

Farming for  
biodiversity  
– with trees

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“Wood is an extraordinary renewable resource; and taking it from well-managed sources benefits forests and the planet.”

“Natural forests can’t provide all the wood we need, so we also have to farm trees, just like we do other crops.”



“Plantations that allow wildlife to pass through natural forest corridors, that benefit local communities.”

David Attenborough, *Our Planet*:  
[‘How to restore our forests’](#)

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- We know that the two biggest threats to biodiversity are exploitative land management techniques and climate change, so I’m going to address these two together.
- I want to get you excited about the idea of integrating timber growing into existing farm businesses, as a strategy to benefit both biodiversity and carbon, and production and profitability. Because I like to have my cake and eat it.

Link: <https://www.ourplanet.com/en/video/how-to-restore-our-forests/>



I'm not going to talk about the UK Forestry Standard because I'm sure you're all aware of the forest regulatory system,

so for over 20 years this has been the framework agreed between governments, environmental NGOs and foresters,

to ensure that forest management doesn't damage wildlife and carbon sites (SSSI's and peat bogs), creates diverse forests, creates edge habitats, protects soil and water, and harvests in sensible coupes that create structural diversity.

But I'm going to refer to it because want to look forwards from this standard practice, to what forestry is delivering and can hopefully deliver for you, in terms of enhancing biodiversity *through* increased production.

UK Forestry Standard is here:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/687147/The\\_UK\\_Forestry\\_Standard.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/687147/The_UK_Forestry_Standard.pdf)



1. Growing timber to protect global forests
2. Growing timber to create a low-carbon society
3. Growing timber to create biodiversity on the farm

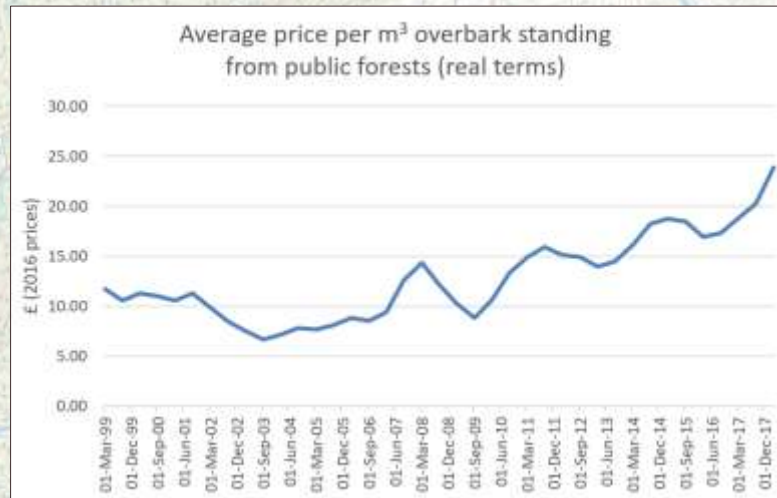


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## Protecting global forests



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Source: Forestry Statistics

Timber is a valuable crop: it wasn't at the start of the century and you'll still meet people who don't realise this has changed.

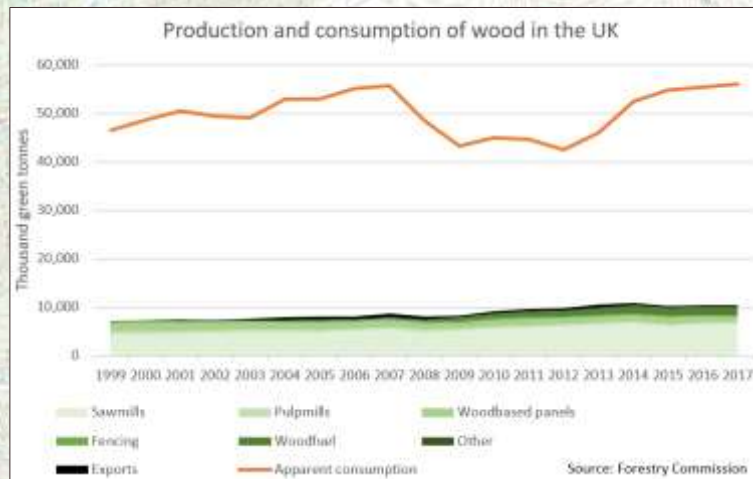
These are sales from public sector forests – a conservative trend compared with the private sector.

You expect to get about 400 tonnes per hectare, so this figure translates to just under £10,000 per hectare. Last year private growers have regularly making double this or treble this for good quality spruce.

