



UK forestry and woodlands – some fundamentals – Marshall Papworth

Jim Waterson MICFor., MRICS May 2019

Jim Waterson

- Principal Lecturer – Forestry and Forest Products

- Background ?

 - sawmill worker

 - university – rural environmental sciences

 - forestry contractor

 - forest and land manager

Please ask questions at ANY point

Plan for this morning?

- Classroom for first half of the session
- Break – 15/20 minutes?
- Outdoors for second half – very short minibus trip to local woodland then return to HAU

Some introductory stats : Forestry is the second largest (by area) form of land use in the UK

- **Agriculture – currently 71%**

(utilised agric. area – source DEFRA, Agriculture in the UK 2016) **17.2 million ha.**

- **Forestry – currently 13%**

(source FC, 2016) **3.14 million ha.**

(10 % in England, 15 % in Wales, 18 % in Scotland and 8 % in Northern Ireland).

(NOTE – European average is 30-35% forest cover. Finland has 72% !)

...other key UK forestry sector trends and stats:

- £2.2 billion annual UK gross value added
- 44,000 jobs (largely in rural or semi-rural locations) in forestry and primary wood processing

all ex FC Facts and Figures 2018, available at

<https://www.forestresearch.gov.uk/tools-and-resources/statistics/forestry-statistics/>

This may be the traditional image of UK woodlands....



But the reality is most of it looks like this...



96% of timber
harvested in UK
is softwood (conifer)
- spruce, fir, pine



38 year old Sitka spruce
being harvested –
Bala, Wales 2017

Overview of UK forest industry? Lets start with Confors vision

<http://www.confors.org.uk/>

<https://www.youtube.com/watch?v=XM5AA-6DTIA>

Forests and woods in UK are increasingly expected to offer many/multiple benefits

- Timber and wood products
- Landscape value
- Biodiversity
- Water and soil protection
- Access and recreation plus health and wellbeing
- Renewable energy – woodfuel
- Cultural functions

- Carbon sequestration – locking CO₂ into growing trees

UK policy framework – UK Forestry Standard

All types and scales of forest and woodland management are expected to comply – it has specific guidelines on :

Soil, Water, Landscape, Biodiversity, Climate Change, People, Historic Environment

