquiry into the public forest estate in Wales**

1. The Woodland Strategy Advisory Panel (WSAP) has 22 members whose interests and experience span most of the diverse roles of woodlands in Wales. We played a leading role in formulating *Woodlands for Wales*, the government's 50 year strategy for Welsh woodlands. Before the formation of Natural Resources Wales we advised Forestry Commission Wales but now report to the Forest Policy Team of Welsh Government.
2. The terms of reference of your inquiry do not reflect the breadth of knowledge and expertise of our members so we take this opportunity to express views related to your broad aim of assessing NRW's management of the public forest estate as well as responding to the four subjects you identify in the terms of reference.
3. Our response is therefore in two parts. Part 1 addresses the four topics in the terms of reference. Part 2 provides comments on other aspects of the management of the public woodland estate. We offer both comments and also some recommendations. The submission is a compilation of the views of members rather than an agreed position statement.

**Part 1**

**Comments and recommendations on terms of reference.**

**The commercial operations and focus of the NRW  
Comments**

4. NRW's forestry objectives, management structure and ecosystems approach to decision making are unclear.
5. NRW is not achieving best value in its contracting. This is because procurement processes are complicated and are not transparent or consistent. Businesses have to retender with detailed risk assessments and method statements when they have already qualified for the Framework Contract. NRW requires them to repeatedly go through the pre-qualification questionnaire (PQQ) process for each contract award. In short there appears to be no recognition of previous experience of working for FCW.

**Recommendations**

6. NRW's objectives for commercial forestry should be clearly defined and delivery mechanisms explained. It should have a clear structure for the management of the WGWE and a senior officer with overall responsibility for woodlands. It should explain how it will implement an ecosystems approach in its decision making.
7. NRW should simplify its tendering process and if businesses qualify for a Framework Contract simplify contract awards within the Framework

**Delivery of business advice and support to the forestry sector in Wales  
Comments**

8. Forest businesses are experiencing a poor and declining quality of service from NRW. There are complaints that local NRW staff have not renewed contacts with organisations who were partners with FCW.

9. Regarding business advice, none is being delivered; rather NRW is being given advice by the private sector (PS) but not acting on it. As NRW no longer employ Woodland Officers there is no mechanism for dispensing advice.
10. NRW are inflexible towards amendment of existing grant schemes e.g. in re-allocating under-spent budgets or to making changes in response to *Phytophthora ramorum* (PR). NRW seem to have given up on Better Woodlands for Wales (BWW), the grant scheme before Glastir, although it is by far the most active grant scheme in delivering activity on the ground.
11. One excellent example of collaborative working and support between the private sector three local authorities and NRW is with timber transport from Tywi Forest (largest in Wales) and use of WGWE forest roads to relieve pressure on fragile local highways and divert timber traffic away from vulnerable rural communities. There is potential to take similar initiatives elsewhere.
12. With respect to regulations there has been a change in enforcement policy with creation of NRW. It is now much more heavy handed and it is difficult to see where the "public interest" test has been applied as it was in the past when prosecutions were contemplated.
13. A real problem for the private sector is the lack of balance in how NRW regulate themselves and the private sector. It is not clear whether NRW even monitors for breaches in compliance within their own Forest Design Plans and certainly no sanctions are applied due to Crown immunity. Evidence of breaches by NRW is only anecdotal but non-compliance is strongly suspected by the private sector and there is no reporting by NRW. This breakdown in trust between the private sector and NRW is not good for the industry or NRW.

### **Recommendations**

14. NRW must improve the ways it works with stakeholders paying particular attention to: accessibility of staff with forestry expertise; responses to phone calls and e-mails (speed and quality of response) and coverage of forestry on the NRW web site.
15. NRW should allow amendments to BWW and re-allocation of unspent funds.
16. NRW should continue to encourage the use of WGWE forest roads to ease impact of timber traffic on rural County roads and communities.
17. NRW should implement its objective of reducing, coordinating, streamlining and simplifying regulations affecting commercial forest businesses who should be consulted about proposed changes.
18. NRW must ensure it is being effectively self-regulated and not treated completely differently from the private sector as is currently the case.
19. NRW should apply the "public interest" test to potential prosecutions.
20. NRW needs to engage more effectively with the Private sector.

## **Management of disease outbreaks on the public forestry estate.**

### **Comments**

21. *Phytophthora ramorum* has been by far the most serious disease outbreak in Welsh woodlands for many years. Management by NRW is now freely admitted by those elements of NRW/WG not in self-denial as being, quote, a "disaster". There has been a lack of any deliverable strategy over the last 2-3 years with FCW/NRW always trying to play "catch-up" and being beaten by the disease's progress. NRW has lost credibility for managing the disease by failing to deal with 3000ha of diseased larch on the WGWE. This is a clear example of failure in self-regulation. In the light of this failure by NRW how can it have any credibility in enforcing Statutory Plant Health Notices (SPHN) in private woodlands?
22. The latest strategy of a two zone approach to dealing with the spread of the disease makes sense and can potentially adapt to development of the disease. However with no funding for the private sector to meet the costs of sanitation felling and with the risk of spore build up in the Core Disease Zone there is potential for the disease to mutate into a form that could infect and sporulate on other commercially valuable species.

### **Recommendations**

23. NRW should implement a damage limitation strategy to restore its reputation which has been severely damaged in regard to plant health.
24. NRW should ensure the new *P ramorum* strategy is delivered and reviewed regularly. It should use the carrot rather than stick to encourage compliance.
25. NRW needs to engage more actively with the private sector and Forest Research.

## **Progress made by NRW to deliver the recommendations of the Wales Audit Office**

26. No comment

## **Part 2**

### **Comments from Panel members on other aspects of management of the WGWE.**

#### **Delivering Woodlands for Wales (WfW)**

27. NRW is not taking a balanced approach in delivering WfW. It is placing undue emphasis on environmental measures and too little attention to the economic and social roles of woodlands.

#### **The Stewardship of the Land**

28. Soil: carbon stocks, productivity, peat.  
Many important wetland areas were planted in the 20<sup>th</sup> century. Many were peatlands with very large stores of sequestered carbon. These stocks have been eroded as a result of afforestation and while some sites have been restored there is much to be done to enable these sites to function as long term carbon stores. With this exception, the stewardship of the soil has been good.

29. Water: flood flows, erosion, acid waters, pesticides.  
Planting wetland areas had a disruptive effect on the catchments of many rivers, affecting flood flows, water retention and acidification. Some progress is evident with drain blocking and the creation of riparian corridors but there is still a great deal to do and much to be gained. There are examples of areas in need of restoration in all parts of urban and rural Wales.
30. Flora and Fauna: terrestrial, aquatic, woodland, open habitats, plantations on ancient woodland sites (PAWS).  
The flora and fauna (F+F) associated with any intensive land use including conifer plantations will be significantly impoverished compared with semi natural habitats. Conifer plantations in acid sensitive areas also impact on aquatic F+F. While some mitigation is possible it should be recognised that the production of timber in these areas may come at a cost to the environment and commercial fisheries. The Ancient woods on the WGWE fall into two categories; those planted with non-native species and those retaining native flora. Significant efforts have been made to restore and maintain these important sites but there is more to do.
31. Landscape:  
Attitudes to landscape design have changed over time. WGWE managers have been diligent in keeping pace with change but there is still a legacy of poor design "working through the system" Large scale clearfelling is particularly contentious in some areas.
32. Access and Informal Recreation:  
The provision of 100,000 hectares of land with open access will probably be judged as the greatest legacy of 20<sup>th</sup> century afforestation. It is a national treasure and it is time it was given a better name than the WGWE!
- The Stewardship of the Growing Timber**
33. Species Structure:  
Present and future production is very dependent on Sitka spruce. The need to diversify is acknowledged but choices of coniferous species are limited.
34. Age Structure:  
Most of WGWE is planted in large even aged blocks. The need to diversify is acknowledged but progress has been slow.
35. Productivity:  
The WGWE is working at maximum productive capacity.
36. Resilience: climate change, storm, drought, global markets.  
The WGWE should be seen as being at high risk of damage from pests, diseases, storm and drought. This arises because of choices made decades ago. It is also threatened by market competition from overseas.
37. Silviculture:  
The majority of WGWE is still managed as a rotational crop on a relatively short production cycle. This is very unusual, only 7% of Europe's forests are managed in this way.

38. Timber Quality:

Silvicultural choices influence the quality of timber. Softwoods with a high proportion of fast grown material will be of inferior quality when compared with slower grown material. This restricts the options for use in higher value markets.

**The Business**

39. Timber Production: quality, quantity, cost, income, fairness, transparency, continuity.

Plantation silviculture predetermines the quality and quantity of timber produced. It is a high input system when compared to the methods generally used in Europe to grow softwood. It is important that timber produced at significant net cost to the taxpayer is sold to sustain the greatest possible number of jobs in large and small businesses

40. Commercial Recreation: accommodation, shooting, stalking, biking.

This is an area where the WGWE could do much more. It was not given sufficient priority in the past. Here is an excellent opportunity for NRW to make its mark.

**Behaving as a Good Neighbour**

41. Pests and Diseases:

WGWE has taken a proactive role in coordinating deer management. It attracts criticism from farming neighbours for not controlling foxes and crows.

42. Invasive Species:

NRW should set an example in dealing with these.

Roger Cooper  
Chair WSAP

16<sup>th</sup> May 2014





**Cyfoeth  
Naturiol  
Cymru  
Natural  
Resources  
Wales**

## **National Assembly for Wales Environment & Sustainability Committee Inquiry into the Public Forest Estate in Wales**

### **Submission by Natural Resources Wales**

#### **1. Summary**

The purpose of Natural Resources Wales is to ensure that the natural resources of Wales are sustainably maintained, enhanced and used, now and in the future.

We have a broad range of powers and duties and in respect of forestry we have the power to manage the Welsh Government Woodland Estate (WGWE) for purposes of our functions. We have specific statutory duties and functions under the Forestry Act 1967 to promote the interests of forestry, the development of afforestation, the production and supply of timber and the establishment and maintenance of adequate reserves of growing trees. Under the general duty we are charged with the overall ‘Balancing Duty’ and to have regard to the national interest in maintaining and expanding forestry resources. We are the Welsh Government’s key partner in supporting the delivery of the outcomes described in the Welsh Government’s strategy for trees and woodlands ‘*Woodlands for Wales*’. The Woodland Strategy established a 50 year vision and its action plan sets a partnership approach to deliver a balanced set of outcomes from all the trees, woodlands and forests in Wales – the Welsh Forest Resource. Welsh Ministers also rely on us to provide them with advice and assistance as provided for by our Establishment and Functions Orders.

The current WGWE equates to 6% of the land area of Wales and comprises 125,705.4 hectares (ha) of land managed by Natural Resources Wales. Around 13% comprises of land other than woodland such as farmland, quarries, buildings, open water, roads and rides. Much of this other land is made up of small patches of open ground within the forest (an integral part of the forest habitat) or is a vital part of the infrastructure which services forest management. 87% of the forest public forest estate is freehold and 13% leasehold. The forest estate has a capital value of £617,905,579 (excluding 2014ha Lake Vyrnwy) and the land other than woodland £35,356,064<sup>1</sup>.

As manager of 38% of the Welsh Forest Resource, we are the largest producer of timber and provider of outdoor recreation in Wales. Woodlands provide multiple benefits in the same place at the same time and forest managers have developed expertise in handling the trade-offs when prioritising between competing objectives – a cornerstone of Sustainable Forest Management. The relative importance of woodland habitats in Wales is

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<sup>1</sup> Provisional figures from Natural Resources Wales’ Annual Report and Accounts 2013/14 - in preparation.

high and the flow of services from them, in terms of contribution to human well-being, is generally improving with the exception of the impact of pests and diseases<sup>2</sup> (**annex 1**). There are very strong synergies between Sustainable Forest Management and the aspiration to adopt an Integrated Natural Resource Management (INRM) approach. There is international and domestic (UK and devolved) recognition<sup>3</sup> that Sustainable Forest Management operates within a form of ecosystems services framework which is wholly complimentary to our emerging country level approach to Integrated Natural Resource Management. Delivering Sustainable Forest Management in Wales needs to be an integral part of successful implementation of Integrated Natural Resource Management. Public ownership provides Welsh Ministers with direct control and rapid delivery of public policy objectives (including but not exclusive to timber) at an influential scale in a way that would be difficult or impossible to achieve by grant aid or regulation alone.

## **1.1 Since vesting key successes in Natural Resources Wales' management of the WGWE include:**

### *1.1.2 Commercial operations and focus:*

- Developed our Enterprise Framework providing effective governance for the consideration of current and new enterprise activities;
- Increased our engagement with Local Authorities, Forest Holidays, new energy markets and carbon capture projects and extended our sporting rights;
- Supplied 887,000m<sup>3</sup> of timber to the market in 2013/14 via 300 harvesting contracts providing an income of over £14 million and market 878,000m<sup>3</sup> of timber in 2014/15;
- Completed more than 1400 hectares of replanting with over 3.4 million trees of 37 different species (twice the variety of a decade ago). The main species planted continues to be Sitka spruce (39%), followed by Douglas fir (14%), Norway spruce (11%), Serbian spruce (6%) and oak (6%);
- Saved more than 700KtCO<sub>2</sub> annually<sup>4</sup> through our Renewable Energy Programme;
- Considering 172 small scale hydro schemes on the WGWE;
- Deliver more than £100 million over the next 25 years through the establishment of Community Trust Funds sourced across all wind energy projects starting with Pen y Cymoedd in 2016; and,
- Put in place over 900 permissions and agreements for use of the WGWE for activities benefitting communities and enterprises.

### *1.1.3 Business advice and support to the forest sector:*

- Issued over 1200 forestry permits (ie. licences, notices, assessments);
- Approved 178 Glastir Woodland Creation contracts;
- Issued 261 new Statutory Plant Health Notices for compliance with WGs new *Phytophthora ramorum* Disease Management Plan;
- Provided training and support for staff and contractors to improve water quality management during forest operations;

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<sup>2</sup> UK National Ecosystem Assessment (2011) *The UK National Ecosystem Assessment Technical Report* UNEP-WCMC, Cambridge

<sup>3</sup> Quine, Bailey & Watts, (2013), *Sustainable Forest Management in a time of ecosystem services frameworks: a common ground and consequences*, Journal of Applied Ecology, 50, 863-867

<sup>4</sup> Average annual carbon savings calculated from figures for WEBS; small scale hydro; Wind energy sites at Clocaenog (Environmental Statement annex 2.1 carbon balance assessment, March 2013, SKM Enviros); Nant y Moch (non-technical summary, May 2012, Dulas ReSolutions); Brechfa West (updated carbon balance assessment for RWE, July 2011, RSK Group PLC); Pen y Cymoedd Environmental Statement, non-technical summary).