It does fluctuate, so this year it's gone back down because of a flood of wind and beetle damaged wood from Europe – but that is creating a long-term shortfall in the European timber supply so anyone who can grow timber to fill it is in luck.

Once you've got a forest established with a nine-year gap between each coup, you have income in most years from either thinning or harvest.

## Protecting global forests



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We are highly dependent on imported wood in the UK.

This shows production in green and our consumption in orange. Immediately we can see that producing timber here shortens supply chains and keeps production under our eye.

## Protecting global forests



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Source: <http://www.oecd.org/publications/global-material-resources-outlook-to-2060-9789264307452-en.htm>

Timber products might be harder to import in future. Global development means increasing demand for everything from toilet paper to mass timber buildings.

Timber is renewable, but it is certainly not infinite.

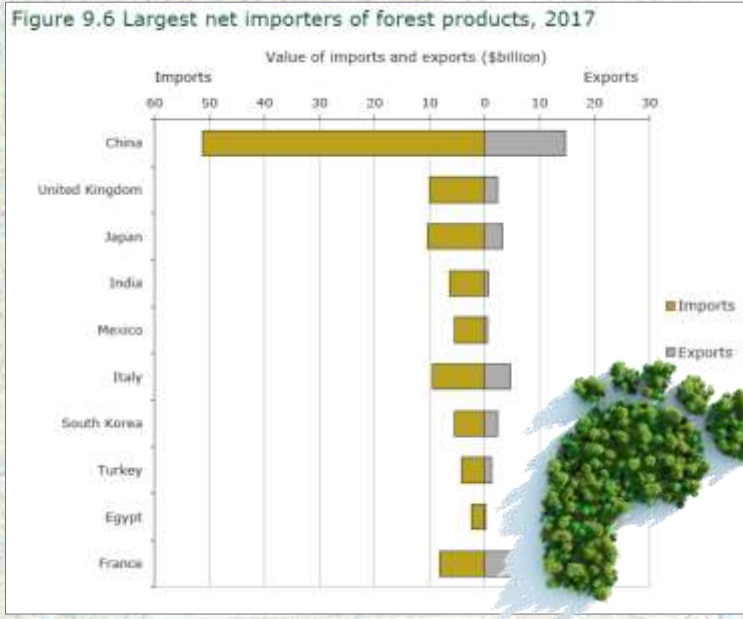
This research from OECD provides a picture of how much stuff we use now, in the dark colours, and to 2060, in the light colours.

Timber is one of the biggest growth areas, with global demand projected to treble.

We can also see that there is an enormous projected growth in mineral materials; these are non-renewable and have an enormous carbon impact. If we are to replace steel or concrete or coal with fossil-free alternatives, we need to grow a lot more trees.

*Global Material Resources Outlook to 2060* published February 2019

Protecting global forests



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

The UK is the second largest net importer of forest products in the world. Only the massive developing economy of China imports more timber than our little island.

We have a huge global forest footprint.



Protecting global forests

## Global change: New Generation Plantations

The image displays four logos arranged in a 2x2 grid. The top-left logo is the FSC (Forest Stewardship Council) logo, featuring a tree and the text 'FSC FORESTS FOR ALL FOREVER'. The top-right logo is the Rainforest Alliance logo, featuring a green frog and the text 'Rainforest Alliance'. The bottom-left logo is the PEFC (Programme for the Endorsement of Forest Certification) logo, featuring a tree and the text 'PEFC'. The bottom-right logo is the New Generation Plantations platform logo, featuring a globe and the text 'NEW GENERATION PLANTATIONS platform FOR PEOPLE, PLANET AND PROSPERITY'.

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

Timber growing is becoming more sustainable globally.

The kind of things we've done in the UK through the Forestry Standard have been developed globally by sustainability labels over a generation – FSC and PEFC are standard for timber in the UK

And also by New Generation Plantations which is what it says, a new generation of timber growers, NGOs and local communities collaborating to ensure forests don't cause damage and do create multiple benefits.

Protecting forests

**Romania breaks up alleged €25m illegal logging ring**  
Security forces launch raids linked to deforestation in the Carpathian mountains, home to some of Europe's last virgin forests

**Poland violated EU laws by logging in Bialowieza forest, court rules**  
Judge dismisses claims by Polish government that logging was necessary to protect ancient forest from outbreak of bark beetles

**Chainsaw Gangs: The Plunder of Albania's Ancient Forests**  
Rampant illegal logging in Albania is ravaging primordial woodlands, WWF investigates

**RUSSIA IS NUMBER ONE IN THE WORLD IN LOSING INTACT FORESTS**  
In recent decades, Russia has been losing an average of one to two million hectares of intact forest

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Source: POI

But timber is becoming so much in demand that pressure to over-exploit natural forests keeps growing.