<https://www.gov.uk/government/publications/the-uk-forestry-standard>

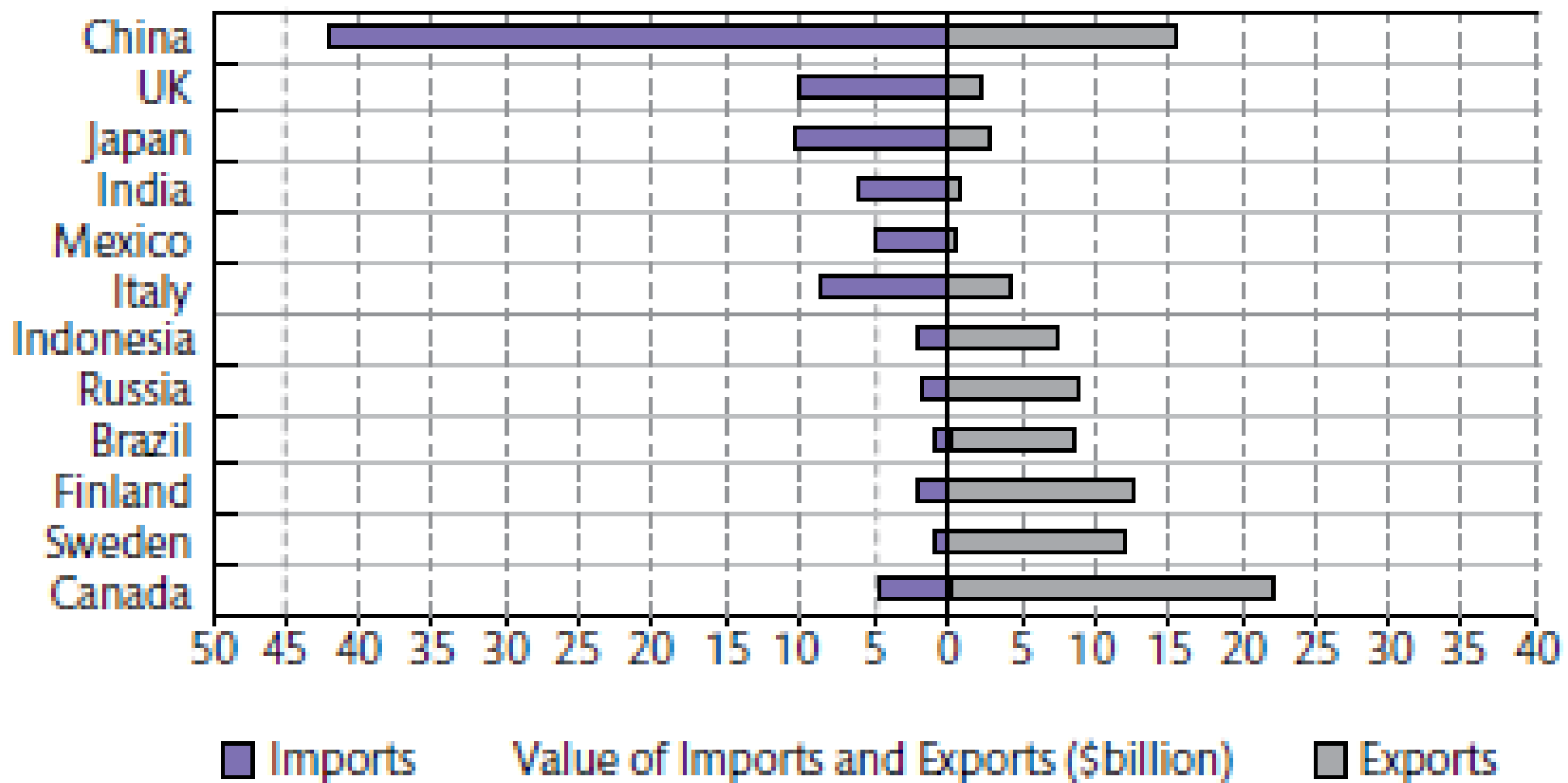
Lets look at some applied examples of these different values and how forests contribute to them

Timber and wood products

UK is a major net importer of timber and wood

This is not a new situation!

Largest net importers and exporters of forest products 2015



UK timber production

- Concentrated in Scotland, with some in Wales/northern England
- Clearly reflects the location of forest resources – upland areas, high rainfall, less productive land (not good enough for agricultural cropping – the alternative land use is extensive grazing with sheep – supported by government subsidy)