- Provided tree health seminars attended by 200 participants from public and private sectors; and,
- Offered woodland based learning and improved outdoor learning skill sets via more than 800 educational site visits to over 19000 students – delivering the equivalent of 55000 learning / physical activity hours.

#### 1.1.4 Management of disease outbreaks on the public forest estate:

- Undertaken annual surveillance for *Phytophthora ramorum* across Wales, inspected over 1000 suspected sites and issued 261 new SPHNs;
- Advised and supported WG in the development and implementation of their tree disease management strategy and the new *Phytophthora ramorum* Disease Management Strategy;
- Felled over 2000 hectares of infected larch since 2010 and supplied 456,000 cubic metres (m<sup>3</sup>) as a direct response to *Phytophthora ramorum* control and intend to supply around 244,000 m<sup>3</sup> in 2014/15;
- Worked closely with local businesses and communities to reduce the impact of large scale clearfelling operations due to *Phytophthora ramorum*;
- Begun to implement our larch reduction plan on the WGWE;
- Continued to monitor *Chalara fraxinea* in Wales, development of the disease in the wider environment and produced a report into the biodiversity impacts of the disease; and,
- Undertaken a range of surveillance including statutory protected zone surveys for chestnut blight, chestnut gall wasp and pitch pine canker.

#### 1.1.5 Progress made to deliver the recommendations of the Wales Audit Office:

- Scrutiny of progress of the 17 actions is made as a standing item at the Audit and Risk Assurance Committee;
- Three actions were completed prior to vesting with a further nine discharged after April 2013;
- Three outstanding actions are on track to be completed during 2014 and one will be taken forward by Welsh Government; and,
- Three recommendations are necessarily part of long term improvement as we respond to the evolution of Welsh Government legislation and policy and as part of good management of the organisation development process.

### **1.2 To continue to successfully deliver Sustainable Forest Management across the public forest estate and encourage others to do so we will:**

- Support jobs and growth in Welsh business - adding more value to the timber produced in Wales;
- Encourage and advise landowners to bring under-managed woodlands into management and engage the forestry sector to contribute more fully to our INRM Programme;
- Support Welsh Government to develop mechanisms to make woodland creation attractive, by using the UK Woodland Carbon Code and developing a coherent set of market mechanisms for the provision of ecosystem services and woodlands special role in carbon abatement;
- Work with communities so that they have access to the benefits that flow from woodlands - especially in disadvantaged and urban areas;

- Detect and respond effectively to pests and diseases;
- Adapt to the impacts of climate change on forests - making forest ecosystems more resilient and continue to improve woodland condition;
- Improve resilience and continue to diversify the tree species we plant and ensure that the silvicultural management system we employ yields the benefits that come from the right tree in the right place for the right reasons and adopt a sound approach to genetic diversity and conservation;
- Implement regulations for sustainable forestry policy in accordance with our duties, powers and functions;
- Implement multi-purpose forestry policies and develop our strategic, tactical and operational approaches to deliver the best we can for people and place;
- Target our priority areas for the restoration of Plantations on Ancient Woodland Sites, afforested deep peat sites and conversion to native woodland whilst striving to balance the need to retain productive potential across the Welsh Forest Resource and the flow of utilisable timber products;
- Improve woodland condition especially in and around protected sites such as Special Areas of Conservation, to support the achievement of good ecological status under the Water Framework Directive and the wide range of important species dependent on careful management of the WGWE such as red squirrel and hazel dormouse; and we will,
- Manage the WGWE to the desired Sustainable Forest Management standards in an era of reducing public funding.

## 2.0 Introduction

Legal and good forestry practice in the United Kingdom (UK) has developed within a conceptual framework of Sustainable Forest Management committed to at International and European level over two decades. The definition of Sustainable Forest Management at a country level is represented by the UK Woodland Assurance Scheme (UKWAS) which provides the audit standard for independent certification that woodlands are in sustainable management. The UKWAS standard is complementary to the Government's own standard of sustainable forest management, the UK Forestry Standard (UKFS), which links together all the technical guidelines<sup>5</sup> that are used as the basis for regulation and provision of grant aid.

We inherited the Forestry Commission's general duty under the Forestry Act 1967 to promote in Wales the interests of forestry, the development of afforestation and the production and supply of timber. That duty includes promoting the establishment and maintenance of adequate reserves of growing trees and an overall 'Balancing Duty' - key to the delivery Sustainable Forest Management. The Act confers a number of functions on us to enable it to discharge its general duty, principally the management of forestry, the land placed at its disposal by the Welsh Ministers under the Act (the WGWE) and the control of the felling of trees in any quantity via the felling licence regulations. We also exercise the Welsh Ministers' functions to acquire and dispose of forestry land, subject to

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<sup>5</sup> The seven Guidelines describe 39 legal requirements, 59 requirements of good forestry practice and 316 elements for sustainable forest management supplemented by best practice guidance for specific elements.

certain constraints, under an agency arrangement made under section 83 of the Government of Wales Act 2006.

Forestry policy was devolved to Wales in 2003. The development of Welsh Forestry Policy was informed by the UKFS but was also influenced by European forest policies and action plans focussing on maintaining *'the multiple functions of forests crucial to society'*.<sup>6</sup> SFM is the foundation for *'Woodlands for Wales'* and the 50 year vision for the Welsh Forest Resource:

*'Wales will be known for its high-quality woodlands that enhance the landscape, are appropriate to local conditions and have a diverse mixture of species and habitats.'*<sup>7</sup>

The strategy sets out the environmental, social and economic benefits that woodlands in Wales should provide. It recognises that some of these outcomes may take decades to achieve, although others can be much more rapid. This framework together with the commitments (that the UK are a signatory to) set the context for forest policy in Wales and the standards to which the WGWE is expected to be managed. It also forms the basis of the management of the WGWE for multi-purpose benefits.

The established Sustainable Forest Management framework and how the UK and Wales has taken forward its commitments is presented diagrammatically at **annex 2** and shows the roles and responsibilities of Natural Resources Wales in its delivery.

### **3.0 The commercial operations and focus of the Natural Resources Wales;**

#### **3.1 Introduction**

Our management of the WGWE is to the established Sustainable Forest Management framework guided by a series of long term plans known as Forest Design Plans (FDPs). These are the 'planning backdrop' for achieving multi-purpose objectives which respond effectively to people and place. The development of an Enterprise Framework and a methodology for qualifying existing and new ideas, and prioritising the ones to pursue further provides the governance framework in which economic opportunities can be realised.

In this section we describe our: Forest Resource Planning; Enterprise Framework; timber marketing and trade liaison; increasing the diversity and resilience of the public forest estate; renewable energy programme; and, delivery for the needs of society.

#### **3.2 Forest Resource Planning**

FDPs drive operational plans which secure the quality and quantity of local work programmes such as the identification of how the woodland will be managed and replanting or natural regeneration to achieve objectives looking 25 years ahead. It is within the context of over 220 established FDPs that commercial focus and business programmes operate. We are taking the opportunity to demonstrate successful Sustainable Forest Management through the development of a Forest Resource Planning process – modifying the established GB Forest Design Planning process for Wales - which will link the management of the WGWE with the wider management of natural resources more comprehensively. They also demonstrate how WGWE is managed alongside

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<sup>6</sup> Extract from Oslo Ministerial Decision on European Forests 2020: FOREST EUROPE's signatories shared vision available from <http://www.foresteurope.org/>

<sup>7</sup> The Welsh Assembly Government's Strategy for Woodlands and Trees *'Woodlands for Wales'* (2009) Forestry Commission Wales



adjacent National Nature Reserves and other designated sites that sit within our expanded estate. Such an integrated approach will make it easier to build partnerships with others to plan, fund and implement delivery across land managers and sectors (shown in **annex 3**). The Forest Resource Planning process will be based on an assessment of current and potential future value of ecosystem service provision and set management objectives and plans accordingly.

### **3.3 Enterprise Framework**

The development of existing and new enterprise activities has been identified as a priority for us in the Welsh Government's Remit Letter 2013 -14 and by many business stakeholders. The direct management of significant land based assets and resources, together with core skills in key market sectors provides a new opportunity for us to maintain and develop new innovative enterprise activities based on the principles of sustainable natural resource management. Well considered and efficiently implemented enterprise opportunities will provide useful mitigation to likely increased future pressures on Grant-in-Aid funding from Welsh Government and make an important contribution towards the Government's aspirations for jobs and growth in Wales.

Since 1 April 2013, we have developed an enterprise framework and a methodology for qualifying existing and new ideas, and prioritising the ones to pursue further based on revenue potential, minimum acceptable rates of return, *vires*, speed, ease of implementation and environmental and social fit. Our enterprise activities are wide and varied including the award of long-term contracts to supply infected larch, joint public-private ventures, WGs Housing Task Force, the lease of sporting rights to local businesses, sale of surplus agricultural land, telecommunication wayleaves and a pilot project for carbon capture using a 'payments for ecosystem services' approach.

### **3.4 Timber trade liaison, sales and marketing**

#### *3.4.1 Trade liaison*

We have a customer manager-led approach to liaison with timber customers with ongoing communication for existing contract management and sales together with a series of scheduled formal quarterly meetings. We meet at least annually with the whole of the timber trade where we share existing in-year performance together with the rolling plan of production and sales for the future three year period. Matters such as contract and timber production performance, changes to health and safety or environmental policies and procedures that will impact upon timber harvesting on the public forest estate is also shared and discussed at the annual trade liaison meeting. We meet with key organisations on a regular basis.

For business continuity purposes we adopted the legacy body Timber Marketing Strategy 2011-16<sup>8</sup> developed in consultation with the timber trade and other external stakeholders. It makes the connection between the objectives set in the *Woodland Strategy* and how timber marketing will deliver them in an annual and five year timeframe. Whilst the current strategy runs until March 2016 the significant impact of *Phytophthora ramorum* on timber production volume and flows we have decided to bring forward its review by 12 months to summer 2014 with a view to the launch of the new Timber Marketing Strategy by March 2015. The timber trade will be fully consulted in its preparation.

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<sup>8</sup> Timber Marketing Strategy 2 011-16, Forestry Commission Wales / WG - available at time of writing from legacy body website [http://www.forestry.gov.uk/pdf/TimberMarketingStrategy11-16.pdf/\\$FILE/TimberMarketingStrategy11-16.pdf](http://www.forestry.gov.uk/pdf/TimberMarketingStrategy11-16.pdf/$FILE/TimberMarketingStrategy11-16.pdf)

### 3.4.2 Timber marketing

Our current Timber Marketing Strategy aims for equality between long term contracts (LTCs) and short term contracts and sales – all of which are offered to an open market. In 2013/14 the proportion was approximately 40:60 LTC to short term contracts and sales. However the impact of *Phytophthora ramorum* and the increasing larch harvest (rising to nearly 30% of all timber production from the estate in the current year) has meant that in 2014/15 these proportions are reversed at 60:40. The increase in LTC offers was to encourage and support the harvesting and processing sectors on as stable a basis as possible. We wrote to timber processors in December 2013 giving notice of the changing future availability of red (eg larch) and white wood (eg spruce) in volume and spatial location across Wales. We have liaised closely with the timber contracting and processing sectors throughout the rapid response phase, our plans for regulatory compliance and the management of a significant tree disease through the implementation of the Larch Reduction Plan for the WGWE (see section 5.5). We provided the timber trade (including private growers) at the earliest opportunity with a timber production plan to 2021 to inform their own business planning. Through the use of long term contracts we have encouraged private investment that will ensure best value for larch for all growers in Wales.

The year 2013/14 was an incredibly challenging year for forest managers, not only in managing tree disease, but it was also the wettest year on record and Wales experienced successive Atlantic storms. 80% of *Phytophthora ramorum* infected woodland is part of the WGWE. Despite this we exceeded our Business Plan targets for timber volume by nearly 70,000m<sup>3</sup> and predicted income by £400,000.

### 3.4.3 Timber sales

Principal sales methods and rationale are described in the Timber Marketing Strategy. Timber is offered on a regular basis to the open market through two methods described as Standing Sales or Direct Production sales. Both sales methods are in demand by processors across Wales and both offer benefits to the industry and ourselves as part of the sustainable forest management of the WGWE.

Sales are conducted either through long term contract agreements or through offering short term contracts via an electronic tender system. Long term contract agreements are entered into through open market competitive sale processes and are designed to ensure that there are positive outcomes for all parties and to support all areas of the timber sector where possible. This could be through investment in processing capacity, improvement of health and safety standards, contractual requirement to support apprenticeships, adding value to end products and development of niche markets for minor species. Open market sales are offered through advertised sale events and lots are offered for both standing and roadside parcels. The system (E-Sales) is an internet based tender sale with all the relevant documentation made available on-line.

Through the Timber Marketing Strategy, regular customer contact and the annual customer liaison meeting the sector is informed when timber volume is expected to come to the market. We currently publish the average prices from sales events on the Forestry Commission website together with price trend information from roadside and standing sales through a series of indices. Due to commercial confidentiality only sales with three or more bids are included in the figures published by us. The indices aim to show long term trends and do not represent the actual prices received for individual sales lots. Timber

prices achieved from the public forest estate in Wales are broadly comparable to those achieved in England and Scotland.

We are committed to revising the current approach to publishing timber prices so that the data is more meaningful to others. We have recently proposed that the current review of timber marketing together with the timber trade statistics group could be a mechanism to take this forward. As always confidentiality is a major consideration and any change in publishing price for our timber would need to carry the support of the whole sector.

Prices and lot content can vary significantly from one sale point to another reflecting the diverse nature of tree stands and the nature of managing a public forest estate for multi-purpose objectives. Factors affecting timber prices include tree size, site terrain, mix of thinning against clearfell programmes and proximity to market. Broader economic factors influence timber prices and the consumption of wood products such as house building and manufacturing industry performance, energy prices and currency trends. The improving economic climate has seen an increase in timber prices over the last two years but markets are still expected to remain volatile and challenging for the foreseeable future.