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Source: FAO Forestry

This is a very striking figure: planted forests make up only 7% of global forest cover, but provide 33% of commercial timber.

Those tree farms that David Attenborough talked about are a pretty efficient way to produce timber. The best way to protect intact natural forests under threat from timber production, I would argue, is to make it uneconomic to exploit them by outcompeting them with a sustainably-produced farm product.



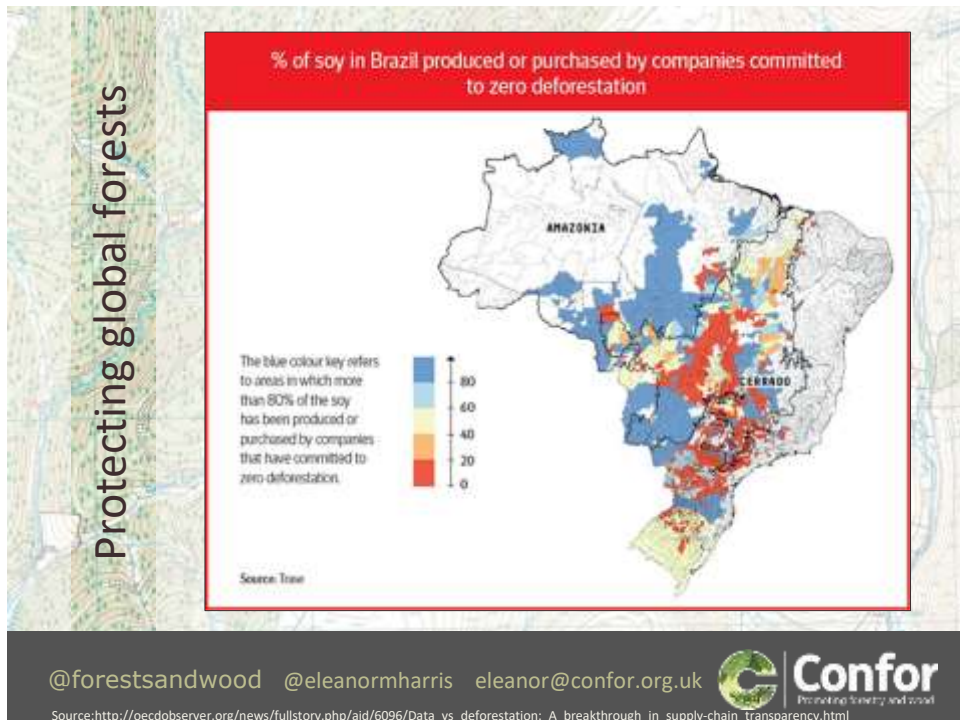
But I'd like to get you thinking about a second way in which forestry on a Scottish farm can protect global forests.

This is a new film which Scottish Forestry have just put up on Youtube, starring Biggar farmer Peter Gascoigne, talking about the integrated benefits of timber and lamb production. He found feed costs going down and lamb survival going up, his poorer land stopped losing money and began to produce a valuable crop.

I don't want to dwell on this because I'm not a farmer but I do commend this film (10 minutes).

Link: <https://www.youtube.com/watch?v=aWOUQW9ih8o>

## Protecting global forests

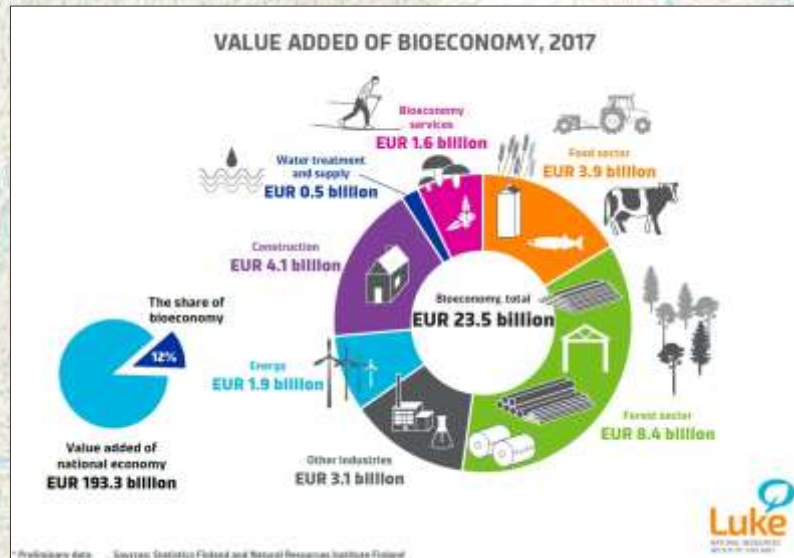


I just heard on *Farming Today* yesterday that the UK imports 3 million tonnes of soya each year, forming 60% of protein fed to livestock.