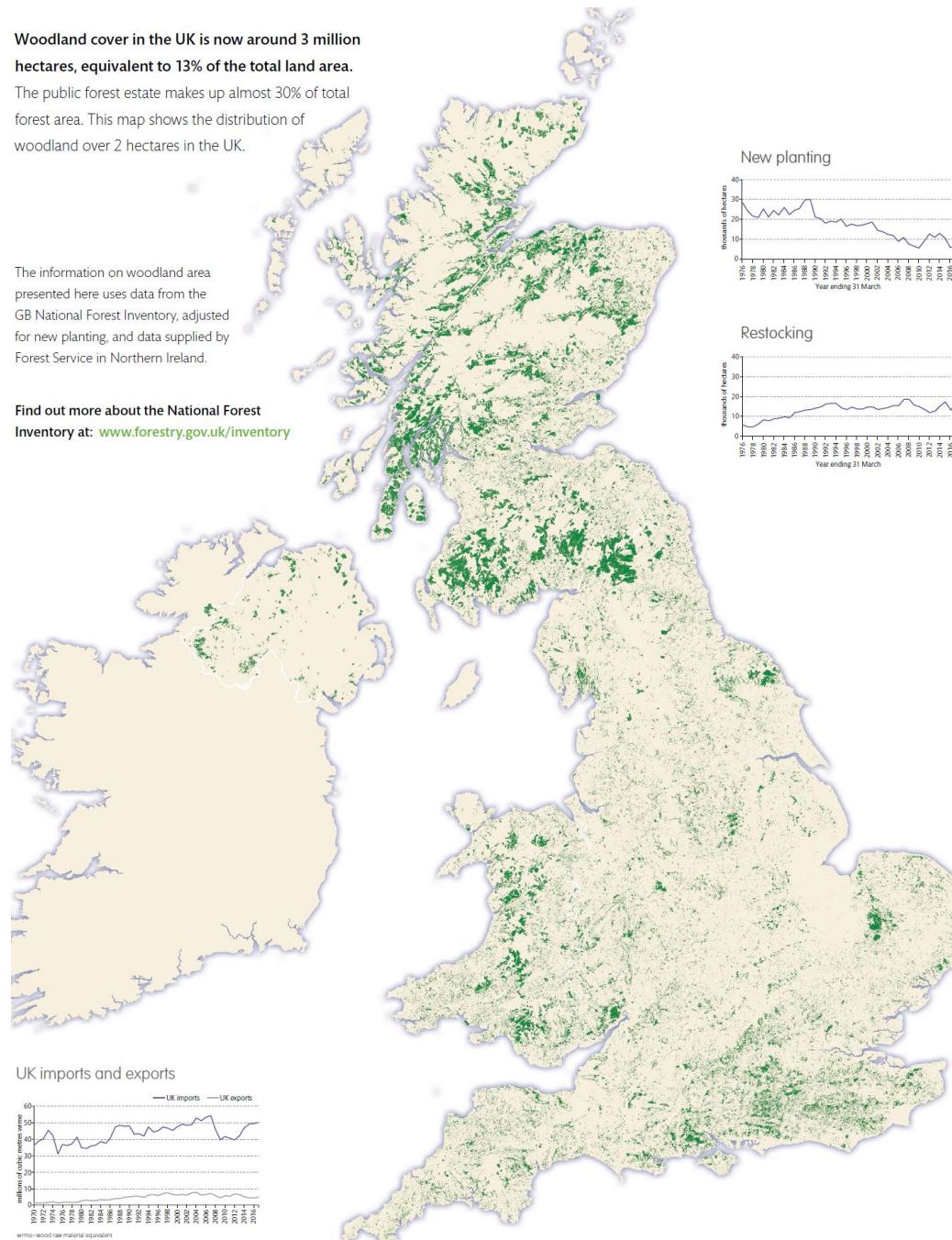
Distribution of woodland in the UK

Woodland cover in the UK is now around 3 million hectares, equivalent to 13% of the total land area.

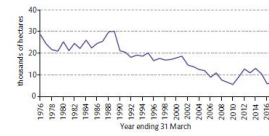
The public forest estate makes up almost 30% of total forest area. This map shows the distribution of woodland over 2 hectares in the UK.

The information on woodland area presented here uses data from the GB National Forest Inventory, adjusted for new planting, and data supplied by Forest Service in Northern Ireland.

Find out more about the National Forest Inventory at: www.forestry.gov.uk/inventory



