

Restoring heathland by conifer plantation removal at The Lodge RSPB Reserve, Bedfordshire, England

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SUMMARY

In order to restore heathland, Douglas fir *Pseudotsuga menziesii* and Scots pine *Pinus sylvestris* was removed, and thereafter three treatments were applied: i) no soil removal or seed addition, ii) seeding with heather *Calluna vulgaris*, iii) removal of humic layer and seeded with heather. There was little or no heather establishment in untreated areas; heather establishment and growth was good in one seeded area (15% cover) but not the other; where humus had been removed and seed added the area was dominated by common bent grass *Agrostis capillaris* (50% cover), *Campylopus introflexus* (20%) and juniper hair-moss *Polytrichum juniperinum* (13%); very little heather (<1% cover) had established.

BACKGROUND

Lowland heathland, dominated by dwarf shrubs such as heather *Calluna vulgaris*, is a rare habitat in the UK which supports a distinctive fauna and flora. This dwarf-shrub vegetation can be out-competed by Scot's pine *Pinus sylvestris* and other trees through successional processes (e.g. Mitchell *et al.* 1997) and in some localities heathland has been afforested with commercial conifer plantation (e.g. Pywell *et al.* 2002; Walker *et al.* 2004). This case study describes the regeneration of dwarf-shrub heathland following conifer removal at The Lodge RSPB Reserve in Bedfordshire, central England.

ACTION

Restoration area: A 2 ha area of approximately 40 year old non-native Douglas fir *Pseudotsuga menziesii* and Scot's pine conifer plantation at The Lodge RSPB Reserve (National Grid ref: TL 190479) was selected for reversion back to heathland. The area was underlain by Brown Sands (light, free-draining acidic sands) soil. There was little or no heathland vegetation below the conifers prior to felling.

Conifer removal: In 1998, most of the area was clear-felled by contractors and the timber removed. One small block of trees was left as it contained the rare, ground-dwelling fungus,

larch wax cap *Hygrophorus speciosus*. Much of the resultant brash (twigs and branches) was cleared by hand soon after felling, that remaining was gradually removed in the following years. At the same time, the humic layer was also gradually removed by hand-raking, but also by a JCB in 2000-2001 (see below), down to the mineral sand.

Rabbit fencing: Rabbit fencing was erected around the whole site. Within it, further fenced sub-divisions were erected as precautionary measure based on advice that it is very difficult to control rabbits *Oryctolagus cuniculus* if they manage to get into large enclosures.

Treatments: The felled 2 ha area had the following three treatments applied:

Treatment 1 - a 0.9 ha block was left to regenerate naturally, with no addition of seed.

Treatment 2 - two blocks of 0.15 ha were seeded in 2000 using seed gathered in autumn from adjacent mature heather (initially by scraping up seed pods underneath mature plants, but later mainly by stripping heather seed directly from plants by hand). The quantity of seed spread was not recorded.

Treatment 3 - in winter 2000/2001, 0.8 ha had its humic layer removed by a JCB. There was concern about the compression of the ground due to the weight of the JCB, particularly over

Table 1. Estimated % vegetation cover in April 2005 on areas from which the humic layer was removed by hand, The Lodge RSPB Reserve.

Species	Unseeded	Seeded with heather in 2000	
		Area 1	Area 2
Vascular plants:			
<i>Agrostis capillaris</i>	<1	<1	2
<i>Betula pendula</i>	1	<1	<1
<i>Calluna vulgaris</i>	0	15	<1
<i>Chamerion angustifolium</i>	1	1	0
<i>Deschampsia flexuosa</i>	10	2	<1
<i>Pteridium aquilinum</i>	13	1	1
<i>Rubus fruticosus</i> agg	4	1	2
<i>Rumex acetosella</i>	20	5	4
Mosses:			
<i>Campylopus introflexus</i>	20	65	80
<i>Hypnum jutlandicum</i>	<1	<1	1
<i>Polytrichum juniperinum</i>	7	<1	8
Bare ground	20	<1	<1

drainage reduction affecting vegetation. This area was seeded immediately afterwards (spring 2001) with seed collected by hand-stripping from mature heather plants. Again, the quantity of seed was not recorded.

CONSEQUENCES

Plant colonisation: Birch *Betula* seedling growth was prolific over all areas after clearance, and these needed almost constant control by hand pulling or by cutting and painting the stumps of saplings with Timbrel herbicide. In spite of depleting the nutrients by humic layer stripping, many other undesirable plants quickly colonised, particularly rosebay willowherb *Chamerion angustifolium*, sheep's sorrel *Rumex acetosella* and bramble *Rubus fruticosus* agg. Regular weeding out of birch saplings and bramble is ongoing.

Treatment 1: There has been little or no heather establishment in the unseeded area.

Treatment 2: Visual estimates of vegetation cover recorded in 2005 on the two hand-cleared areas which were seeded, are given in Table 1. Heather establishment and growth was good in one of the re-seeded areas (Area

Table 2. Estimated % vegetation cover in April 2005 for the area from which the humic layer was removed mechanically and heather seed sown.

Species	% cover
<i>Agrostis capillaris</i>	50
<i>Calluna vulgaris</i>	<1
<i>Deschampsia flexuosa</i>	<1
<i>Rumex acetosella</i>	2
<i>Campylopus introflexus</i>	20
<i>Polytrichum juniperinum</i>	13
Bare ground	1

1: 15% cover) but not the other (Area 2: <1% cover). Similar quantities of seed were added to both areas and there is no obvious reason why there was such a difference in heather establishment rates. The most abundant plant in both the areas (Area 1: 65% cover; Area 2: 80% cover) was the non-native moss *Campylopus introflexus*.

Treatment 3: By 2005 the area that had had its topsoil removed mechanically by a JCB and was seeded with heather was dominated by three species, common bent grass *Agrostis capillaris* (50% cover), *Campylopus introflexus* (20%) and juniper hair-moss *Polytrichum juniperinum* (13%). Only small amounts of heather (<1% cover) had established. Table 2 summarises the estimated vegetation cover of the different plant species in 2005. There was little evidence of soil compaction by the JCB (i.e. no standing water after heavy rainfall).

REFERENCES

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