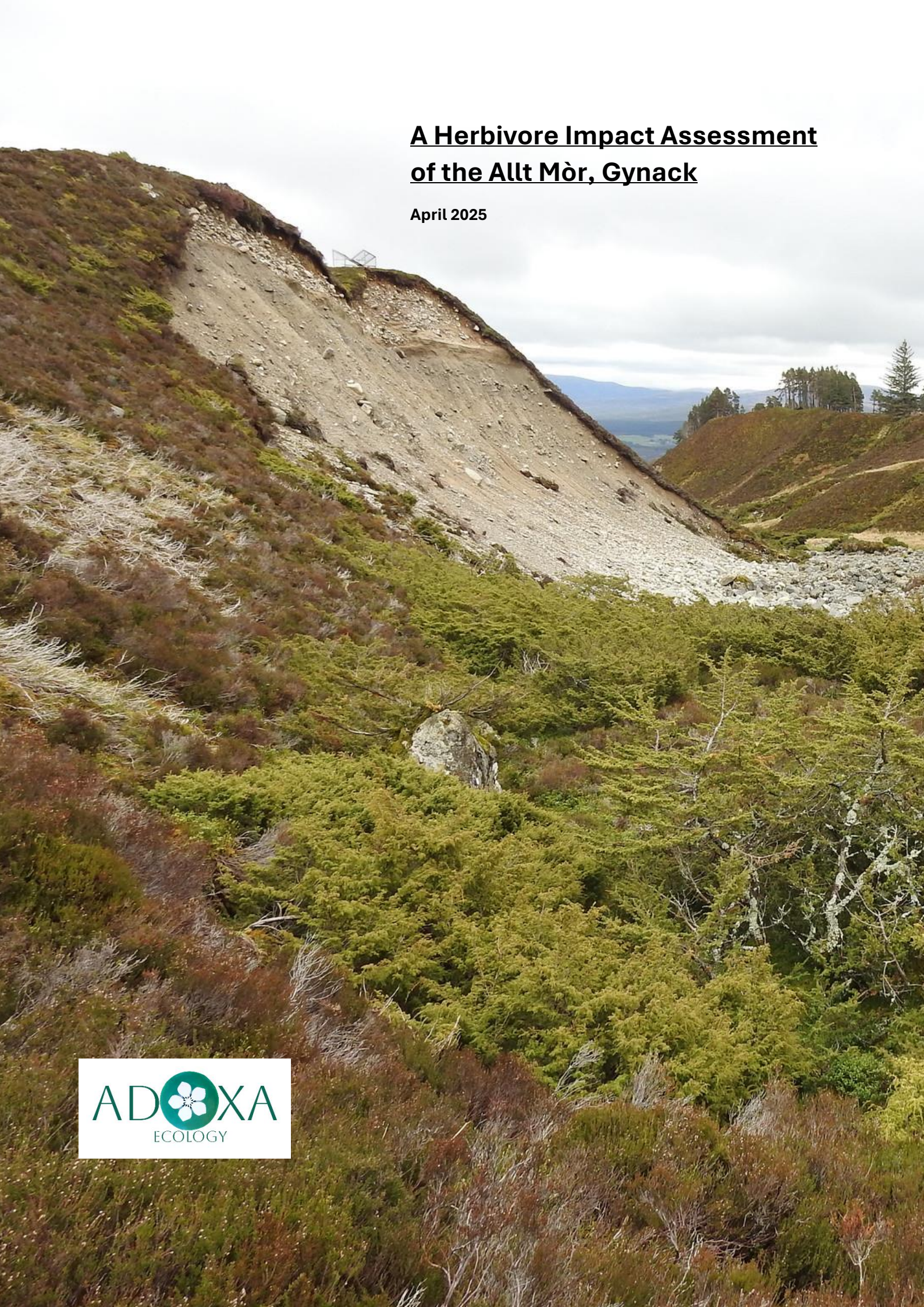
A Herbivore Impact Assessment of the Allt Mòr, Gynack

April 2025



ADOXA ECOLOGY

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1. Introduction

Gus Routledge of Adoxa Ecology was awarded the contract for a herbivore impact assessment on the Allt Mòr, 3km north northwest of Kingussie, by Spey Catchment Initiative (SCI). The aim is to assess browsing/grazing impacts on the vegetation along the Allt Mòr ahead of restoration works to reduce the rate of erosion of the banks. An induction meeting was held online (10th April) with Penny Lawson and Ffion Robb of SCI to discuss the scope of the project, the site itself, proposed methodology, risk assessment and timelines.

The survey itself was carried out on the 28th April 2025 after first meeting with Ffion and Graham Mabon of Pitmain Estate. At the moment the vegetation is typified by dry heath with patches of grassland particularly in the upper area, and quite extensive juniper *Juniperus communis* scrub further downstream, alongside scattered trees such as birch *Betula sp.*, rowan *Sorbus aucuparia* and willows *Salix spp.*. Sheep graze the site as part of the management of the wider area for driven grouse shooting, and red deer do graze the area at the time of survey but a large deer fence is soon to be erected, splitting the site in half where the main track crosses the burn.