If utilising forestry to create shelter and better use of pasture in Scotland, means lowering feed requirements and lowering that huge pressure to produce soy at all costs, that's not just cost-savings for the Scottish farmer: that's giving a break to the jaguar and the orangutan and all the other rich biodiversity of tropical rainforests that are threatened by its production.

And that means Scottish lamb and beef are taking strides towards becoming truly eco-friendly protein.

Farming the green economy



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Source: Statistics Finland & NRI Finland, <https://www.luke.fi/en/natural-resources/finnish-bioeconomy-in-numbers/>

So this integrated production brings us back to the UK.

This graphic which is actually from Finland, but it demonstrates my next point which is about where our future society is physically going to come from.

Our society needs food, houses, clothing, furniture, tech, power:

And if we want them renewably and without climate change, then it's people like you who are going to be producing them. Not miners or nuclear physicists or geologists, but farmers.



So what are the trees growing on your farm going to be for?

With food it's obvious that it grows from the land. But with the rest of our stuff, you can grow it or you can mine it.

And this is the first huge biodiversity benefit of growing timber, because if you're not growing trees, someone else will be drilling oil, or quarrying stone, or smelting iron, or blasting clinker, because that's what stuff is made of, if it's not made of timber.

This is Glasgow. You could make all of that from timber. This is like the bit where the devil takes Jesus up to a mountain and shows him the kingdoms of the world and says 'all this can be yours' – except this is the good version – *"all this you can produce!"*



This is a Scottish firm who build super-energy efficient homes, from panels engineered largely from OSB, oriented strand board, which is this stuff that you see around building sites. It's made by Norbord in Inverness, from Scottish timber.

We don't build houses from oak beams these days – at least not houses for ordinary people.



Farming the green economy



CCG Construction, Anderston, Glasgow: 'You wouldn't build a car in a field so why would you build a house in one?'

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Source: <https://woodforgood.com/news-and-views/2017/10/16/interview-with-calum-murray-ccg/>

This is 540 new affordable homes in Anderston in Glasgow built by another company, CCG using their own off-site timber panel system.

## Carbon stored in timber



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And of course the point about these timber buildings is that they are made out of captured atmospheric carbon.

Locking up timber in buildings while new trees grow in their place is one of the best forms of carbon capture and storage we have available.

This graphic shows a building in London made of Cross-Laminated Timber, CLT – so instead of panels with insulation you engineer enormous blocks of timber.

It's very sustainable,

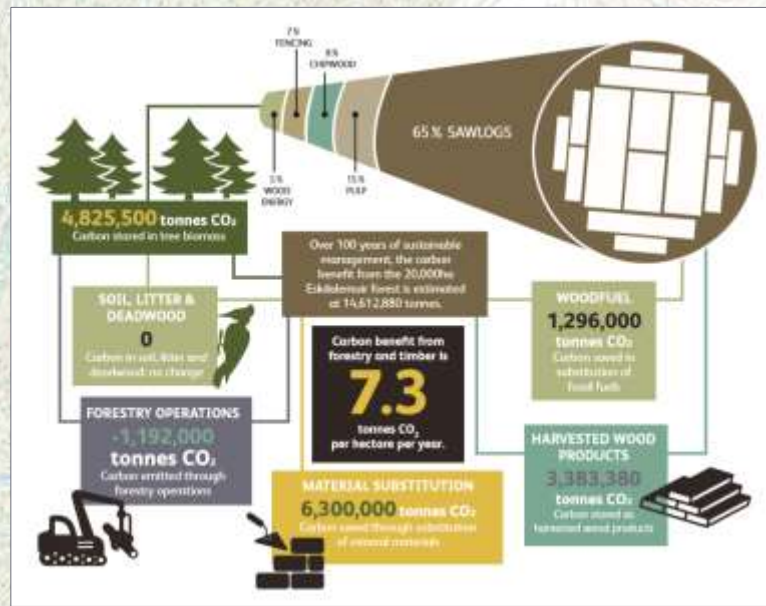
very versatile,

counterintuitively very fire resistant because the blocks just char on the outside and don't collapse as steel-framed structures do,

and you can lock up massive amounts of carbon.