A consequence of increasing the production and marketing of *Phytophthora ramorum* infected larch has, despite a rising trend in timber prices, resulted in a reduction of income from timber sales from the public forest estate. **Table 1** demonstrates the financial impact year on year of increasing the percentage of larch in our timber harvesting programme. Wales has dealt with a significantly larger scale and rapid response to the disease since 2010/11 than the rest of the UK and accounts for country distortion in achieved timber prices. Further evidence is given in section 5.

Table 1 Larch within harvesting programme and income

Period	Larch as % of programme	% reduction in total income
2010/11	6.29	1.92
2011/12	15.29	4.62
2012/13	13.43	3.98
2013/14	19.84	6.25
2014/15	29.48	8.95

### 3.5 Increasing the diversity and resilience of WGWE

#### 3.5.1 Measures to improve woodland resilience

Managing a more diverse WGWE will help make it more resilient to the impacts of climate change, in particular the risk from pests and pathogens, but also as a mechanism to achieve the balance of multi-purpose objectives sought in the Woodland Strategy that are appropriate to people and place locally described within FDPs. There are three main management measures to secure greater resilience: improving tree species choice, using alternatives to clearfell where possible and adopting a sound approach to genetic diversity and conservation. The outbreaks of *Phytophthora ramorum* in larch and *Chalara fraxinea* in ash show the danger of reliance on a few species. UK wood production remains reliant on softwood (95% coniferous) with hardwood just 5% and we are investing in research to improve our knowledge of the growth performance and timber properties of this broader range of species which will be a part of the long term production forecast. Increasing the structural diversity of the WGWE is a necessarily long term process and we are reducing



the area managed by clearfelling and increasing the proportion being transformed to continuous cover systems. We are working with Welsh Government to develop Wales' approach to genetic conservation and diversity in the Welsh Forest Resource.

### 3.5.2 Replanting and establishment programme

In the previous decade seven different species of conifers were planted with Sitka spruce accounting for nearly 60%. By 2016, we will be replanting with 16 different species of conifer of which 20% will be Sitka spruce. 26% of the total will be species of conifer that would have been traditionally considered 'alternative species'. Approximately 28% of replanted trees will be broadleaves in addition to the area of broadleaved woodland established under natural regeneration. The ability to diversify is somewhat limited by factors such as soils, terrain, elevation, exposure, management history and tree species suitability under predicted climatic changes. In our management of the WGWE we are following a predicted forest types approach which matches suitable species to the specific site and are encouraging other woodland owners and managers to do the same.

The budgeted replanting programme of 1350 hectares was completed by the end of March 2014, with an additional 55 hectares of land felled due to *Phytophthora ramorum* completed, within budgeted funds, to take the actual completed replanting programme to 1405 hectares. Some 3.4 million trees of 37 different species (twice the variety planted a decade ago) were planted by contractors able to take full advantage of the favourable weather conditions during the planting season. The main species planted continues to be Sitka spruce (39%), followed by Douglas fir (14%), Norway spruce (11%), Serbian spruce (6%) and oak (6%) and includes species such as cherry, lime and western red cedar. Our seed liaison group continue to work closely with growers to identify and collect seed in order to meet projected programmes and address any shortfalls in supply.

5515 hectares of stands under five years old were surveyed and selective control measures for weeds, insects and mammals were put in place to ensure successful establishment.

Plantations on Ancient Woodland Sites that have been clearfelled because of tree disease, i.e. *Phytophthora ramorum* in larch, are, subject to funding, to be restocked with the objective of protecting ancient woodland characteristics and restoring native tree canopy cover.

## 3.6 Renewable Energy Programme

### 3.6.1 Wind energy

The wind energy programme on the WGWE is projected to deliver 83% of the WG onshore wind energy target<sup>9</sup>. Our staff manage the programme on behalf of Welsh Government utilising and further developing valuable skill sets. Planned delivery of all wind energy projects are on target with the relevant corporate dashboard targets being met for the period. Each project is at a different stage of development. Brechfa Forest East (36MW) and Brechfa Forest West (84MW) have been granted planning consent, Clocaenog Forest (96MW) due Ministerial determination and planning application is expected to be submitted for Dyfnant Forest (116MW) later in the year. Strategic Search Area E Pontardawe has no option agreement but has been kept in reserve as a potential Community Development – something which was identified and conveyed in the Ministerial Submission required to

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<sup>9</sup> Feb 2013 from <http://www.forestry.gov.uk/forestry/INFD-8JTE8F>

authorise the termination transaction. The Nant y Moch project (155MW) is currently subject to review and SSE Renewables are working with us to establish the best possible way forward.

The most advanced site is Pen y Cymoedd (228MW installed capacity). In February 2014, we delivered the agreed tree clearance programme to the developer, Vattenfall UK, and construction of the compound and associated infrastructure has begun. Construction of the 'Blade' mountain bike mitigation route was undertaken between July and December 2013 and the route opened in February 2014 in Afan Forest Park. Environmental mitigation of £3M is now being addressed with the establishment of the Ecological Steering Group which will advise on the delivery of the Habitat Management Plan and associated expenditure. Pen y Cymoedd is expected to save between 4 and 9.5MtCO<sub>2</sub><sup>10</sup> over its 25 year lifespan<sup>11</sup>.

The wind energy programme operates with a number of important principles from the Woodland Strategy including where permanent removal of woodland is permitted then an equivalent area of woodland will be created in Wales funded by the developers and the programme.

### *3.6.2 Small Scale Hydro Power*

The Small Scale Hydro Power Programme was commissioned by WG to investigate and deliver opportunities for the development of such schemes on the WGWE. The Programme received 302 expressions of interest on 240 sites and is now considering 172 schemes in three tranches between April 2013 and December 2017. The four year programme has worked closely with developers to ensure compliance with our water abstraction policy. Based on half of schemes being built or completed this programme is expected to save 79KtCO<sub>2</sub> annually<sup>12</sup>. This programme has stimulated the creation of small and medium sized enterprises and is a good example of public investment (and the use of public land) to pump-prime interest, technological development and the growth of support services for renewables in the wider economy.

### *3.6.3 Third Party Access for Energy Programme and Wood Energy Business Scheme*

There are four access agreements across the WGWE to operational wind energy schemes developed off the public forest estate.

Wood Energy Business Scheme (WEBS) is an EU funded scheme which provides capital grant support to businesses for woodfuel heating systems and processing equipment. 70 offers were made to applicants with 59 projects completed. The scheme is closed to new applicants but will continue to run until March 2015 as there are three potential grants to be finalised. This programme is calculated to save over 2KtCO<sub>2</sub> annually and within the lifespan of the funded scheme by a total of 6.47KtCO<sub>2</sub><sup>13</sup>. The scheme provided applicants the opportunity to identify supply volume from the WGWE – an example of the flexibility of public land ownership to stimulate new enterprise.

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<sup>10</sup> carbon savings calculated by comparing loss from site development while displacing electricity generated from the UK fossil fuel or grid mix

<sup>11</sup> Pen y Cymoedd Environmental Statement, non-technical summary

<sup>12</sup> Natural Resources Wales May 2014 unpublished figures

<sup>13</sup> Jeffreys, M. Submitted as part of Independent End of Project Review to WEFO



### 3.7 Delivery of the social agenda

#### 3.7.1 Strategy and priority delivery

Our Recreation and Access Strategic Statement 2014 – 2015<sup>14</sup> sets out how we provide opportunities within and facilitate the use of the public forest estate by others and how we work with others to facilitate and promote recreation and access across Wales. The content was developed from internal events workshops and external workshops during the development of the Corporate Plan.

We have continued to develop opportunities for access provision within the public forest estate. High priority has been given to the development and improvement of recreation and access provision in and around Afan and Cwmcarn visitor centres - areas that have been significantly affected by large scale clearfelling to control *Phytophthora ramorum*. Redevelopment of the sites will encourage new and repeat visitors, providing continued access opportunities whilst forestry operations are ongoing. The nearby Vattenfall UK wind energy programme has provided mitigation in the form of new mountain bike trails in Afan.

At our Coed y Brenin site 11km of new trails have been built. Four new running trails have been developed using guidance from Welsh Athletics, which cater for a growing market. A new trail running outlet (retail and advisory) has been leased to support this new market. End of year visitor and job creation figures for 13/14 will be available for the oral evidence session but at the time of writing 51500 extra visitors have visited this site along with the creation of 5.75 jobs<sup>15</sup>.

A new play area, including natural play area, has been developed and launched at Moel Famau in North East Wales – the first of its kind in the public forest estate. The play area encourages children and young people to venture out into the woodland, away from the more usual built play area, building their confidence and motor skills through play and exploration.

#### 3.7.2 Engagement with the public

Building on the Forestry Commission and Natural Resources Wales' established approach<sup>16</sup> and high emphasis on the management of health and safety within forest operations we have developed specific guidance for areas of high public use. Forest management operations are essential to the provision, development and maintenance of well-managed, safe and welcoming woodlands for recreation, access and other community activity. This guidance will provide information to the public on the 'when', 'why' and 'what' of our forest operations and other major works including forest road construction. Developed in partnership and consultation with our specialist operational staff the guidance was piloted in Coed y Cymoedd in South Wales last year and will be rolled out across woodlands managed by us in 2014 in line with UKWAS recommendations. The guidance is being extended to cover informing and consulting the public about Forest Resource Plans. This will involve stakeholder and spatial analysis to ensure that engagement resources are focussed on those communities and groups with a direct

<sup>14</sup> In preparation - due at Natural Resources Wales Board 14<sup>th</sup> May.

<sup>15</sup> Unpublished Natural Resources Wales part-year figures submitted to WEFO. End of year figures being finalised at time of writing.

<sup>16</sup> For example Forestry Commission Practice Note – Managing Public Safety on Harvesting Sites, revised November 2012 - provides guidance for landowners, forest managers and forestry practitioners when discharging their duty of care to the public on forest operation sites together with information and advice on suitable control measures and illustrates good practice through the use of scenarios.

interest in high use woodlands. We can consult about 'how' and 'when' operations are carried out and we can inform about given factors which dictate tree species choice and forest resource plans (the 'what' and 'why') such as soils, terrain, elevation, exposure and management history.

### 3.7.3 'Woodlands and You'

Through the *Woodlands and You* scheme we encourage and facilitates use of the WGWE for a range of community and enterprise benefits. The woodlands we manage can be used for training and enterprise ventures, health and well-being initiatives, arts and community regeneration programmes, activities and events of all kinds. Over 900 permissions and agreements were put in place in 2012/13 and although the figures for 13/14 are still being prepared there is an upward trend. Both the WG and Natural Resources Wales want communities and social enterprises to get the greatest possible benefit from the WGWE. A monitoring and evaluation toolkit and process have been developed and implemented to ensure that we provide the best possible service to applicants. The scheme is currently being developed and extended to include all land owned and managed by us

## 4.0 Delivery of business advice and support to the forestry sector in Wales;

### 4.1 Introduction

We discharge our duties and functions according to the parameters of its Establishment and Functions Orders. In our management of the Public Forest Estate we are able to deliver against broader WG priorities such as green growth (providing opportunities for enterprise), healthy activity (provision of recreation and access); green energy (renewable energy programme, sale of biomass); tackling poverty (channelling benefits to most disadvantaged groups and communities) illustrated in **annex 3** and described in section 3.7 and 4.3.8.

An often undervalued aspect of direct management of a public forest estate is the experience of our staff and making these valuable professional forestry skill sets transferable to the broader discharge of our powers, duties and functions. Using applied research to influence how others plan and manage their land is a key part of our business. We continued to administer new Glastir Woodland Creation grants until 31<sup>st</sup> December 2013. In addition to our capacity as regulator for forestry issues and woodland grants, we continue to provide advice and support to secure the change needed for a resilient forest sector and the continual development of Sustainable Forest Management best practice.

In this section we describe our: regulation of forestry issues; examples since April 2013 of technical advice and guidance to support regulatory compliance and best practice including investment in forestry research; and, how we engage with our key external stakeholders in the forestry sector and those interested in it.

### 4.2 Regulation

#### 4.2.1 Forestry issues

As the regulator for forestry issues, we are responsible for issuing felling licences and Statutory Plant Health Notices (SPHN), and for the administration of Environmental Impact Assessments and open access restrictions and exclusions for forestry. It is responsible for these issues on the WGWE as well as the private sector. Generally, with the exception of SPHNs (to implement the WGs Disease Management Strategy for *Phytophthora*



*ramorum*), there has been no significant change to forestry regulatory activities since April 2013.

Since vesting the following have been issued<sup>17</sup> (not exclusive to WGWE):

Open access restrictions and exclusions	134
Felling licences	350
EIA (forestry) determinations	46
SPHN (which includes the rescinded & new SPHNs following WGs Disease Management Strategy for <i>Phytophthora ramorum</i> )	471

We are responsible for dealing with alleged illegal felling cases and in 2013/14 responded to 80 cases of which five were investigated as Cases to Answer. We are also responsible for reclaiming grants where work has not been completed or is unsatisfactory. Since April 2013 two new reclaims have been pursued. These do not involve Natural Resources Wales' management of the WGWE.

#### *4.2.2 Woodland grants*

During the year we approved 178 Glastir Woodland Creation contract applications of which 89 required consultation to be undertaken. Glastir Woodland Management has been administered by Welsh Government since inception as has Glastir Woodland Creation since 2014. We will continue to manage Better Woodlands for Wales and Glastir Woodland Creation legacy grants for as long as Welsh Government remit us to do so – with final payments made in 2022. We continue to advise on the development and implementation of the Glastir Woodland Element.

### **4.3 Technical advice, guidance and research**

#### *4.3.1 Water quality - water management plans for WGWE*

As part of our response to recent pollution incidents we have strengthened our procedures to manage the risk to water quality from forest operations with a focus on the risk of sediment entering water catchments. Awareness raising sessions for forest operations staff, including contractors, was carried out in late 2013 with further sessions planned for this year. Contractors are often a shared resource between public and private forest managers and our investment will help to improve standards for all.

#### *4.3.2 Water quality - training for the private sector in forest regulations and controlling diffuse pollution*

We provided training for UPM Tilhill contractors to raise awareness to issues relating to forest regulations (EIAs and felling licences) and managing operations to prevent siltation of water courses during forest operations.

#### *4.3.3 Water quality - managing forests in acid sensitive catchments*

A Forestry Commission practice guide (part of the UK Forest Standard suite of best practice) is to be published shortly on the management of forests in acid sensitive areas. We have produced and informed the forest sector about our implementation guide for Wales and until 30 Sept 2015 will provide a service to the private sector and Glastir Managers to help them implement the guidance.