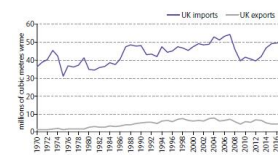
New planting



Restocking



UK imports and exports



Notes: wood saw material equivalent

Complex and sophisticated processing sector - examples

<https://www.jamesjones.co.uk/>

<https://www.bsw.co.uk/>

...and in contrast, a lowland example

<https://www.sayitwithwood.co.uk/>

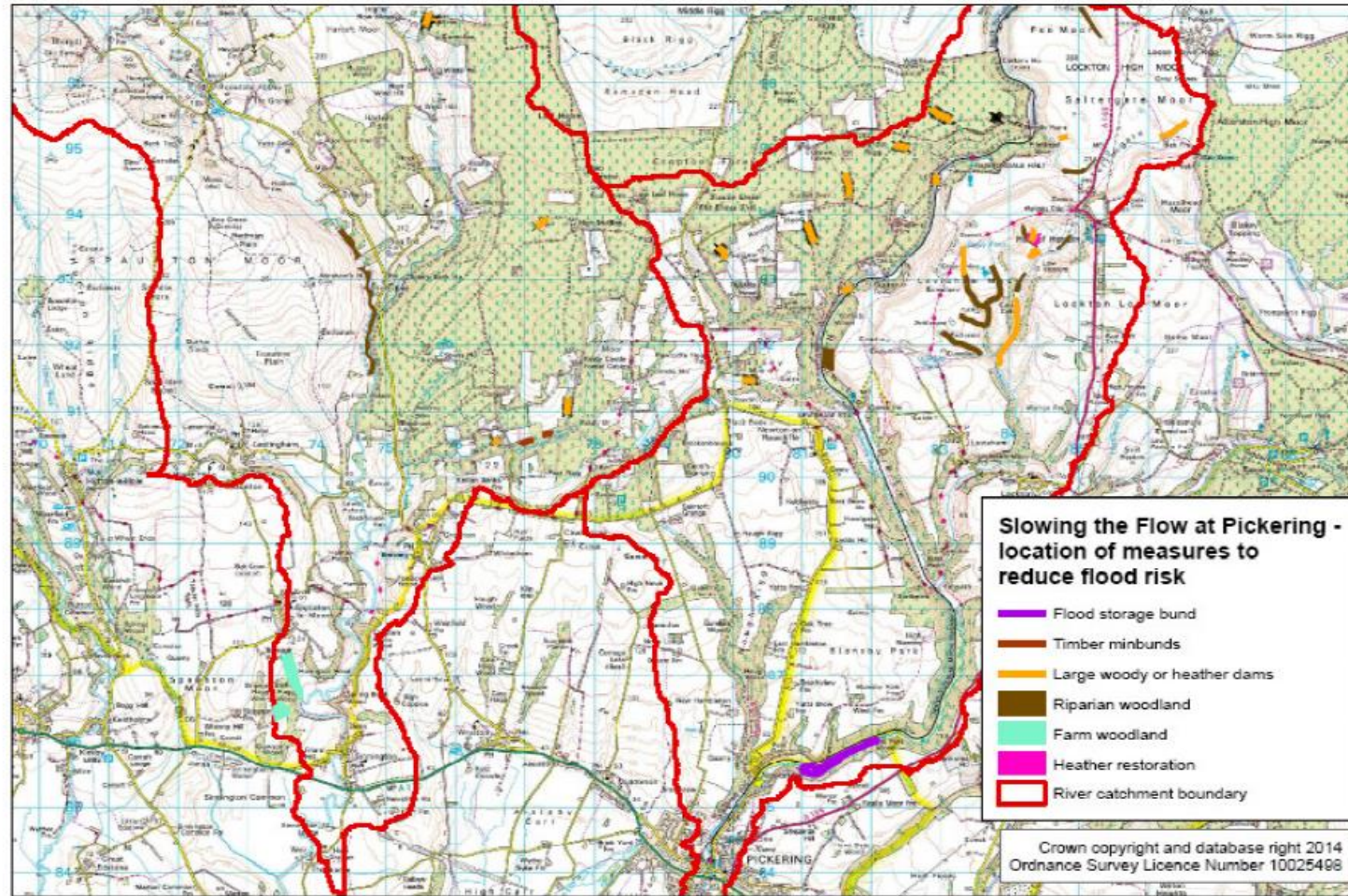
UK forests and woods have a strong functional connection to water (and flooding)

Some examples....