There's a lot of discussion about CLT as the new wonder-material, and a bit of competition about which UK city is going to have the first UK CLT plant – maybe Aberdeen, maybe Newcastle – but what it's going to need is lots and lots of timber. It needs farmers to be the carbon-storage conveyor belt.

## Farming the green economy



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Source: Sandy Greig: Benefits of Carbon

But storing carbon isn't the only important thing.

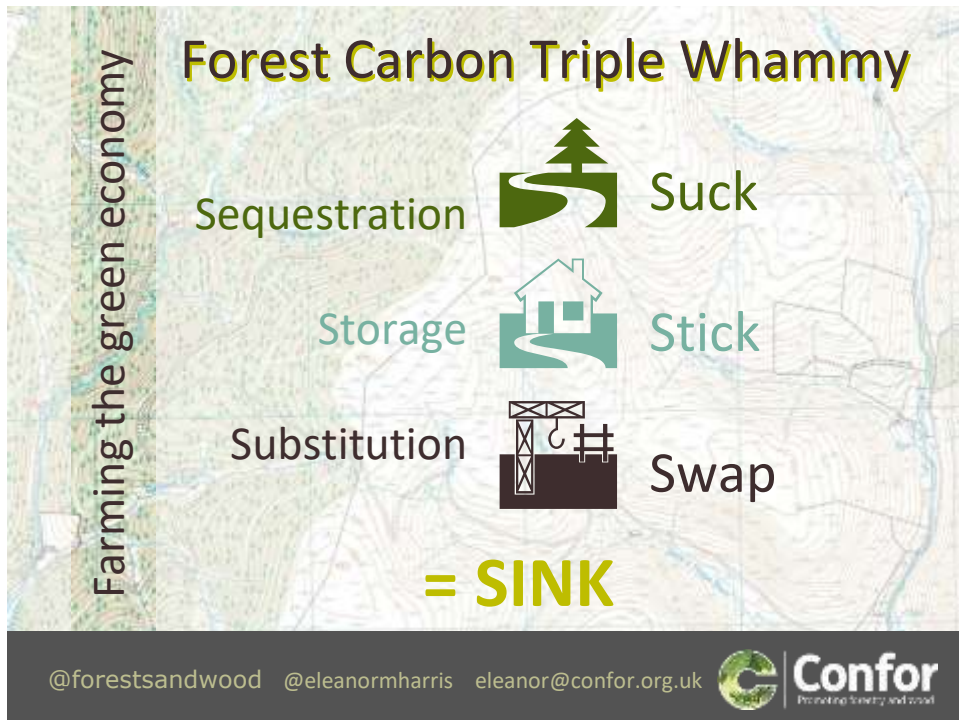
If you grow trees, you capture some carbon and you can sell it under the woodland carbon code;

If you grow timber, you can store carbon in products over different lengths of time while the forest captures more.

But more and more research is showing that the biggest carbon benefit of all is the carbon not emitted from mineral materials you didn't use: steel, concrete, oil, plastic, coal.

When we're talking about growing the green economy, we need to be talking a lot more about material substitution.

Full report: <https://www.confor.org.uk/media/247533/eskdalemuir-summary-report-and-infographic.pdf>



So when you're thinking forests and carbon remember the three s's –

sequestration, storage, and substitution –

or because that's a bit hard to say: suck, stick and swap.

all three elements are what equals the carbon sink



But what about the biodiversity on the farm itself? In the last part of this talk I want to talk about productive forestry for biodiversity.

Here are three Scottish forests:

On the left, a nineteenth-century estate forest planted by the Duke of Atholl

In the middle, a twentieth-century forest – either planted by the Forestry Commission or by private investors under tax incentives.

On the right, a modern twenty-first century forests – planted by private landowners through agri-environment schemes.

Almost all forests in these three categories all of them had twin aims of providing timber and enhancing natural capital.

Obviously the 200 year-old ones look most impressive and have the richest biodiversity

The twentieth-century ones are just getting there now: you can see a lot of harvesting, deadwood, and restocked young trees.

The modern ones clearly don't look very exciting yet, but we are getting

smarter and smarter about making them as much like ancient woodland as quickly as possible.