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<sup>17</sup> Figures as at April 2014

#### *4.3.4 Reducing our use of chemicals - cypermethrin and the alternatives for pine weevil control and plant protection*

Pine weevils are a major threat to newly planted trees and can cause up to 100% losses if population control is not undertaken. We continue to work with Forest Research, Forestry Commission, growers and forest owners and managers to secure effective alternatives to cypermethrin as part of a wider chemical reduction strategy<sup>18</sup>. We already use a number of alternatives including biological control using nematodes which kill the weevils. We have continued to contribute to the £500,000 that has been spent since 2010 on research into alternatives suitable for British forestry. We are undertaking a review of the use of alpha-cypermethrin and cypermethrin on the WGWE and will provide short-term actions, a medium term plan and long term framework for the control of damage due to pine weevils.

#### *4.3.5 Tree Health awareness*

In conjunction with Forest Research, We held two tree health seminars on *Chalara fraxinea* (dieback of ash) in May 2013 and a further two on *Phytophthora ramorum* and other pests and pathogens in June 2013. These were open to the private sector and were attended by 200 participants.

#### *4.3.6 Natural approaches to flood risk management – the role of trees*

We have commissioned Forest Research to provide GIS spatial datasets and maps which identify priority areas for woodland creation and improved management of existing woodlands to benefit flood risk management in the three pilot catchments targeted by the Natural Resources Planning process; the Rhondda, Tawe and Dyfi catchments. The findings of which will be considered for use across Wales and will be shared with our Flood Risk Management staff.

#### *4.3.7 Short rotation forestry*

We have commissioned Forest Research to work with our Wales Silvicultural Operations team to establish short rotation forestry trials on the WGWE. Short Rotation Forestry seeks to address the (increasing) demand for biomass through a management system which can sustainably produce a renewable source of fuel in a relatively short time-frame (8 to 20 years). A range of tree species are in trial. This has not been previously tested in Wales and will contribute to an aim of the Woodland Strategy which was set out in the associated Action Plan: '*Develop an approach to short rotation forestry in Wales and provide guidance to owners and managers.*'

#### *4.3.8 Education, skills and work experience*

The WGWE offers an ideal setting for outdoor learning opportunities which could form an extension to learning for our schools but also increases the capacity for small and medium sized enterprises by providing settings or transfer of expertise to improve outdoor learning skills sets in Wales and beyond. Our forestry education team delivered over 800 visits for approximately 19,000 students and 3000 accompanying adults. In addition the team provided training events for 260 teachers and supported the Forest School training network. We continued to facilitate Outdoor Learning Wales (formerly known as Forest Education Initiative) supporting 21 groups to share best practice and build capacity.

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<sup>18</sup> Willoughby et al, Forestry Commission Practice Guide - Reducing pesticide use in Forestry, 2004, Forestry Commission. Operational Guidance Booklet 15 (for FC [& NRW] staff) – Using Chemicals in the Forest



We have set up the Cyfle placement scheme to support work placements and provide opportunities for skills training. In the first year 65 work experience placements were made in offices which have a forestry focus giving students the opportunity to find out more about this aspect of our work.

Within our harvesting Long Term Contracts we have added social procurement clauses to support apprenticeships and at least three have been supported since April 2013.

#### *4.3.9 The value of tree planting in our urban areas*

Wales is the first country in the world to complete a survey of canopy cover in all its urban areas. Full details and the benefits that flow from trees in urban areas are set out in the *Tree Cover in Wales' Towns and Cities'*<sup>19</sup>. The study provides an evidence base to help a range of key groups and organisations - from community tree interest groups to urban planners and decision-makers in local authorities and national government - to plan and manage our urban tree resource in a better way. Aerial photography analysis showed that urban tree canopy in Wales was 16.8% in 2009 (mid-range in world rankings) with 55 of our 220 towns showing an overall decline in canopy cover between 2006 and 2009. We are committed to working with colleagues in the Welsh Government and in public, third and private sector organisations throughout Wales, to support and build on this work and promote a strategic approach to managing our urban trees.

In summer 2013, we worked in partnership with Wrexham County Borough Council and Forest Research to complete a survey of the trees in Wrexham County Borough using i-Tree Eco, a model developed by the US Forest Service. The ecosystems services provided by Wrexham County Borough's urban trees were valued at more than £1.7 million a year. Alongside the iTree Eco project, a three year research project has been commissioned by a partnership group with representation from Natural Resources Wales, the Welsh Government, Forest Research and Wrexham County Borough Council to assess the policy and wider attitudes towards and impacts of the survey on Wrexham's urban forest over time.

#### **4.4 Liaison with the forest sector**

We lead, facilitate and participate in many fora where the forestry sector are considered and /or represented (section 3.4.1 describes timber trade liaison). We also hold bespoke seminars and meetings to discuss topics or disseminate information such as 'forests, fisheries and water' held in March 2014. 45 attendees from relevant sectors came to hear specialists in their field and discuss the sustainable management of forests, inland fisheries and water catchment management.

The Wales Land Management Forum was established in May 2013 to act as the main communication route between the Board and Executive Team of Natural Resources Wales and elected office holders from the principal land management organisations in Wales. The forum provides a mechanism to share information, identify areas of common ground and develop a 'no surprises' approach to strategic issues. The Forum currently includes representatives from Confor, the farming unions and land management and owners organisations but will be refreshing its Terms of Reference and membership and is looking to expand its forest sector representation.

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<sup>19</sup> Natural Resources Wales *Tree Cover in Wales' Towns and Cities'* May 2014, Natural Resources Wales - full copy and summary available from our website

## 5.0 Management of disease outbreaks on the public forest estate;

### 5.1 Introduction

Tree Health has become an increasingly serious issue in the UK in recent years as climate change and in particular, unseasonal weather patterns, have made trees more susceptible to fungal diseases which often thrive in warm, moist conditions whilst increased global movement of goods has resulted in more rapid movement of both pests and pathogens between countries.

There are several diseases that are of particular importance in Wales. A fungal disease called *Dothistroma*, often referred to as Red Band Needle Blight (RBNB,) has been affecting pine species, in particular Corsican pine since the late 1990s. It is a chronic, defoliating disease but one that can be mitigated by thinning to increase air flow and reduce humidity in the tree canopy. *Chalara* disease is a more virulent fungal disease in ash trees which causes dieback and can lead to death often from other diseases which take advantage of its weakened state. It was first found in the UK in 2012 and is now present on a number of sites in Wales, there is little prospect of preventing its gradual spread in the absence of research findings. However, the disease that has had the greatest impact on forests in Wales in recent years is *Phytophthora ramorum* of larch.

In this section we concentrate on our management of *Phytophthora ramorum* of larch since April 2013 but it is important to describe some of the background in our role to detect and respond to the outbreak since its first discovery in Wales in June 2010 in the Afan Valley in South Wales. It is important to note that our roles in relation tree health are not confined to the management of the WGWE.

### 5.2 Background

*Phytophthora ramorum* of larch is a fungus-like organism which was first confirmed in the wider environment in Great Britain in 2002 in rhododendrons in ornamental gardens. It was found to be affecting larch trees in 2009 in Devon and Cornwall and then in Wales in June 2010 on the WGWE in South Wales. It is known to affect a wide range of other species of shrubs and trees including beech, sessile oak, Douglas fir and western hemlock. However larch has proved to be a much more susceptible host and the disease can cause very rapid death whereas many of the other species only suffer dieback. There is limited understanding of the behaviour of *Phytophthora ramorum* in larch and the pattern of spread has not followed modelled predictions. When this is coupled with the variability in a range of factors that impact on its spread, such as weather, it is not possible to be certain about how effective interventions will be in controlling the spread.

There are statutory regulations about containing the spread of *Phytophthora ramorum* which are reflected in the management of sites with the disease using Statutory Plant Health Notices (SPHN). The method of spread is via spores which move in moist air. In order to reduce spores and therefore reduce spread the infected material should be cut down. A UK wide Outbreak Management Team (OMT) was established to develop strategies to cover regulation, manage biosecurity and drive research priorities to increase knowledge. In Wales all initial responses including management were guided by Forestry Commission Plant Health and the OMT.

### 5.3 Tree Health policy

Responsibility for Tree Health within the UK has changed. Prior to April 2013, responsibility for Tree Health lay with the Forestry Commissioners and was discharged solely by the Forestry Commission. In Wales Natural Resources Wales and the Forestry Commissioners are jointly responsible for the delivery of the Welsh Ministers' tree health function. This includes the responsibility for issuing Statutory Plant Health Notices (SPHNs) or their equivalent. We are a member of the Wales Tree Health Steering Group which was established by WG in July 2013. The Steering Group manages the delivery of the Wales Tree Health Strategy (including the regulation of *Phytophthora ramorum* in larch).

### 5.4 The spread of *Phytophthora ramorum* in Wales and strategy development

Since first detection in 2010 the infection became established and spread rapidly in the larch on the public forest estate in South Wales where it was planted in extensive areas on slopes. There has been a more gradual spread into the relatively few private woodlands in the South Wales valleys where larch was generally planted in smaller, more dispersed areas. In spring 2013, it was found that the disease had rapidly spread with an additional 3200 hectares of larch being infected. In 2013, the total infected area increased to over 6500 hectares (around 30% of the larch in Wales) – **table 2**. The spread of *Phytophthora ramorum* in Wales is not dissimilar to the recent spread in other western upland areas of Great Britain, in particular, western Scotland and Cumbria. In fact the disease is now becoming endemic on the western margin of the British Isles where there are similar climatic conditions (**annex 4**).

In December 2013, the *Phytophthora ramorum* Disease Management Strategy (DMS) for Wales was introduced by the WG. This recognises that the previous UK strategy of containment had not been effective and efforts to control of the spread of *Phytophthora ramorum* need to be focussed on the edge of the infection and in any outlying infection, (and that there is little benefit in seeking to control spread in areas where there are already high levels of infection). The strategy will be reviewed at 6 monthly intervals with the first review taking place in June 2014. As regulator for forestry matters we have issued over 470 SPHNs including handling of rescinded notices following the changed approach on agreement of the *Phytophthora ramorum* Disease Management Strategy.

The strategy divides Wales into two zones:

- a core disease zone (CDZ) where there are high levels of infections in contiguous areas of larch (little scope to slow down the infection, or where the felling of infected areas would have a significant adverse environmental or social impact); and,
- a disease limitation zone (DLZ) which has no or limited infection levels (and where there is scope to implement disease control which would help to slow down the spread).

The requirement to fell trees is focussed on the boundary of the control zone and the wider limitation zone. SPHNs do not apply within the CDZ.

Table 2 – The spread of *Phytophthora ramorum* across Wales

Year	Areas of new infection (in hectares)		
	Total Area	Public Forest Estate	Private Forest Estate
2010	831.6ha	819.0ha	12.6ha
2011	745.7ha	463.8ha	281.9ha
2012	1313.8ha	1118.1ha	195.7ha



2013	3712.0ha	2984.5ha	727.5ha
Cumulative total area	6603.1ha	5385.4ha	1217.6Ha
Total area of larch before P ramorum (NIWT 2002)		12000ha	10122Ha

### 5.5 Management response to *Phytophthora ramorum* in larch on the WGWE

Forestry Commission Wales responded to the original infections in the South Wales valleys in 2010 by undertaking extensive felling of infected larch. The timber markets could not absorb large quantities of infected larch and so many areas were felled to stump in order to comply with the deadlines in SPHNs but leaving the trees to be extracted and marketed at a later date.

The reduced rate of infection on the public forest estate in 2011 appeared to indicate that this response was having an impact and that FCW would be able to manage the infection by substituting infected larch into the existing timber marketing programme.

However, once the scale of the increased infection in 2012 was known, it became clear that FCW would need to increase the size of the larch programme in order to address *Phytophthora ramorum* effectively. However, it was also becoming increasingly clear that the large scale, rapid felling of infected areas in the South Wales valleys was resulting in significant local environmental and social impacts. This was especially so in places where large areas of larch are near to communities and where trees have been felled but left on the ground for subsequent extraction and marketing. The felled trees were very unsightly in the landscape and often blocked walking and cycling trails. They also presented a potential long-term fire hazard if left un-cleared. The felling had a major impact on the amenity and recreational value of the forests for local communities and visitors. Tourism related business such as mountain biking centres and accommodation providers were very badly affected as visitor numbers plummeted.

It was clear that the management of *Phytophthora ramorum* infection on the WGWE could not be done sustainably without taking into account the impacts, risks and costs. From 2012 onwards, management has sought to move away from felling to stump as a means of disease control and instead to develop an alternative and more sustainable approach. A longer term approach was needed in order to remove and replace the larch in a way that minimised the adverse environmental, social and economic impacts of the change.

In 2012, based on research advice that *Phytophthora ramorum* was likely to affect all stands of larch in Wales in the medium term, FCW developed an outline programme to reduce the larch on the WGWE to a low level over a period of 10 years (WGWE Larch Reduction Plan). Given that prior to *Phytophthora ramorum*, there were some 2.5M cubic metres of larch timber on the WGWE, this equated to increasing the programme to around 220,000 cubic metres / year by 2014/15. This planned approach would enable more effective resource planning and would provide scope to mitigate the impacts.

This approach was regarded by some stakeholders to be draconian and premature. However, the further increase in the rate of infections in 2013 confirmed the need to put in place a programme for the removal of larch from the public forest estate. In order to keep the overall level of production within sustainable limits and to minimize the adverse impacts on timber markets, the amount of non-larch felling was reduced in order to offset much of the increase in larch.

The capacity does not currently exist in the timber processing sector in Wales to harvest the additional volume from steep ground and to process the additional larch timber into higher value products, so it was concluded that FCW / NRW would need to offer Long Term Contracts LTC to secure the necessary commitment and investment. LTCs are part of the Timber Marketing Strategy for the WGWE and have been used successfully in securing investment. The views of the forest industry were first sought about the additional volumes and the use of LTCs for larch in October 2012 and the feed-back is helping to shape the approach going forward.

While the marketing and resource building has been taking place, the Forest Operations units have also continued to implement the existing programme of operations. To date well over a 2000ha of infected larch areas have been felled. The majority of these have now been cleared and some 450,000 cubic metres of infected timber has been harvested from the WGWE and supplied to timber processors.