Slowing the Flow, Pickering, North Yorkshire

<https://www.forestresearch.gov.uk/research/slowing-the-flow-at-pickering/>

Catchment Map and Photo Selection of Implemented Measures



Map of Pickering Beck and River Seven catchments showing the location of land management interventions



Pontbren – mid-Wales – an iconic, farmer-led project

<https://www.woodlandtrust.org.uk/publications/2013/02/the-pontbren-project/>



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

The original data from 2004-2011 showed that the amount of water that infiltrated the soil in grassland grazed by sheep was much greater than in improved grassland.

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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.

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

This occurs where there is a relatively impermeable soil layer near the surface that causes the soil above it to become saturated quickly. 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.

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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.

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

Bu i'r gwaith ymchwil ym Mhontbren 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.

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 coed⁶.



centre, with
ter quickly
ops. They are
the longer
Pontbren fall
ular role in

h thrive in
Betula pendula),
Aucuparia) and
), and for the
and willow
om field

nydauddan ar ddwystr dener lawni, ang...
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;



2005



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.

2011

- 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 chesnut);
- 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.

Picture it this way...



“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 dwêr ffo oddi ar wyneb y borfa uwchben ac yn caniatáu iddo amsugno'n gyflymach i'r pridd.”



Tree planting strips and shelterbelts act as the 'green' equivalent of built-environment drains and crucially, increase infiltration rates of water into soil and strata, slowing down flow rates and buffering flood peaks downstream

“...compared to sheep-grazed grassland, excluding sheep produces on average a 5x improvement in infiltration rates, but excluding sheep **and** planting broadleaved trees is on average 67x more effective than improved, grazed grassland at absorbing surface run-off₆.”

Integrating agriculture and forestry

Near Machynlleth, Mid Wales



A time of change...

- Huge uncertainty around agriculture, particularly in the hills – future viability under revised support systems?
- Forestry sector is strong and expanding – investment opportunities are proven, timber prices are high, demand for land for afforestation is consistent and high.
- Greater awareness and acceptance of the multiple benefits of integrating farming and forestry in a balanced way.

Confor response to DEFRA consultation on 'Health and Harmony: the future for food, farming and the environment in a Green Brexit' May 2018

Confor welcomes the references to timber production and forestry within the consultation document, as well as many of the proposals including those for:

- An alternative to Direct Payments;
- Excellence in plant health standards;
- Increased productivity and competitiveness;
- The principles of 'public money for public goods' and 'polluter pays'.

Confor strives to **promote integrated land use** and thriving rural communities and seeks to **remove barriers between different land uses**, in particular those which restrict tree planting and woodland management. It favours a post-Brexit system for the countryside which recognises that the **types of rural activity supported by CAP are not the only form of productive land use**. Confor wants a new policy framework for the countryside that **allows farmers to integrate forestry or other activities into their businesses seamlessly**. The public goods intrinsic to timber production should be recognised in any system of public reward.

And another powerful voice – a woodland NGO and advocate – Woodland Trust

See documents on soil and water protection from tree planting and shelterbelts, shelter for livestock etc.

Resources at:

<https://www.woodlandtrust.org.uk/publications/search/?Query=farm+&sortby=date&count=12>

Agroforestry

An emerging discipline and approach in the UK

Combining tree cropping with arable or grassland operations on the same area of land...

<https://www.woodlandtrust.org.uk/publications/2018/06/agroforestry-in-england/>

Political comment ...

<https://www.woodlandtrust.org.uk/blog/2018/04/agroforestry/>

Woodfuel – domestic and commercial

Low-carbon and renewable source of energy

Examples?

...and on the doorstep of HAU

<http://logalog.net/>

Farm-based, high quality domestic (log) woodfuel business. Upgraded its drying plant to enable high volume, consistent production and qualify for Renewable Heat Incentive (RHI) subsidy on the drying heat element of the process.

Cutting, splitting and loading



Green (wet)logs into special twin-wall skips with air movement vents

**Skips linked to
blown hot air
from boiler
system -
RHI eligible
heat source**





Loaded skips of cut logs drying in yard



High volume chipping for boiler fuel – Crows – Shropshire Woodchip, Tibberton



Boiler room



Dried log store – c. 15-20% moisture content

**Commercial wood fuel – chipped softwood
Shropshire Woodchip – supply contractors for AMP Forest Fuels**



Chip drying – slatted floors, blown hot air – grain drying technology



Note the use of agric logistics/infrastructure and resources – new phase of woodfuel sector development?