## Ash obligate species

Organism	Level of association					Total
	Obligat	High	Partial	Cosmopolitan	Uses	
Birds			7	5		12
Mammals			1	2	25	28
Bryophytes		6	30	10	12	58
Fungi	11	19	38			68
Lichens	4	13	231	294	6	548
Invertebrates	30	24	37	19	131	241
<b>Total</b>	<b>45</b>	<b>62</b>	<b>344</b>	<b>330</b>	<b>174</b>	<b>955</b>

Level of association: five different categories of association describing the strength of the dependency of the species that use ash trees. There are: 'Obligat', only found on ash; 'High', rarely uses tree species other than ash; 'Partial', uses ash more frequently than its availability; 'Cosmopolitan', uses ash as frequently as, or less than, its availability; 'Uses', uses ash but the importance of ash for this species is unknown.

Alice Broome and Ruth J Mitchell,  
*Ecological impacts of ash dieback  
 and mitigation methods*,  
 Forestry Commission 2017

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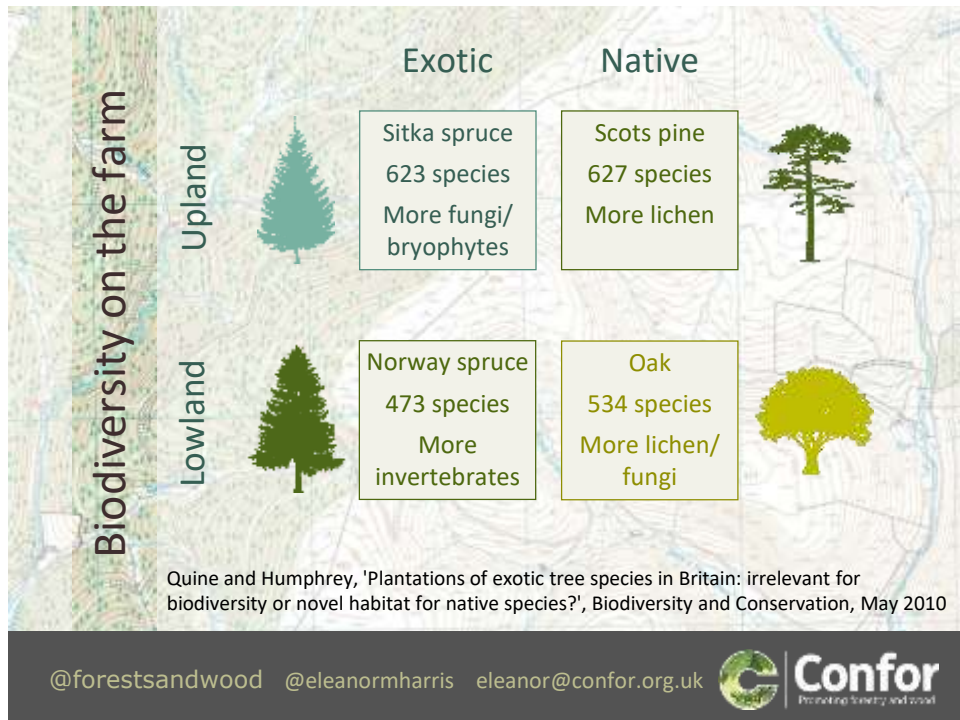
I want to bust one myth before anyone mentions it. I've been surveying the evidence about forestry and biodiversity for a forthcoming Confor publication, and I have not found a single piece of evidence that demonstrates that, for new woodlands, native tree species are measurably better for biodiversity than exotic ones *per se*.

A small number of species are only associated with particular trees, so of course native trees are essential for these species, which is why all timber-producing woodlands include some. For example, Ash-associated species have been in the headlines because of dieback. This shows that 45 species of fungi, lichen and invertebrate are at risk of dying out along with their host ash trees. But 910 species which live on Ash will also live on other trees – some only on certain trees, but for many, any wood will do.

So native species are important – but for reversing the general decline in biodiversity, it's just trees

Reference:

<https://livingashproject.org.uk/pdfs/FCRN029%202017.%20Ecological%20impacts%20of%20ash%20dieback%20and%20mitigation%20measures.pdf>



There are plenty of studies which demonstrate that the exotic trees we grow for timber are very good hosts for the vast majority of UK woodland ecology of fungi, bryophytes, lichens, ferns, flowers, invertebrates, birds and mammals,

and that it is *management practices* which have the big impact.

For example, this study by in 2010 which sampled native and exotic forests across the UK found little difference in biodiversity value, and the ones they found were explained by forest management practices.