### **5.6 Future developments**

Since June 2013, we have had extensive discussions with the Welsh Government about the options and resource implications for dealing with *Phytophthora ramorum* and costed options were developed for different approaches. The net cost of the Sustainable Restructuring Programme on the WGWE was assessed at £50M over the next 10 years. The biggest element of the programme was the cost of replanting the increased felled areas with a more diverse range of tree species to improve resilience. The Welsh Government has confirmed funding for 2014/15 of £2.5m for Natural Resources Wales in order to implement a reduced funding option and we are currently planning how to make best use of this funding.

Alongside Forestry Commission Scotland, Forestry Commission England, the Scottish Government, and FERA, we have been working with Defra on the procurement of a scoping study to support the nursery sector in their development of a tree and shrub nursery labelling, accreditation and assurance scheme for Great Britain.

### **6.0 Progress made by Natural Resources Wales to deliver the recommendations of the Wales Audit Office**

We have continued to make good progress on the recommendations made by the Auditor General for Wales on the operations of Forestry Commission Wales and scrutiny of progress is a standing item at the Audit and Risk Assurance Committee. It is important to note that not all of the Wales Audit Office recommendations are directly related to the management of the Public Forest Estate and that it was appropriate to discharge the management response on certain actions post-vesting of Natural Resources Wales.

Of the 17 recommendations, three were discharged prior to vesting and a further nine since April 2013 (**table 3**). Of the four outstanding items:

- A broader piece of work is due to be completed during 2014 relating to procurement and staff use of procurement cards.
- The review of the timber marketing strategy and broader work as described in section 3.4 is on track for completion later in the year.

- Recommendation 9b regarding the assurance of Natural Resources Wales' delivery of benefits is being undertaken on a co-production basis as part of the Welsh Government's sponsorship arrangements.
- Recommendation 7 is being approached as part of our response to 1c and the development of an integrated approach to natural resource management with Welsh Government.

*Table 3 - summary of progress against recommendations of the report of the Auditor General for Wales on the Operations of Forestry Commission Wales follow-up report*

<b>Recommendations</b>	<b>Action area</b>	<b>Progress at May 2014</b>
<b>Link corporate priorities to local planning, resource allocation &amp; workforce planning.</b>	1a. skills mix assessed & sufficient	Discharged Feb 2014
	1b. Corporate programmes costed and resourced	Discharged Feb 2014
	1c. Local forest district plans updated	Discharged Feb 2014 Also see action 7
<b>Procurement business processes:</b>	2a. review single procurement service	Discharged March 2013
	2b. progress against FCW procurement strategy	Discharged March 2013
	2c. procurement service and use of procurement cards	Due to complete Summer 2014
<b>Risk management processes:</b>	3a. identify opportunities in risk registers	Discharged Sept 2013
	3b. corporate planning & risk management alignment	Due to complete Spring 2014
<b>Managing resources - timber production &amp; forecasting</b>	4a. measuring, evaluating & reporting on success of timber review of marketing strategy	Due to complete Sept 2014
	4b. wider cost-benefit analysis of direct production and standing sales methods – inc. delivery against broader policy outcomes	Discharged Oct 2013 Also see action 4a
	5a. Authorisation of extraction volumes	Discharged March 2013
	5b. spot checks on guidance implementation – assurance procedure	Discharged Feb 2014
	6. Strategy to increase income from non-timber sources & link to broader public policy outcomes (monitor & evaluate)	Discharged Feb 2014



<b>Managing resources – alignment of public forest estate with WG policy priorities</b>	7. Alignment to WG policy objectives: timetable for how WGWE can best contribute	In place and part of broader part of developing Forest Resource Planning process (action 1c) and the development of an Integrated Natural Resource Management approach in conjunction with Welsh Government
<b>Manage change effectively</b>	8. Change management: staff survey, staff engagement & action	Original recommendations discharged Feb 2014 (continues as part of organisational change and development processes)
<b>Continuous improvement review, scrutiny &amp; challenge:</b>	9a. periodic scrutiny of audit recommendations	Discharged Sept 2013 (included as standing item at Audit and Risk Assurance Committee)
	9b. recommendation for WG – assurance on benefit delivery	Discharged. Co-production process with Welsh Government

Two actions (1c & 7) are implicitly linked as local planning of the public forest estate must operate as an integral part of the emerging approach to Integrated Natural Resource Management. We will continue to evolve its strategic, tactical and operational planning and management of the public forest estate for as long as this remains within its remit. We continue to support and advise Welsh Government on their development and implementation of Integrated Natural Resource Management.

As referred to in our summary there are very strong synergies between Sustainable Forest Management and Integrated Natural Resource Management but there are challenges to the continuation of the positive trends:

- a) The timescale over which improvement can be realised – managing forest change is a necessarily long term process;
- b) The resources required to achieve and sustain the delivery of SFM particularly in light of increasing pressure from serious disease outbreaks which present a ‘tipping point’;
- c) Deciding the optimal balance of goods and services to be provided, at what scale, and how and in what context will society have a role and make its choice;
- d) SFM and the provision of balanced service provision flourishes using adaptive management principles yet the provision of single services can have priority due to legal commitments, market forces, place or people;
- e) The full valuation and assessment of market and non-market services that flow from achieving SFM and development of financial mechanisms to support them – and how this interacts with INRM; and,
- f) Taking advantage of new markets and financial mechanisms, understand and act on how this could either support or ‘squeeze out’ the potential achievement of SFM in existing forests and from new woodland creation to increase the flow of multiple benefit services or single woodland-derived services.

INRM requires joined up planning and implementation across land uses and between sectors. People and place are fundamental in meeting Wales' commitments to SFM alongside the maintenance of productive potential and the flow of utilisable timber products. However some of the benefits that policy and society demand may only be realised if difficult trade-offs are dealt with (such as the highly cost-effective role of trees in meeting our carbon abatement targets<sup>20</sup> or removing planted woodland from peatlands<sup>21</sup>). Such decisions require strategic clarity if area based Integrated Natural Resource Plans are to be the vehicle for achieving the synergies and reducing harmful trade-offs. The Environment Bill White Paper proposed that Welsh Ministers will publish a Natural Resources Policy every five years that will set out the high-level direction of travel for all natural resources related policy in Wales, including key opportunities, trends and priorities on a national basis. Any refresh of *Woodlands for Wales* is likely to be as part of this wider policy framework and the management of the public forest estate will evolve accordingly.

In managing public land for public benefit there are tensions to resolve such as the priority to increase income from the WGWE whilst stimulating small and medium sized enterprise by 'pump-priming' the demand and supply of locally and sustainably produced wood products from Wales. In our work beyond the WGWE there are large areas of unmanaged woodlands that could improve the resilience of farm businesses and support growth in small, local businesses and we have a role in supporting such activity.

It is vital that we learn from the Sustainable Forest Management approach, that our emerging approaches do not undermine all that has been achieved and continues to build on the positive progress that has been made. We will continue to integrate Sustainable Forest Management into our overall approach so that there is cohesion between initiatives that match Wales' overall aspirations for Integrated Natural Resource Management.

Natural Resources Wales  
May 2014

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<sup>20</sup> Read, DJ et al (2009) *Combating climate change – a role for UK forests*. The Stationary Office, Cambridge

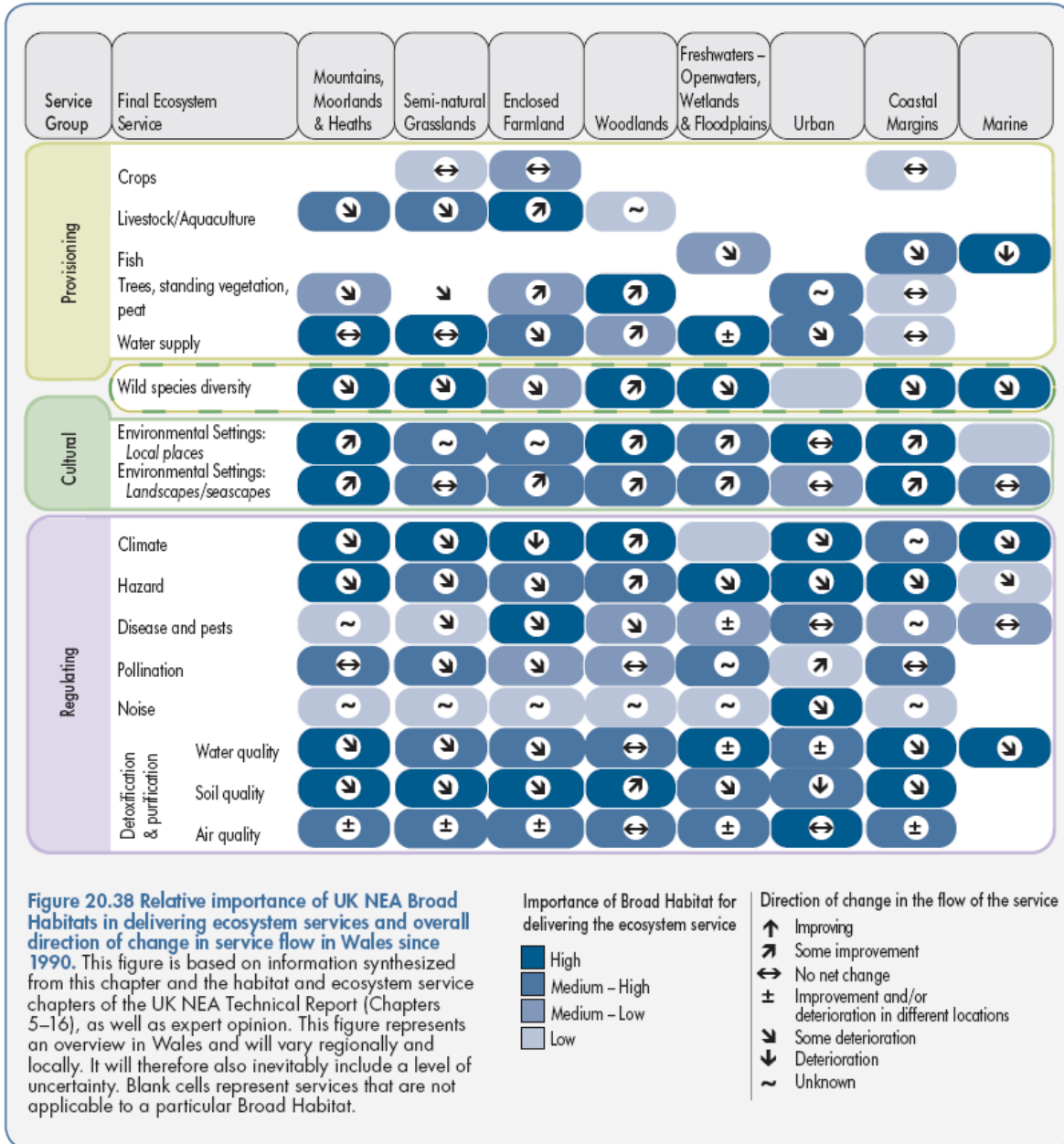
Valetin and Saraev (2012) *Natural Environment Framework: woodland creation case study* Forest Research

<sup>21</sup> Vangelova et al (2012) *Strategic assessment of the afforested peat resource in Wales*. Forest Research

## Annex 1

### Relative importance of UK NEA Broad Habitats in delivering ecosystem services and overall direction of change in service flow in Wales since 1990.

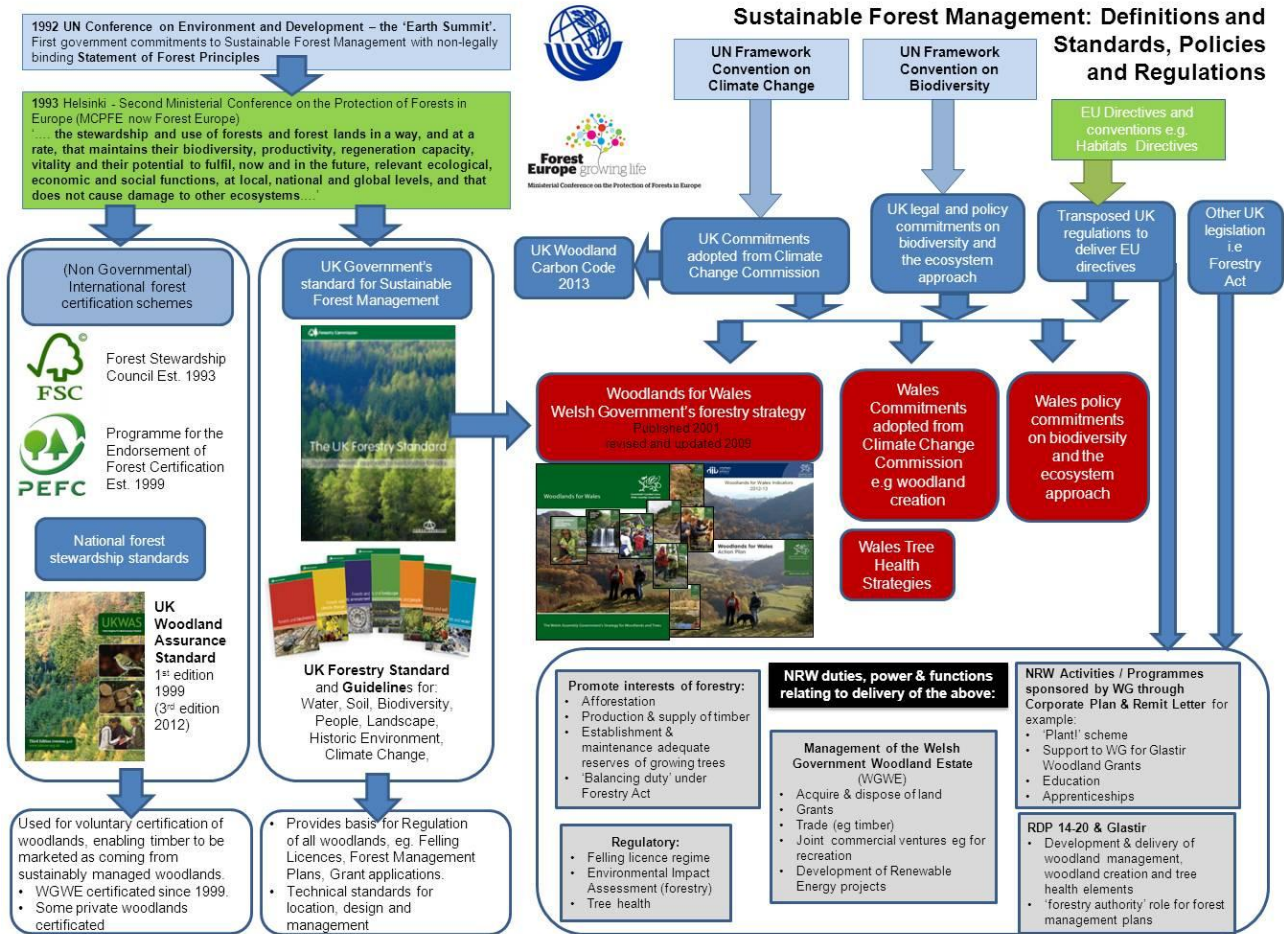
From UK National Ecosystem Assessment (2011) *The UK National Ecosystem Assessment Technical Report* UNEP-WCMC, Cambridge p1029