Access/recreation/health and wellbeing

Now a significant focus for many woodland/forests owners and managers – delivery of benefits from private and state sector woodlands/forests.

Some examples...

Coed Llandegla, nr. Wrexham

Visited by HAU students and JW, courtesy of Tilhill
Forestry Ltd.





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2010

www.ordnancesurvey.co.uk/getamap

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Northern Ireland.



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© 2010 Europa Technologies

© 2010 Google

Imagery Date: Jan 1, 2006

53°03'08.08" N 3°09'39.49" W elev 417 m

Eye alt 4.23 km

Water catchment function in north-east section of Llandegla – Pendinas Reservoir – implications for forest management?



Mainly Sitka spruce (*Picea sitchensis*) – approx. 36-40 years old
– 650 ha. total area, approx. 12,000 m³/ yr harvested



Active thinning programme – interim income plus increasing value of final crop



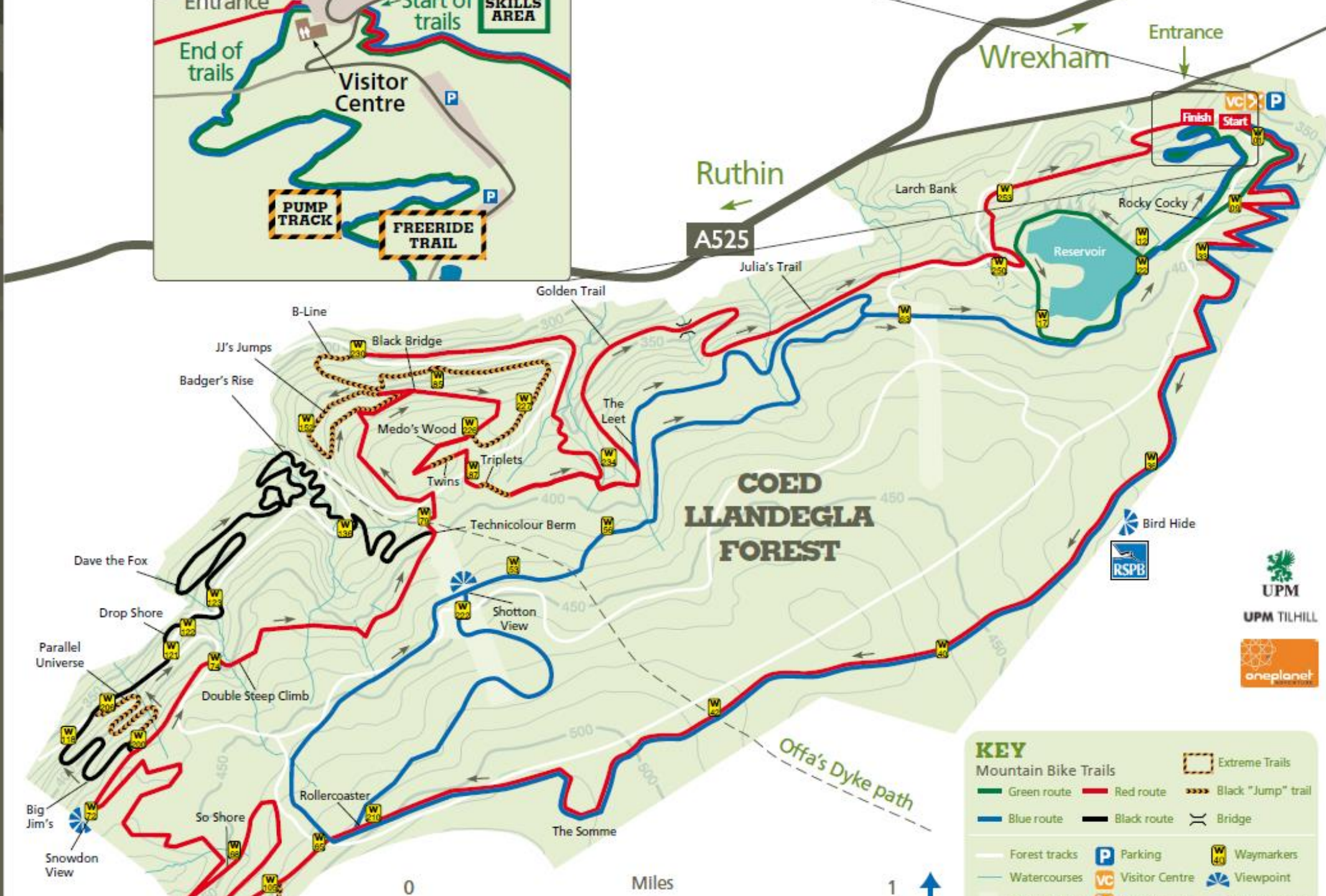




MOUNTAIN BIKE TRAILS

PERSONAL SAFETY

- Always follow the waymarked trails
- Always carry a mobile phone
- Ride the trail type suited to your ability and the specification/quality of your bike
- Ride within your ability
- Ensure your bike is safe to ride and be prepared for all emergencies
- Always carry some sort of identification
- Always tell someone where you are going and when you will be back
- Reflective materials on your clothes or bike can save your life
- ALWAYS** wear a helmet
- The weather determines general trail conditions. Make sure you have adequate clothing, food, drink and time to complete your trip safely. **DON'T RELY ON OTHERS**
- If you get into difficulty on the trail look out for the individually numbered waymarker posts. Report your location to the emergency services or to the Visitor Centre.
- Access to the Visitor Centre from the minor road (off the A525 Wrexham to Ruthin Road) is at Grid Reference SJ 240 524. In case of emergency call 999. Nearest A&E Hospital facilities: Wrexham Maelor Hospital, LL13 7TD. Tel: 01978 291100.