And there are three biggies:



## Management for biodiversity

### 1. Deadwood



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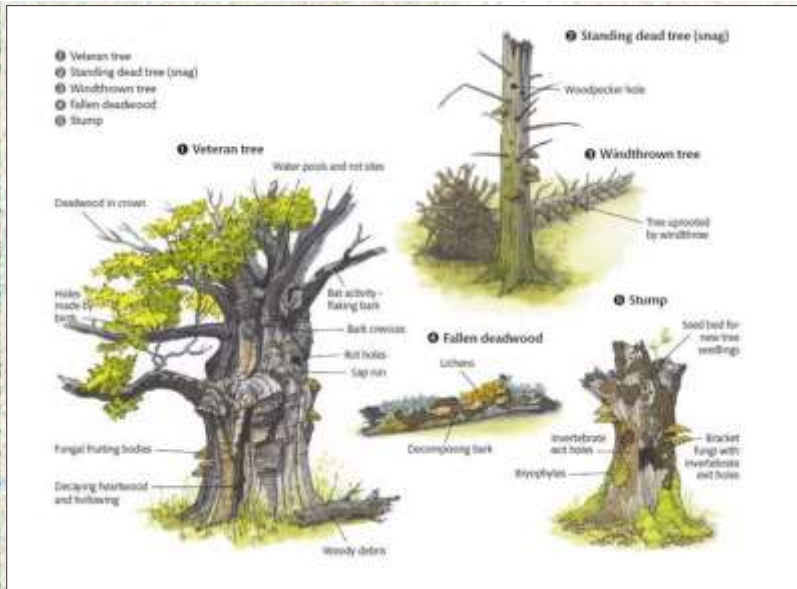


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The best thing in the world you can do in a wood for biodiversity is leave and create deadwood.

This is the stuff the fungi, the bryophytes, the invertebrates love.

Biodiversity on the farm



TCV: The Dead Good Deadwood Blog

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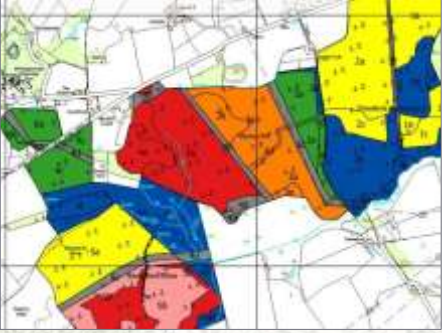
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The Conservation Volunteers have some excellent information on this in their Dead Good Deadwood blog.

Biodiversity on the farm


## Management for biodiversity

### 2. Internal edges



Harvest in coupes  
Variety of ages and species

P.M. Dolman et al, 'Woodland birds in patchy landscapes: the evidence base for strategic networks', *Ibis* 2007, 149 (supple). 146-160

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Another really important thing is structural diversity within the forest.

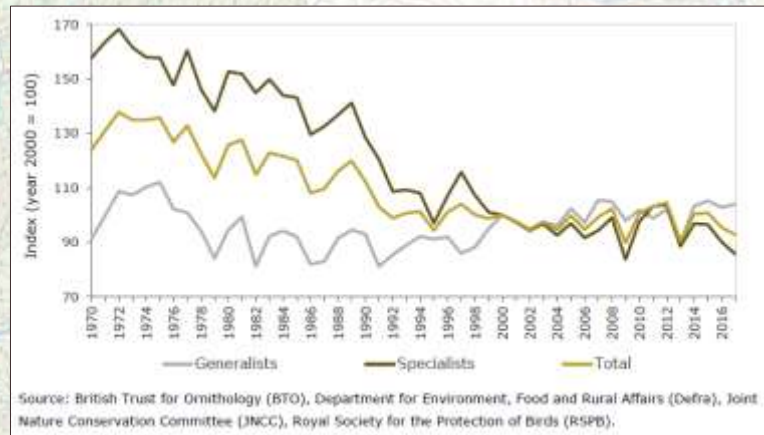
This management practice is standard in the UK through the UK Forestry Standard and felling license process.

When you plant timber, you will have to include a range of species and open spaces,

and when you harvest it, you will have to harvest it in sections like this so the forest always has a diversity of ages, maximising the edge effects and the range of habitats. You can see this on any forested Scottish hillside at the moment as old forests are harvested and restructured to meet these standards.

## Management for biodiversity

### 2. Edges



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Why is this important?

A study of woodland birds found that while some preferred the very edges of woodland or little fragments of woodlands and hedgerows, and (goldcrests and crossbills really like deep forest interiors; what the majority of birds love best is structural edges inside woodlands.

If we look at woodland bird numbers, although we've successfully stemmed the decline of woodland generalist species, which are the ones happy on the edge, woodland specialists, which like the edges inside the sizeable areas of woodland, are still struggling.