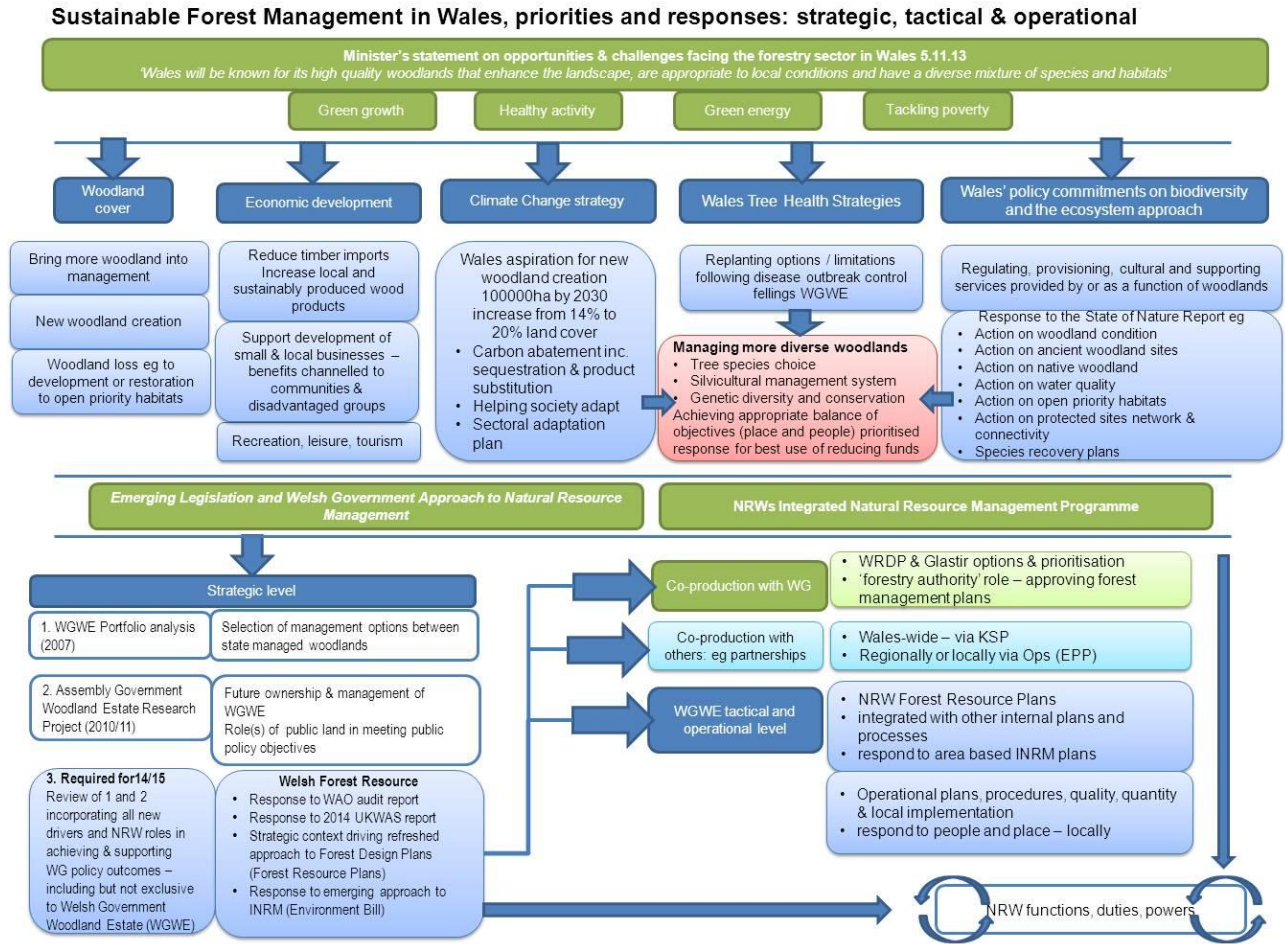
## Annex 2

# Sustainable Forest Management: Definitions and Standards, Policies and Regulations



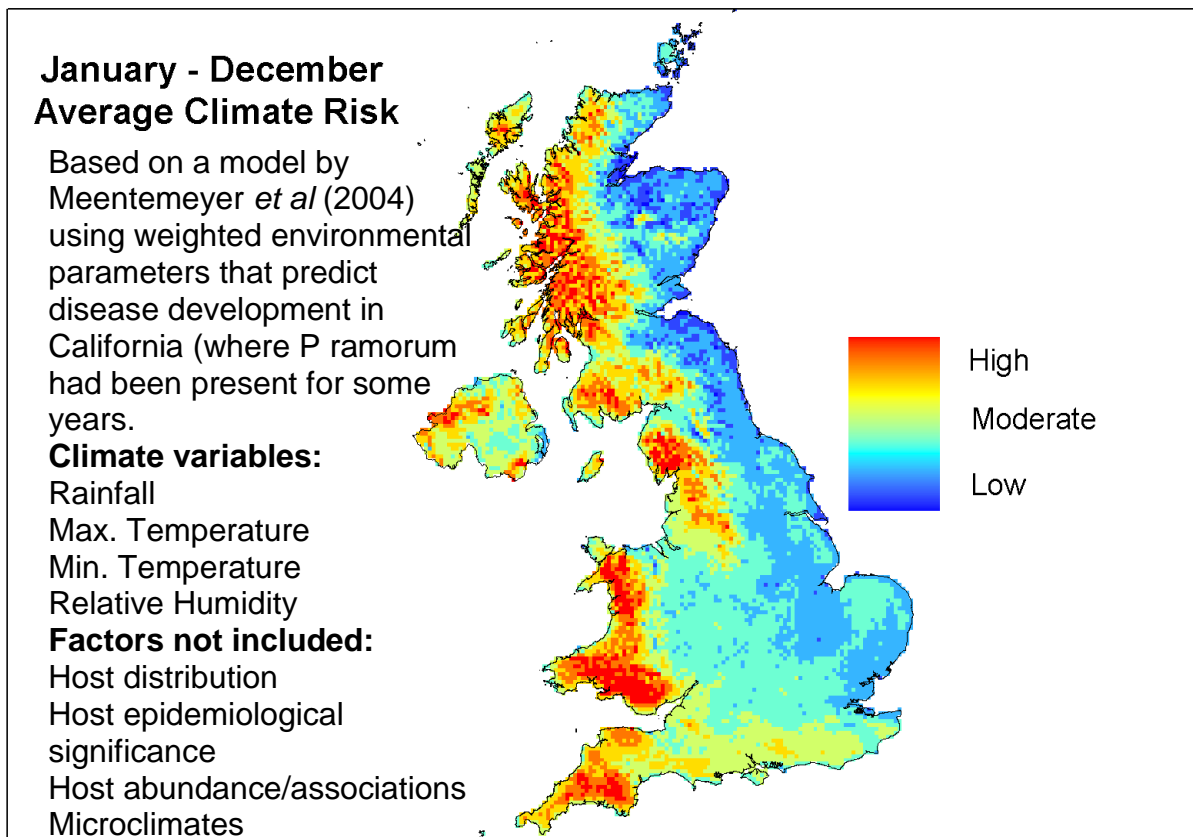
### Annex 3

## Sustainable Forest Management in Wales, priorities and responses: strategic, tactical & operational



## Annex 4

### Climatic susceptibility to *Phytophthora ramorum*





# Agenda Item 7.1

## **The State of Nature in Wales: One Year On**

**May 2014**

This paper has been produced for the Environment and Sustainability Committee session on the State of Nature report one year on. It is supported by the following organisations: RSPB Cymru, Butterfly Conservation Wales, Bat Conservation Trust, Wildlife Trusts Wales, Plantlife Cymru and Bumblebee Conservation Trust. This document reflects on the first State of Nature report published on 22<sup>nd</sup> May 2013 and looks at some achievements of the last year and the challenges that lie ahead. It aims to set out the key actions needed to address the natural crisis in the context of recent and forthcoming developments.

The suite of forthcoming legislation and policy reforms presents a critical opportunity to move forward, and in particular to ensure the health of the natural environment is properly recognised as a key outcome for a sustainable Wales, not something to be sacrificed in favour of other priorities. Ensuring that decision makers appreciate the importance and value of ecosystems and the services they provide, or natural resources, is important, but is not a 'quick fix' for our biodiversity. New approaches will only work in tandem with concerted efforts to stop and reverse wildlife declines, including:

- Prioritising protected areas;
- Protecting species and delivering targeted action;
- Making more space for nature; and
- Investing in research, data and monitoring

We need the Welsh Government to describe its vision for biodiversity, define what this means in terms of specific targets, and set out how we will measure success. We suggest a statutory target for biodiversity, in the Environment Bill, is an important mechanism to secure focused action.

It is vitally important that we seize this opportunity, not just to fulfil our moral obligation to protect the species which we share the planet with, but for our own health, wellbeing, social and economic prosperity. This paper focuses on the opportunities presented by the developing legal and policy framework to address the state of nature in Wales.

### **A groundbreaking report**

The State of Nature report was the first national health check of nature across the UK. The report, which was produced by a coalition of 25 leading conservation and research organisations, was the amalgamation of decades' worth of data analysing the distribution and abundance of our native species across the UK.

The report found that of the 3,148 species assessed across the UK 60% of species have declined over the last 50 years and 31% have declined strongly. In Wales the availability of robust data sets was more limited and a key message is that we need to know more about how nature is faring. However, assessments were possible for a number of taxonomic groups which enabled us to draw a number of important conclusions.

We know from the thousands of species we do have data for in Wales that the state of much of our wildlife mirrors the widespread declines that we are seeing across the UK. One of the primary findings in the analysis of our wildlife is that it is largely the species that rely on particular habitats and conditions – 'the specialists' - which are being lost, while a relatively small number of more generalist species come to dominate once diverse wildlife communities.

A number of Wales level analyses (using different techniques) have been undertaken both prior to the State of Nature report and since it was completed. From these we know that:

- More than one in six plants in Wales are considered threatened. Wildflowers, especially arable flowers such as the small-flowered catchfly and corn buttercup, continue to decline and have a smaller range now than at any other time in recent decades.
- 63% of Welsh butterflies are declining. Since the early 1990s we've lost more than three quarters of our High Brown and Pearl-bordered Fritillaries.
- Red squirrels, once widespread, are restricted to three main areas within Wales (Clocaenog forest, Anglesey and pockets of mid-Wales), with a small populations clinging on in other, isolated areas.
- Farmland birds continue to decline and are now found in fewer places in Wales than at anytime in the last two decades: some, such as the corn bunting and turtle dove have disappeared completely as regularly breeding species.
- Water vole numbers in Wales, like the rest of the UK, have declined by around 95% due to habitat loss, habitat fragmentation and predation by mink. This loss is one of the most rapid and serious recorded declines of any British wild mammal during recent times.
- More than a third of all woodland species assessed are declining. Woodland plants, such as spreading bellflower and narrow-leaved helleborine, and lungwort lichens continue to decline in the absence of appropriate woodland management and the effects of atmospheric pollution.
- Numbers of breeding upland wading birds, such as curlew, lapwing and golden plover, have declined by more than three quarters in recent decades.
- A third of all widespread Welsh moths are severely declining.
- The number of swifts breeding in Wales has halved in the last few decades.

### **Developments in the last year**

In response to the publication of the State of Nature report the Minister Alun Davies affirmed the need to “take urgent action to halt these declines”. He announced a number of key actions at the Royal Welsh Show, including the deployment of an additional £6 million for nature conservation (“the Nature Fund”). The Minister also confirmed last summer that a new Nature Recovery Plan would be developed.

These announcements were extremely welcome, and considerable work has been done over the last ten months, by government, NRW and stakeholders. However we are concerned about the pace of progress: the Nature Recovery Plan seems a long way from completion, and we are concerned over the Welsh Government’s willingness to address key issues within it. Notwithstanding the Minister’s announcement on 14<sup>th</sup> May 2014, deployment of the Nature Fund is still a work in progress.

### **Seizing the moment**

The raft of new policy and legislation under development during the last two years of the current Assembly provides us with a critical and rare opportunity to set the framework through which future governments can go on and deliver the resilient, wildlife rich ecosystems aspired to by the current Minister. The Nature Recovery Plan is the main mechanism to identify the key actions required to halt declines and ensure the long term resilience of species and habitats that underpin our environment, to identify key targets and reflect responsibility for delivery. In the following sections we recommend a number of ways in which the developing legal and policy framework needs to work in tandem with, and reinforce the aspirations of this plan.

## 1. Prioritising protected areas

Designated sites are the cornerstones of protection for our beleaguered wildlife. Typically, they represent our best quality habitats and are havens for much of our most charismatic and threatened wildlife. However, our terrestrial protected sites in Wales are becoming increasingly isolated and many are deteriorating. Encroachment by development or other land uses, lack of appropriate management of the sites themselves, the impacts of widespread environmental change such as climate change, and a decline in the ability of the surrounding countryside to support wildlife means that habitats and the populations of wildlife they support are becoming smaller and more fragmented. Under the legislation, our national protected sites (Sites of Special Scientific Interest – SSSIs) are intended to be representative of the range of habitats and species, which means there are important areas that were never designated. In practice these areas are more likely to have deteriorated due to a lack of protection and appropriate management, so that SSSIs have become disproportionately important for our wildlife. In addition, resource constraints meant that the sites designated in Wales did not represent the full range of important habitats and species in any case, so that some key gaps remain in the SSSI series.

Reviews of current protected sites have found that while they play an absolutely critical role, they need to be 'better, bigger, more and connected' to secure wider ecological resilience; Local Wildlife Sites and undesignated areas of semi-natural habitat also have a key part to play. Studies have also pointed to the importance of protected sites in enabling nature to persist, recover, and adapt in the face of climate change.

