

Restoring afforested peat bogs: results of current research

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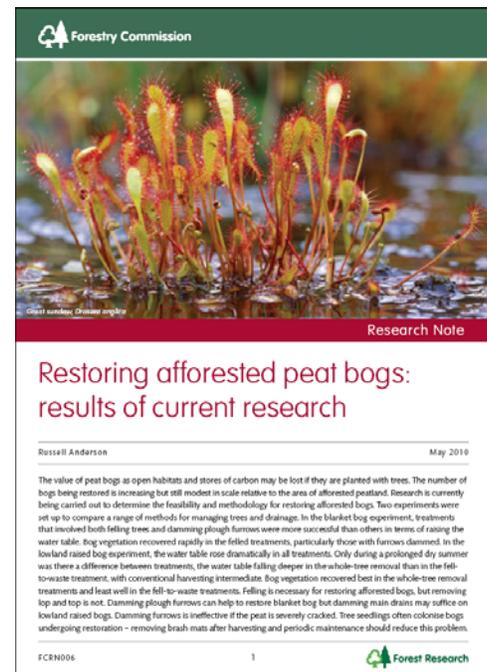
This short and copiously illustrated document from the Forestry Commission of Great Britain (Scotland) outlines the preliminary results of research to explore the feasibility of restoring open peatland which has been converted to coniferous forestry plantation. Because the historical context—and thus the significance—of the work may be unfamiliar to an international audience, a brief outline of the background is given here.

After four centuries of “ruling the waves” in “hearts of oak” (timber warships) and other wooden sailing vessels, and specifically by the end of World War I, Britain’s forest cover had fallen to a critical 5 % of its original extent. Therefore, in 1919, the government’s Forestry Commission (FC) was founded with a remit to re-create a strategic national resource of timber. Of course, much of the land available for afforestation in Scotland was peatland, some of which may never previously have supported trees. It was planted with non-native conifers, initially by hand; although FC researchers were trialling ploughs as early as 1927. This eventually led—during the 1940s—to development of the Cuthbertson plough, which could create effective (i.e. level) drains even across rough peatland surfaces (Neustein 1976) and so significantly increased the rate at which they could be planted. Thus, perversely, the intention to restore the critically threatened forest resource contributed significantly to bringing another habitat—lowland

raised bog—below the ‘5% remaining’ threshold and in sight of extinction by the 1970s (Bragg *et al.* 1984). The 1980s saw forestry expanding across the internationally important Flow Country peatland of northern Scotland (e.g. NCC 1988), promoted by a system of grants and tax benefits which offered attractive financial incentives to speculative private investors until the underlying ‘tax loophole’ was removed by measures included in the government’s budget of 15 March 1988 (Coupar 2003).

The mission of the modern-day FC is “to protect and expand Britain’s forests and woodlands and increase their value to society and the environment”. Within this remit it is recognised, in the opening line of the Research Note, that “the value of peat bogs as open habitats and stores of carbon may be lost if they are planted with trees”. So we come full-circle, with FC—operating now within an ‘ecosystem services’ agenda—researching the feasibility of restoring peatlands that they and others were previously able to plant only after years of strenuous research.

There have been a number of attempts to restore afforested peatland. The first were FC-led projects at Kielder Forest and Black Snib in northern England. Subsequent activity was spearheaded by the voluntary sector at Langlands Moss (raised bog) in November 1994 (Brooks & Stoneman 1997) and the RSPB Forsinard Flows Reserve (Flow Country blanket bog) since 1995, followed by several FC initiatives in



Scotland, Wales and northern England. But, we are told here, few of these have been formally monitored so that reasons for the observed slow recovery of bog vegetation are elusive. Moreover, because policy often favours harvesting well before the end of the first rotation, the trees have no commercial value and any intervention to achieve the recovery of bog represents a net cost, introducing strong economic reasons for doing as little active restoration work as possible. Many questions arise, for example:

- Is it necessary to fell the trees, or will it be sufficient simply to block drainage ditches?
- If the trees must be felled, should they be removed whole, or only usable timber harvested leaving ‘lop-and-top’ on the ground; or can they be felled to waste, i.e. not removed from the site at all?
- Is it actually necessary to block the drainage ditches, or can these be left to fill in naturally?
- Is it sufficient to block only ditches, or should furrows also be blocked?
- Are the same restoration measures effective for both raised and blanket bog, or are different treatments required for these two site types?

The questions are addressed in two replicated factorial plot experiments set up in 1996–1998; one on the UK’s largest remaining primary lowland raised bog (Flanders Moss, central Scotland) where a whole block of lodgepole pine (*Pinus contorta*) was felled; and the other on Flow Country blanket peatland, where a fringe of lodgepole pine mixed with Sitka spruce (*Picea sitchensis*) abutting open bog on one side and forest on the other was removed. Outcomes at the end of five years are evaluated in terms of changes in vegetation, water table depth relative to the peat surface, and ‘aeration depth’ (assessed from the colours of peat cores).

Although only summary results are presented, a particularly interesting effect revealed is the interplay between the quantity of timber and brash left on the site; evapotranspiration from the peatland surface; and the degree to which new tree seedlings are browsed by deer, which frequent both sites.

One-quarter of the document is devoted to recommendations for management practice in bog restoration projects. Basically, felling appears to be essential for the British conditions tested, although there are potential advantages and disadvantages associated with the removal of felled trees from the site. Whereas ditches should be dammed, the results for furrow-blocking on blanket bog are so far inconclusive and there is a potential interaction with

the degree of cracking that the peat has previously undergone as a result of the forestry (e.g. Pyatt 1987). New trees growing from seed left by the removed crop or as invading birch (*Betula* spp.) may require ongoing management.

This is a fascinating but frustratingly brief account of possibly the only rigorous research on this topic available for the UK, which the absence of a reference suggests has not yet been committed to peer-reviewed literature. Perhaps this is because the results so far are inconclusive, underlining the long time requirement for recovery of peatland even after active restoration measures are implemented, as well as the need for long-term monitoring. The Research Note raises many questions in my mind, such as what were the effects on peat properties apart from colour; can the data be examined in the context of mesotope (i.e. landscape unit) function; and how would the results compare with the outcome of simply killing the trees *in situ*?

The publication date of May 2010 is 11–14 years after the experiments were established. It is to be hoped that data collection has continued, and that at least a ten-year evaluation is already overdue. Perhaps more definite conclusions can now be drawn, and perhaps the work will now be publishable in peer-reviewed literature. In the meantime, this tantalising first glimpse of the results must suffice; although enquiries to the author are encouraged and full contact details are provided on page 8.

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Olivia Bragg, March 2011