- Follow all safety and diversionary signage



KEY

Mountain Bike Trails	Extreme Trails
Green route	Black "Jump" trail
Red route	Bridge
Blue route	Forest tracks
Black route	Watercourses
Waymarkers	Parking
Viewpoint	Visitor Centre



Location is crucial...





Source: trailguru.com

Originally a partnership/profit share – Tilhill and One Planet Adventure – OPA operate MTB centre, shop, cafe, training etc.

- Approx. 18 people employed
- Exceeding projected visitor numbers by 100% - 120,000 people in first year, now at c.450,000+ p/a
- Average spend per visitor estimated at £12-16 ('17-18 figs.)
- Multiplier/ripple effect in local economy – accommodation, food, drink, fuel....?
- Funded to date by Forestry Commission Wales (NRW), Welsh Assembly, UPM Tilhill

Private sector example of a different type of forest 'offer'

Wilderness Wood, East Sussex

<http://www.wildernesswood.org/about/>

Would this work anywhere in the UK?

Location, demographics, relative affluence....?

and, different again but still private sector... The
Cartshed, Herefordshire

<http://www.thecartshed.co.uk/>

"The Cart Shed is an amazing place to be. It immediately helps you to relax which I think is due to the environment and the caring nature of the people who run it. I'm sure having Veterans on the site has been a learning experience for all concerned but the course tutors and volunteers have all been amazing and have certainly made a difference to both our lives. I too cannot wait for the days my partner attends as it gives me some time off from PTSD and I know he is going to be enjoying whatever it is he's doing that day!"

Elwy Working Woods, North Wales

- An unique (?) approach to woodland working and developing woodland business and enterprise
- Co-operative approach – central yard and workshop spaces with multiple small businesses working individually and together on bigger projects. Also developing affordable housing for woodland workers



<https://www.facebook.com/elwyworkingwoods>