The Environment Strategy for Wales set targets for securing good condition of Wales' protected sites: By 2010, 95% of international sites to be in favourable condition; by 2015, 95% of Welsh SSSIs to be in favourable condition; and by 2026 all sites (international, national and local) to be in favourable condition.

It is challenging to get comprehensive, up to date information on the condition of protected sites but we already know that the 2010 target has been missed and there seems to be little prospect of securing the 2015 target. For example, the latest 'rapid review' of SSSI condition – in 2006 – concluded that 68% of SSSIs were in unfavourable condition.

This is bad news not only for wildlife and our enjoyment of it but also for the natural services on which we all depend. These include clean air and water regulation, carbon storage, as well as the economic contribution from tourism and health benefits from improved wellbeing through recreation. Research has estimated that every £1 spent on maintaining SSSIs delivers benefits to society worth over £8. The conservative methods used in the analysis undertaken by the UK Government's Department for the Environment, Food and Rural Affairs (Defra) mean that this cost:benefit ratio of 1:8 is almost certainly an underestimate of the true value of the benefits that these sites provide. In spite of this we believe that under-investment in site management is a key reason for poor delivery.

For the marine environment, the Welsh Government has a legal obligation to deliver Wales' contribution to an Ecologically Coherent Network of Marine Protected Areas in UK seas by 2016, as the foundation of an ecosystem-based approach to marine management. This means designating and securing appropriate management for SACs, SPAs and nationally important Marine Conservation Zones in order to complete the network by 2016. An ecologically coherent network must provide protection for mobile species within the marine environment.

## RECOMMENDATIONS

- The Nature Recovery Plan must:
  - set out revised, time-bound targets for terrestrial and marine protected areas based on sites achieving favourable condition and species meeting favourable conservation status
  - clearly define time-bound targets for protecting nature (ie the number of priority species and habitats for which declines are halted in Wales – or agreed regions of Wales)



- set out clear measures for assessing the effectiveness of mechanisms to halt the loss of nature (ie what has been put in place that better allows nature's needs to be taken into account and effectively contributes to halting the loss of nature)
- set clear targets for addressing past losses in species populations and restoring or creating new habitats
- Welsh Government investment in nature conservation activity (e.g. managing protected sites) should reflect the value of the broader benefits they provide.

## **2. Protecting species and delivering targeted action**

Conservation organisations have long recognised the need to work beyond the boundaries of protected sites. For example, we provide advice to land owners, developers and regulators, and directly implement projects and undertake habitat management to support species populations. We also support the development and upholding of voluntary codes of conduct for marine areas. We know that where we invest in conservation projects, they work, and that they can deliver benefits that apply well beyond the targeted species.

The Natural Environment and Rural Communities (NERC) Act 2006 places a duty on all public bodies to have regard to the purpose of conserving biodiversity, insofar as is consistent with the proper exercise of their functions. It also requires (under section 42) the Welsh Ministers to publish a list of the species and types of habitat that are of principle importance for the purpose of conserving biodiversity – known as the section 42 list.

While important action has been taken at various levels for biodiversity it has not been at sufficient scale to halt declines. The NERC duty has not stopped biodiversity damage linked to public bodies' decisions around land use, for example. Furthermore, it is not clear – e.g. in the new corporate plan - what specific responsibility NRW has to further the conservation of those species and habitats on the priority list.

## **RECOMMENDATIONS**

- The Future Generations Bill must make it clear that a healthy, biodiverse natural environment is a sustainable development goal. As our life support system biodiversity must be a cross cutting theme across Government departments and public bodies; guidance will be needed as to how each can deliver against this goal to make a real contribution towards delivering targets to halt and reverse declines.
- The Environment Bill must put the measures in place to ensure this sustainable development goal is delivered, including:
  - a statutory target for biodiversity recovery as the responsibility of Welsh Ministers, to be reported on regularly to the Assembly.
  - clarity of NRW's role as champion for Wales' nature, protecting species and habitats from adverse impacts as well as delivering conservation projects.
  - a duty for public bodies to deliver against the priorities identified through the natural resource management process; this is necessary, for example, to ensure that land use plans and planning decisions, environmental regulation by NRW, and the deployment of rural payments, properly reflect both opportunities and constraints identified through the process.
- Glastir, as one of the Welsh Governments main tools to deliver for nature, must adopt a more targeted and outcome based approach as part of the wider strategy for meeting the Welsh Governments environmental objectives.
- The Nature Recovery Plan must give clarity on NRW's responsibility for delivering species conservation, as well as for habitats and protected areas

## **3. Making more space for nature**

Landscape-scale conservation is a big, bold approach to nature conservation. This approach looks to tackle the problem of habitat loss, the need to help wildlife adapt to climate change, and the need to

make space for wildlife as our demands from the land and sea increase. It involves working with land owners, local communities, business and public bodies to support wildlife populations and drive habitat restoration on a larger scale. A number of our organisations invest directly in landscape scale approaches, and work in partnership on the ground. The area based approach proposed in the Environment Bill is an excellent opportunity to identify opportunities and prioritise habitat restoration. It is critical that species' needs are integrated into this process, and it is used as a means of delivering against biodiversity objectives as well as providing 'ecosystem services' for human benefits.

## **RECOMMENDATIONS**

- The Environment Bill must make clear that delivering biodiversity conservation and recovery is a part of the purpose of natural resources management as established by the Bill; this is essential if the area based approach is to be seen as a means of delivering for priority species.
- Existing and innovative funding mechanisms – including Government initiatives such as the Nature Fund, Glastir, and new developments around Payment for Ecosystem Services (PES) must recognise the role of biodiversity in underpinning resilient ecosystems and the benefits they provide, and integrate delivery for species and habitats.

### **4. Recognising progress and understanding change**

Moving towards a broad vision of sustainable natural resource management delivered through an ecosystem approach requires clear measures to understand our impacts on the foundation of ecosystems, the species and communities of which they are comprised. The State of Nature report provides us with an important baseline, and must be seen as a call to action.

In order for us to know how we are progressing towards targets it is vital that we improve upon the data sources available and monitor progress. Citizen science initiatives can play an important role in observing broad trends in the fortunes of many common species and broad habitats but there are limitations on their use to inform specific objectives.

Scientific research must set the compass for us in this regard. Well-designed surveillance and monitoring schemes with experienced staff and/or skilled volunteers collecting data in a controlled manner are essential in developing the evidence that enables targets to be set and refined and supporting effective interventions. However, this evidence has to be applied; we have to invest in practical management that applies the solutions to our negative impacts on nature.

We must also invest in monitoring and surveillance to understand the current picture and identify trends, and importantly to assess the value of different interventions. Clear targets and indicators are vital, and effective monitoring will ensure progress towards targets can be assessed and reported regularly and communicated effectively to the people of Wales.

## **RECOMMENDATIONS**

- The Welsh Government must work with partners to strengthen existing monitoring and surveillance initiatives as well as identifying additional priorities for establishing the necessary surveillance, monitoring and research to deliver nature conservation objectives (including those set out in the forthcoming Nature Recovery Plan)
- Reporting against biodiversity targets and indicators should be integrated into NRW's State of Natural Resources reports, to be required under the Environment Bill.

## **SUMMARY OF RECOMMENDATIONS**

- The Nature Recovery Plan must:
  - set out revised, time-bound targets for terrestrial and marine protected areas based on sites achieving favourable condition and species meeting favourable conservation status

- clearly define time-bound targets for protecting nature (ie the number of priority species and habitats for which declines are halted in Wales – or agreed regions of Wales)
- set out clear measures for assessing the effectiveness of mechanisms to halt the loss of nature (ie what has been put in place that better allows nature’s needs to be taken into account and effectively contributes to halting the loss of nature)
- set clear targets for addressing past losses in species populations and restoring or creating new habitats
- Welsh Government investment in nature conservation activity (e.g. managing protected sites) should reflect the value of the broader benefits they provide.
- The Future Generations Bill must make it clear that a healthy, biodiverse natural environment is a sustainable development goal. As our life support system biodiversity must be a cross cutting theme across Government departments and public bodies; guidance will be needed as to how each can deliver against this goal to make a real contribution towards delivering targets to halt and reverse declines.
- The Environment Bill must put the measures in place to ensure this sustainable development goal is delivered, including:
  - a statutory target for biodiversity recovery as the responsibility of Welsh Ministers, to be reported on regularly to the Assembly.
  - clarity that delivering biodiversity conservation and recovery is a part of the purpose of natural resources management as established by the Bill; this is essential if the area based approach is to be seen as a means of delivering for priority species.
  - clarity of NRW’s role as champion for Wales’ nature, protecting species and habitats from adverse impacts as well as delivering conservation projects.
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- Existing and innovative funding mechanisms – including Government initiatives such as the Nature Fund, Glastir, and new developments around Payment for Ecosystem Services (PES) must recognise the role of biodiversity in underpinning resilient ecosystems and the benefits they provide, and integrate delivery for species and habitats.
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- Reporting against biodiversity targets and indicators should be integrated into NRW’s State of Natural Resources reports, to be required under the Environment Bill.





# Briefing note

## Environment and Sustainability Committee

E&S(4)-14-14 paper 10

Natural Resources Wales – Further information following 7 May meeting

### Natural Resources Wales response to questions from Russell George AM on flood forecasting

*“In terms of the accuracy of forecast modelling, I know that this is a challenging issue for the Met Office going forward. I have been involved with incidents of flooding near the Clywedog dam, and I know that the Minister is aware of those as well. The forecasters and, perhaps more importantly, some the equipment determining weather probability for the area are based just west of Birmingham, so I wonder how our Government intends to work with its partners to improve local weather modelling.”*

**Plenary, 6 May 2014.**

*“With regard to the monitoring process of severe weather, I have raised issues in the past about Clywedog dam in my own constituency where the nearest equipment that monitors the local situation is based in Birmingham or just west of Birmingham. I would be grateful as well if you could perhaps just outline—if there is not time in this committee meeting, then perhaps separately—how you can improve local knowledge and involve local knowledge with regard to flooding.*

**Environment and Sustainability Committee, 7 May 2014.**

#### Summary

- Flood forecasts and warnings for communities at risk of coastal and river flooding in Wales are delivered by Natural Resources Wales, and the decisions on issuing warnings are made in Wales;
- We have prioritised, risk-based, programmes of work to improve our forecasting and warning services;
- We work with local and UK partners to deliver these services and share our advice and information on developing flood risk during an incident.
- This includes two-way sharing of information (i.e. from Wales to England and also from England to Wales) for the rivers that cross the Wales/England border.

#### Our forecasting services in Wales

Natural Resources Wales delivers a forecasting service for communities at risk along our coast and rivers.

Our local forecasts are used to:

- inform our decision making on the issue of our flood warnings within Wales;
- escalate our operational response (for example checking our assets are performing correctly);
- advise professional partners including those within Wales (for example local authorities).

We make forecasts of local sea and wave conditions at 80 communities at risk of coastal flooding in Wales. We also provide forecasts of river levels for 82 communities at risk of river flooding within Wales.

We have invested in our forecasting and warning service over a number of years and they continues to grow. Our investment is risk based and we expect to increase our local forecasting coverage further in the next 5 years.

Figure 1 provides an illustration of how our river forecasting service has expanded in recent years. Where we have gaps this is either because the relative risk (priority is lower), or because we need to make improvements to our measurement network to enable us to develop real time forecasting models. Assuming current funding is maintained, we plan to address these gaps on a flood risk prioritised basis between 2015 and 2020.

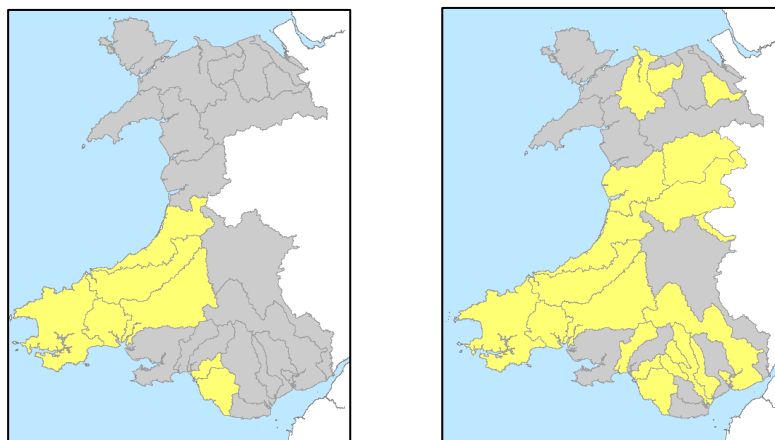


Figure 1 – Natural Resources Wales river forecasting service coverage in 2007 (left hand map) and now (right hand map). Service coverage shown in yellow.

### **Delivering locally, working with UK partners**

We deliver our flood forecasting and warning services locally within Wales using a combination of computer models which are run by Natural Resources Wales forecasting staff, real time observations from our network of over 300 rain and river gauges within Wales and the knowledge and judgement of our local staff. The combination of all of this is critical in our decision making during a flood event and the advice we provide to our professional partners and the public.

In making local forecasts, we use a combination of local rain and river gauge measurements along with weather radar and rainfall forecast model data provided to us by the Met Office. The rainfall forecast data when used appropriately gives us additional lead

time – waiting until the rain falls reduces the lead time we have, especially in large events and where we have fast responding rivers which can peak within a few hours or less.

We have a close two way working relationship with the Met Office and the joint EA-Met Office Flood Forecasting Centre. We use their meteorological data and advice in making our local forecasts which we then use to provide them with our local assessment of flood risk at a county level. For example our local forecasts are used for the Flood Guidance Statement which is issued to professional partners across England and Wales. This shows the forecast flood risk for 5 days ahead for all sources of flooding. Our advice also helps inform the Met Office National Severe Weather Warnings.

### **Challenges & opportunities**

Flood forecasting remains a challenge – storms vary in their nature and extent and inevitably some are better forecast than others.

The working relationships we have with our UK partners have been developed and strengthened over recent years and have proven their worth during recent flooding events in Wales. Natural Resources Wales, along with the Environment Agency and the Scottish Environmental Protection Agency, have benefitted from the Met Office investment in high resolution rainfall forecasting models. All operating authorities across Wales, England and Scotland use the Met Office rainfall, sea level and wave forecasts in providing their tailored local services.

For example, the improved Met Office forecasts being provided by the higher resolution models, combined with Natural Resources Wales investment in local coastal and river models enabled us to provide earlier warning of the St Asaph flooding in November 2012. This Winter, the surge and wave forecasts provided by the Met Office, coupled with locally tuned sea level and wave overtopping models enabled us to plan and prepare Wales's response to some of the worst coastal flooding seen around the Welsh coast in over 20 years.

