



Peatland restoration on Scotland's forests and land

Scotland's forests and land are key in fighting the impact of the climate emergency and biodiversity crisis. We're already adapting how we work, but there are more opportunities to take action across our forests and land – and its only by putting nature at the heart of our actions can we truly make a difference. To do this, we're using nature-based solutions and ensuring that biodiversity is a focus in everything we do. We are restoring peat bogs to help conserve biodiversity. As we re-wet these sites, we're turning them from net sources of greenhouse gases into sites that will eventually store carbon.

FLS Climate Change Plan

Our vision is to put protecting biodiversity and developing nature-based solutions at the heart of our forward-thinking, innovative approach.

Our aim is to reduce our emissions, capture more carbon and adapt how we manage the land – leading the way for the land-based sector.

Developing the FLS Peatland Strategy

The FLS Peatland Strategy is currently being drafted. Our aim is to see that all of the peatlands on Scotland's forests and land are managed in a sustainable manner, maximizing the provision of ecosystem services for the benefit of Scotland's people and the environment.

Progress of 'forest to bog' restoration

FLS began a significant programme of peatland restoration projects in 2014, funded by the Scottish Government's Peatland Action programme. Since then, restoration has begun on 80 of 'forest to bog' sites (over 3,800 ha), and 30 open areas of peatlands (over 4,100 ha).

Restoration methods have been improved, following and adapting treatments developed by Scottish Power Renewables (such as stump flipping and ground smoothing, zipping and wave damming), Forest Research (back fill trenching or linear bunding without bunds) and the National Parks (hag and gully re-profiling).

A more efficient shears harvesting system was developed in partnership between FLS and contractor Environmental Forestry Services. This approach recovers more timber, leaving the site with lower stumps and largely free of brash, allowing an efficient re-wetting to be done. Crucially, compaction and disturbance of peat is also minimised.

Principles of 'forest to bog' restoration

- **Enough and no more** – don't over-engineer treatments
- **Minimise disturbance** and compaction of peat
- **Remove modifications** – don't introduce more

Observations on 'forest to bog' restoration

- Positive desirable peatland species are either slower to re-establish, or show no signs of recovery at all where disturbance and compaction has been too great. Where peat has been 'churned' or 're-constituted', it resembles the milled peat deposits found on peat extraction sites, or bare peat pans. This may render it hydro-phobic, unable to support peatland vegetation for decades or even ever again.
- Sitka spruce has shallower root plates which allow the stumps to be peeled back and flipped relatively easily, disturbing as little peat as possible. Lodgepole pine root balls tend to establish deeper into the peat, meaning that catotelmic peat can be brought to the surface when these roots are upturned. Vegetation recovery is much slower, perhaps taking up to 5 years to re-vegetate, despite being re-wetted successfully. Other examples of this are found where rutting or repeated passes by machines have compromised the brash mats on main extraction routes and next to timber stacks at roadsides.
- Water table rise – the response after re-wetting is usually very quick and dramatic, with the water table rising to very high level, then stabilizing to near natural levels after 3 to 4 months.
- The rate of recovery of peatland habitat also varies by gradient, with steeper slopes slower to respond. However, positive trends have been observed on slopes of up to 10%. The lower flushed slopes show the quickest response, but slower on the unflushed upper parts.
- Collection and spreading of seed from Hairs tail cotton grass is recommended where remnant populations are scarce within 200m or perhaps less. It is not thought to be a priority to spread sphagnum to our sites in Scotland, but could be done for scarce species after 10 or 15 years if key species are still not present.
- It is now possible to restore afforested peatlands that are cracked below the furrows by installing back fill trenches. Until relatively recently, restoring cracked peatlands was thought to be impossible.



Inset: cracked peatland has been restored at Gowmoss in Moray, with an impressive rate of recovery given the low annual precipitation.

Main image: over 1,200 hectares of landscape-scale 'forest to bog' restoration has been carried out at Dalchork forest since 2014.

Conclusion

FLS is confident that 'forest to bog' peatland restoration is possible on most afforested sites, including those with peat depths from 0.5m and below, and those with slopes of up to 10%. Potential limiting factors are steeper slopes and larger stumps, as it may not be possible to treat these stumps without too much disturbance to the peat. Following our three principles of 'forest to bog' peatland restoration, FLS will continue to develop and improve the methods and techniques used.

