Using heather brash

Sourcing and getting to site

The amount of heather brash required is calculated from aerial photographs. The material is delivered in approximately 0.73m^3 dumpy bags (i.e. 90x90x90cm). It is estimated that one bag will make a layer 1cm thick over 73m^2 and therefore 1 hectare of bare peat requires 139 bags of brash. To calculate the amount of brash required an 8.5mx8.5m grid is drawn onto aerial photographs in a GIS program. Those areas not over bare peat are deleted; leaving an estimate of the number of squares (i.e. the number of bags of heather brash) required to cover the bare peat. The areas are then ground-truthed on site.

Heather brash can be applied in two forms; long stalked heather cut in heather bales and double-chopped heather brash. Both types are cut and collected from donor sites which have the following characteristics:

- All from sites above 200 metres in height.
- All from sites within the Peak District National Park, to prevent the importation of sheep ticks in to this tick-free area.

The brash is cut during late autumn/ winter, when the seed would set naturally, in order to ensure the highest amount of heather seed is present and spread onto the ground as quickly as possible.

Figure 1. *Heather brash cutting on Warslow Moors using a double chop forage harvester*

Heather brash is cut and collected from a donor site and collected in dumpy bags. Various techniques for cutting can be used, including a modified double-chop forage harvester (Figure 1) and a Uni-mog mounted flail mower. These cut between two and four bags at any one time. The area to be cut depends on the length of the heather but an initial estimate would be 150-200 bags per hectare, which would be the minimum length of heather that could cost-effectively be undertaken. Generally, 200 bags can be cut in one day.

Due to the logistical implications of carrying out the cutting, haulage, airlifting and spreading of hundreds of tonnes of heather brash, the time between cutting and spreading may be many weeks. Initial thought were that this would cause problems with the composting of material that would have implications for the viability of *Calluna vulgaris* seed. This does not appear to be the case, primarily because winter temperatures on the

hill tops, where the material is stored prior to lifting and spreading, rarely rises much above freezing. Additionally the bags, which are slightly smaller than 1m^3, reduce the amount of composting that occurs, although if the bags get very wet and sit for extended periods then the material can start to rot, without composting.

Figure 2. *Hand spreading of heather brash*

Heather bales are applied in a very similar way. They are cut and collected using standard agricultural equipment to form standard sized agricultural bales. Bales are loaded into either cargo nets or dumpy bags and flown onto site. The material is spread in a similar way, although to a greater depth because of the type of material. However, there is plenty of light penetration through the open branches of the cut heather, allowing the plants beneath to grow well. It is not possible to spread heather bales using the helicopter mounted hopper because of the reduced density of the material, which means that it is not a cost-effective method (i.e. rather than half a tonne per lift it is only possible to lift 1/8th of a tonne).

Figure 3. *Spreading brash on Arnfield, April 2005, using the hopper*

Application

Initially heather brash was exclusively spread by hand. However, we trialled a method of applying the heather brash directly from a hopper under-slung from a helicopter (Figure 3) and used this to apply all of the brash in 2006. This technique works very effectively on those areas that comprise completely bare peat and less effectively on those areas that have a high percentage of vegetation as it is not possible to selectively apply the brash to bare peat using the hopper. Therefore a significant amount of brash is applied to already intact vegetation. This is not the most effective way to use this scarce material.

Figure 4. *Heather brash spread correctly showing heather seedlings germinated.*

The bags are flown onto site in pairs. Each bag is emptied in opposite directions and spread to a depth of approximately 1cm, which leaves a considerable amount of light accessing the peat. This is to prevent the formation of a mulch, which would impact on the growth of both grasses and heather. The heather brash remains on most areas even when applied at this very low thickness. Additionally, spreading at a greater depth is unnecessary and wasteful of the resource. When the bags are emptied they are rolled up and parcelled together for airlifting off the moor. It is very important to collect as many together as possible to ensure adequate weight for airlifting as the collected bags function as a drone, significantly increasing the drag on the aircraft and causing instability. Single use bags must not be used again but can be recycled.

Brash Stats:

One ton of heather fills approximately 8 dumpy bags

One dumpy bag of brash contains 125kg of heather brash - dry weight

One dumpy bag of brash covers approximately 64 square metres of ground to a depth of 1cm.

One dumpy bag takes one person 1/2 hour to spread.

One helicopter flight can carry 6-9 dumpy bags

Brash is spread on slopes of angles up to 30 degrees.

Number of bags of brash applied by Moors for the Future since 2003

2009	2008	2007	2006	2005	2004	2003	Total
2764	3500	1062	2760	4640	2760	1000	**18486**