However, we are not complacent. We continue to work with the Met Office to realise improvements in their forecasts whilst at the same time improving and expanding the coverage of our local forecasting services here in Wales. Every major flood enables us to learn lessons and refine our services.

### **Forecasting services in North Powys (Upper Severn & Vyrnwy catchments)**

We provide flood forecasting services for the Rivers Severn and Vyrnwy in Wales – these are provided by Natural Resources Wales staff based in Cardiff. The decisions on warnings and operational response are made in Wales.

Until 2010, flood risk management in the Severn and Vyrnwy catchments was delivered by the Midlands Region of the Environment Agency. However, during 2010/11 at Defra and Welsh Government's direction, we undertook a re-alignment of flood risk management operations in our cross-border catchments to align them with political boundaries. As a result, flood forecasting and warning services for the Rivers Severn and Vyrnwy in Wales were transferred to Environment Agency Wales. The Middle Wye between Hay-on-Wye and Monmouth (the English part of the catchment) was transferred to Environment Agency Midlands Region.



As part of the boundary change we also took on ownership of all of the rain and river gauges within the Severn and Vyrnwy catchments in Wales.

So, since 2011 Natural Resources Wales and its legacy body Environment Agency Wales have been delivering services from within Wales using gauges within Wales. The flood forecasting and warning services for these catchments are no longer delivered by the Environment Agency Midlands office in Solihull.

In making forecasts of flooding, we use our own gauges as well as some gauges located in England just over the border - this is because river catchments cut across political boundaries and weather systems may arrive from different directions (e.g. from the east passing over England first). We therefore share our gauge data in real time with the Environment Agency over the border and they do likewise.

We maintain a close working relationship with Environment Agency Midlands Region to manage cross-border flood incidents including the sharing of data and models at an operational level. This is supported by a Memorandum of Understanding between the Chief Executives of both our organisations.

Environment Agency Midlands Region still regulate the operation of releases from the Vyrnwy and Clywedog reservoirs as part of a long standing statutory agreement put in place for the secure management of these strategic water supplies. We work closely with Environment Agency staff on a daily basis - all decisions on releases are shared with our staff, when river levels are high we are consulted on proposed releases and any releases which are made are incorporated within our forecasts for downstream reaches.

There is a complex set of rules governing the releases which can be made at times of low and high flow in order to protect downstream interests, including those within Wales. We are currently working with the Environment Agency to review the terms of the agreement and the details of the operational rules.

**Andy Wall**  
**Flood Forecasting Team Leader**  
**13 May 2014**

## Natural Resources Wales response to question from Julie James AM on the Wales Coast Path

*“You mentioned the coastal path in your introduction, and how proud we all are of it, and many of us have walked various bits of it. However, during the coastal flooding, some of it got really quite damaged. What conversations have you had with the various councils, and so on, about the various bits of the coastal path? There are several instances that I am aware of, and I am sure that you are aware of them as well, where the route has changed as a result of the flooding. I will give you an example: in Aberdeiddi in Pembrokeshire, my understanding is that the path is now not along the coast and you have to divert quite a long way inland, because they do not plan to put back the path as it existed before. What was your role in that? Did the council consult? How does that work?”*

**Environment and Sustainability Committee, 7 May 2014.**

### NRW role in Wales Coast Path diversions

Natural Resources Wales is a statutory consultee on Public Rights of Way diversions in the National Parks – elsewhere, we are not generally involved.

However, as primary funders and co-ordinators, we are usually involved in discussions regarding any diversions involving National Trails or the Wales Coast Path. These discussions are directly between the Access teams in NRW and the National Trails teams at the National Park Authorities.

The Wales Coast Path partnership group meet a few times a year, but do not discuss specific cases of damage repairs or path diversions.

### Diversion at Aberdeiddi, Pembrokeshire

Following the winter storms, a section of a foot path at Aberdeiddi was damaged. The Wales Coast Path / Pembrokeshire Coast Path’s route goes behind the car park (see figure 1) and was not damaged by the storms.

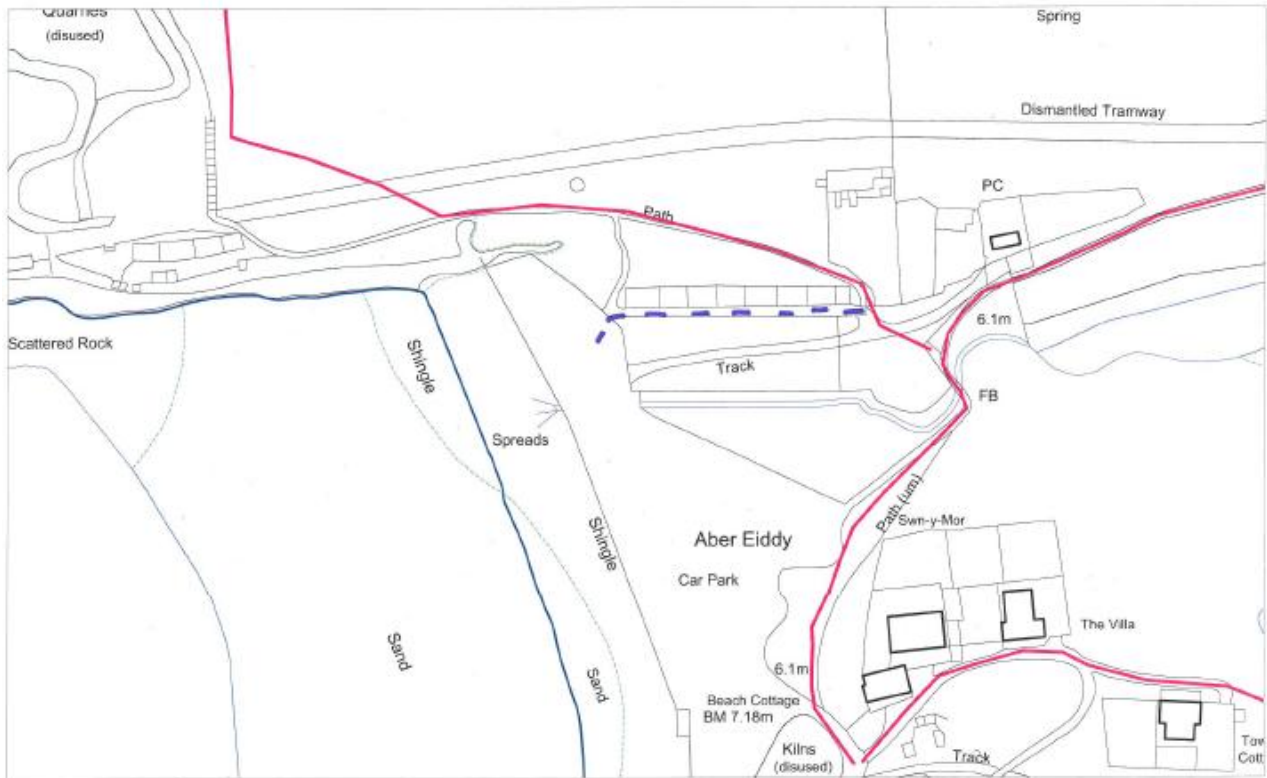
The path that was washed away by the sea is a private permissive path that was managed by the owner, National Trust, with help from the Pembrokeshire Coast National Park Authority. Erosion has cut off access to the seaward end of this path towards the Blue Lagoon.

If there is a diversion to the Coast Path, any changes would need extensive public consultation. But when a path is permanently eroded; the usual procedure would be to seek a new route inland, which does not need public consultation. Also, closure of a permissive path does not require public consultation.

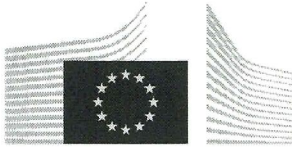
Work has been carried out by Pembrokeshire County Council, part funded by NRW, to enable wheelchair access as was previously available on the permissive path.

Figure 1

Pink line = Pembrokeshire Coast Path / Wales Coast Path  
Blue dash line = private path







**EUROPEAN COMMISSION**  
DIRECTORATE-GENERAL ENVIRONMENT  
Directorate D - Implementation, Governance & Semester  
**ENV.D.3 - Enforcement, Cohesion Policy & European Semester, Cluster 3**  
Head of Unit

Brussels, **08 MAI 2014**  
ENV.D.3/SG/ad/Ares(2014)

Alun Davidson  
Committee Clerk  
Environment and Sustainability  
Committee  
National Assesmbly for Wales  
Alun.Davidson@Wales.gov.uk

Dear Mr Davidson

I understand that you have asked for some general guidance on the application of Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (the so called Strategic Environmental Assessment or SEA Directive) for the forthcoming discussions of your Environment and Sustainability Committee on 21 May 2014. As my colleague Ms Grohs explained, we try to avoid taking position on specific national development projects when these are in the national decision making process. However, we can assist in responding to more general queries. I will therefore try to answer some of the questions you forwarded to her by your e-mail of 1 April 2014. In answering these questions I would suggest that regard should be had to the Commission Guidance on the implementation of the Directive from 2003 (SEA Guidance) which can be found at <http://ec.europa.eu/environment/cia/sea-support.htm>. Numerous other materials can also be found on this webpage and may be of assistance to your committee.

*What constitutes a reasonable alternative for the purposes of the Directive? When a planning authority is considering what constitutes a reasonable alternative what factors should they consider?*

Article 5(1) of the Directive requires that the environmental report be prepared in which reasonable alternatives taking into account the objectives and geographical scope of the plan or programme are identified, described and evaluated. Reference is made to Annex I. Annex I (h) in particular requires an outline of the reasons for selecting the alternatives dealt with. The SEA Guidance provides information on how to approach the question of alternatives and the factors to be considered in paragraphs 5.11 to 5.14. In summary the assessment of alternatives should be a genuine exercise. As the Explanatory Memorandum to the proposal for this Directive made clear a particular benefit of the SEA Directive is that alternatives can and should be properly assessed whilst the options remain open, whereas options for changes later on at the EIA stage are more limited.

*Can an authority begin an SEA process and then rescind the consultation on the grounds that it has re-considered whether or not its proposals constitute a draft plan for the purposes of the Directive?*

This question is difficult to answer as it would appear to be rather unusual to start a consultation process and then rescind it unless there was a serious error of judgment or interpretation of the applicability of the SEA Directive vis-à-vis the respective plan or programme. However, if a serious error has appeared and needs to be remedied then a fresh start to the process should be possible.

It should be born in mind that the consultation process should address both the draft plan or programme and the accompanying environmental report before the adoption of the plan and programme.

*Does an SEA need to include information about why certain reasonable alternatives were selected and why they are believed to represent reasonable alternatives?*

Yes. There needs to be an outline of what alternatives were chosen and why. See also para 5.28 of the Guidance.

*What constitutes good practice in terms of consultation under the Directive?*

In contrast to the EIA Directive, the SEA Directive does not specify any details about the method for consultation. Analogies can however be made to the experience under the EIA Directive in terms of what works for ensuring optimal consultation. See paragraph 7.16 and 7.17 of the SEA Guidance on who to include in public affected and relevant NGOs. Since the guidance was drafted there was also some guidance in case C-474/10 Seaport pointing out that whilst the Directive does not require precise periods for consultation to be laid down Article 6(2) does require that, *for the purposes of consultation of those authorities and the public on a given draft plan or programme, the period actually laid down be sufficient to allow them an effective opportunity to express their opinions in good time on that draft plan or programme and on the environmental report upon it.*

*Whether the SEA needs to set out recommendations made by statutory environmental bodies during the scoping phase and how these have been addressed in drafting the SEA?*

The Directive requires Member States under Article 6(3) to designate authorities to be consulted which by reason of their specific environmental responsibilities are likely to be concerned by the environmental effects of implementation plans and programmes. Given the importance attached to these bodies and specific reference made to them in Article 6(3) it would seem advisable to set out their recommendations and how these are addressed within the SEA. Reference should also be made here to Articles 8 and 9.1.b of the Directive which require information to be provided on how the information made available during the consultation process was taken into account.

*To what extent should an SEA take account of other Union Environmental legislation such as the Water Framework Directive?*

Article 11 of the Directive indicates that the assessment is without prejudice to other EU legislation. The EIA Directive is specifically mentioned but other legislation such as Directive 2000/60/EC (Water Framework Directive) is also relevant. The Commission Guidance gives information on this question in paragraphs 9.1 to 9.12 with particular information on the Water Framework Directive at paragraph 9.7.



Furthermore, since this guidance was drafted the Court of Justice has provided additional guidance in its judgment in joined cases C-105/09 and C-110/09 concluding that an action programme for nitrate vulnerable zones under Directive 91/676/EEC could itself be subject to the requirements of the SEA Directive. I would also refer you to the provisions in Annex I (c) and (d) and the relevant sections of the SEA Guidance on these. Annex I (c) provides that account should be taken of the environmental characteristics of areas likely to be significantly affected. Annex I (d) provides that account should be taken of any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 2009/147/EC and 92/43/EEC.

*To what extent should an SEA take account of domestic policies on Climate Change and Sustainable Development?*

Our recent *Guidance on integrating climate change and biodiversity into SEA* published in 2013 and available at <http://ec.europa.eu/environment/eia/pdf/SEA%20Guidance.pdf> is relevant to this issue and provides a step by step account of how climate change considerations and biodiversity impacts should be taken into account.

*Once a decision has been reached on a final option whether the authority needs to issue a report on how consultation responses to the SEA were taken into account and set out reasons for its final selection?*

Yes. Article 9(1) of the Directive requires Member States to ensure that information is provided in a summary statement outlining how environmental considerations have been integrated into the plan or programme as adopted and how the environmental report and the consultation responses received were taken into account with regard for the choice of plan or programme adopted in the light of the other reasonable alternatives dealt with.

*In making a final decision what information should be provided on the monitoring or mitigation of any adverse impact on the environment?*

The Commission SEA Guidance also provides information on how Member States should implement the requirements of Article 10 of the Directive in paragraphs 8.1 to 8.19. Monitoring is required to cover the significant environmental effects of the implementation of plans and programmes which includes not just the realisation of the projects envisaged but also other activities such as management schemes which form part of that plan or programme. Another element of the monitoring is to identify unforeseen adverse effects which may for example bring to light shortcomings in the previous assessment which could be remedied in future.

Yours sincerely



Paul Speight