I suspect this decline represents the effect of government policy steering farmers away from woodland management. Hopefully the rise in sustainable management of woodlands for timber will result in their numbers starting to rise, but an essential component of that is farmers seeing the potential of their woodlands.

## Management for biodiversity 3. Light



Thin, and thin again  
Limit shady species

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The third vital component of woodland management for wildlife is light.

A special feature of UK woodlands is lack of shade-tolerant species of tree.

So whereas woods in Europe or North America would have an understorey of trees growing up underneath,

UK and especially Scottish woodlands have assemblages of bryophytes, ferns and flowers that have adapted to the dappled light under our canopy.

Most famously bluebells.

This photo shows two stands, Western Hemlock on the left and Scots pine on the right, thinned in the same way, but you can see that under the pines enough light is getting through to the ground for plants to grow.



Everyone blames Sitka spruce for being dark and having no light or life – but if it's like that it's either been planted on a very windy site or the owner hasn't thinned it – either because they planted it on a too-windy site, or because timber prices were low when they should have thinned it, or because they didn't know much about forestry.

The problem is not poor species but poor management. You can perfectly well have a sunny wood of spruce or Douglas fir.

Some species, like Western Hemlock, beech or sycamore, need to be managed carefully more heavily thinned to compensate for their heavier shade cover.

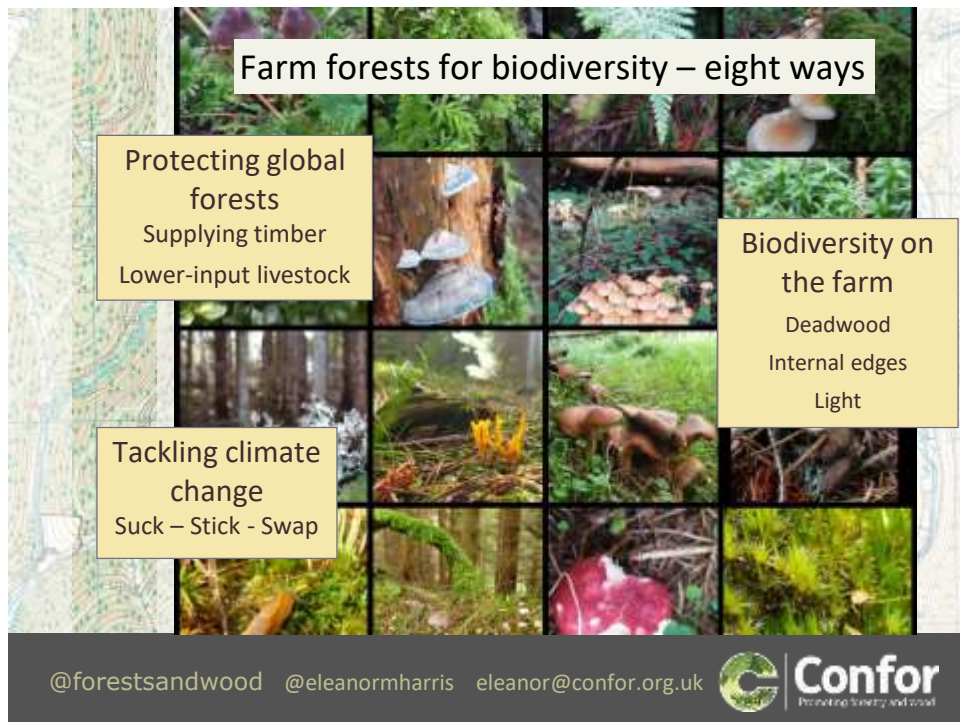


And what do these three top actions for biodiversity – deadwood, internal edges, and light – have in common when it comes to managing woodland?

They are all achieved by harvesting timber.

Because conifers grow fast, and are harvested fast, you're effectively accelerating the natural cycle of woodland. Plant a wood over the course of 10 years, after 15 years do the first thinning, and already you've got deadwood, internal structural diversity and have let in light – and you've started making money.

It will take centuries for a native biodiversity woodland to achieve those things, and you'll never make money – and it will never yield that timber which protects global forests, captures carbon and creates the green economy.



Summary: Farm forestry for biodiversity, eight ways:

Global forests 1) outcompeting illegal timber markets; 2) developing lower-input livestock systems

Climate change: 3) sequestering 4) storing 5) substituting carbon

Biodiversity in the farm woodland: 6) leaving deadwood 7) creating internal edges 8) letting in light