2. Methodology

2.1 General

The contract requested 10 plots be surveyed based on what was asked for by NatureScot (who are funding works), but the surveyor added an extra point for good coverage of the site. Results were recorded on an Excel spreadsheet on a Samsung Galaxy Tab Active 2, and navigation of the site was done with a Garmin GPSmap 66S. A 2x2m plot was used for heathland indicators, and the 'distance from destination' function on the GPS was used for woodland indicators to assess an area centred on the plot within a 25m radius.

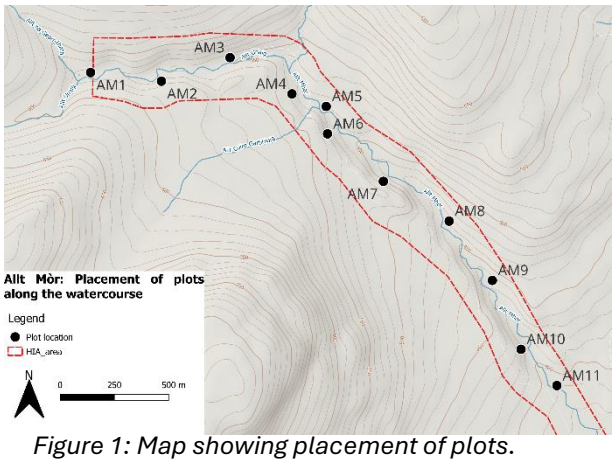


Figure 1: Map showing placement of plots.

Plots were placed along the length of the burn, starting at the top of the site and placing plots on alternating sides of the burn at roughly 330m intervals. Using the GPS to place these points whilst in the field meant plot placement was not influenced by surveyor bias to choose particular vegetation types. Short wooden posts were hammered into the ground, marking where future assessments should be taken from, with the post marking the southwest corner of the 2x2m plot.

Results are displayed in maps as charts are deemed less useful for such a small sample size. All raw data is provided in spreadsheet format (see 'Allt Mòr - Herbivore Impact Assessment results – 280425').

2.2 Heath indicators

Given the most dominant vegetation type along the Allt Mòr is dry heath, this formed the bulk of the assessment. Indicators were taken from MacDonald *et al.* (1998) and assessed both current

impacts and indicators of the trend in herbivore impact within a 2x2m plot. For one plot where the heathland was much reduced and the area more grassy, the smooth grassland indicators were assessed but given this isolated instance of using these, they are not used in the analysis.

Also note MacDonald *et al.* use the term "chronic high/moderate/low" for discussing trends but this has been replaced with "stable high/moderate/low" for clearer communication. Results for the current indicators and trend indicators were totalled separately for each plot and the median value assigned as the overall impact level for that plot.

2.3 Woodland indicators

Given the aim of establishing some more resilient vegetation that may assist in preventing significant erosion, it was deemed important that impacts on the shrubs along the Allt Mòr would also be useful. These were assessed using the Armstrong *et al.* (2023) method.

Given the other vegetation was already being assessed using the dry heath indicators, understory species were not assessed using this methodology. Woodland indicators, in this case trees and shrubs, were assessed in a plot with a 25m radius centred on the middle of the 2x2m plot. Tree species were searched for within this area and any present were assessed for browsing on their basal shoots, epicormic shoots and low branches, and regeneration. The impact on these aspects of each tree species was recorded, and the overall impact on basal shoots, epicormic shoots and regeneration was assigned based on the browsing impact of the tree species assessed, taking into account their palatability. For example, if browsing levels are moderate on unpalatable species then the overall impact is high. The overall impact level for each plot was assigned by taking the median value of each of the indicators.

Regeneration was also assessed in 5.6m radius area centred on the plot, which gives 100m² area allowing results to be multiplied by 10 to give a 'stems per hectare' figure.

2.4 Other information

Photographs were taken at each plot; one showing the plot in context to facilitate refinding the post, one bird's-eye view of the 2x2m plot, and four photos stood over the wooden post facing north, east, south and west. The National Vegetation Classification community was recorded for each plot.

The herbivores responsible for the impacts and the number of dung groups within each plot were recorded; density of herbivores may be roughly calculated using the dung data but this is outwith the scope of this report. Notes were also taken at each plot describing general observations in the field.

3. Results and Analysis

3.1 Overall

The overall current browsing impacts on heathland indicators currently is **moderate/low**, the trend indicators suggest impacts are **stable low**, and impacts on trees and shrubs were deemed to be **high-very high**. It should be noted, however, that for a statistically significant results, 30 plots would need to be assessed. The results of this survey are simply indicative and provide some suggestion as to the impacts on the site from herbivores. 30 plots would likely have been difficult to fit within this size of site.

3.2 Heathland

With current heathland herbivore pressure suggesting moderate/low impacts, it is likely that the heathland vegetation will remain as it is on the site without seeing declines. Heather *Calluna vulgaris* and other moderately palatable dwarf shrubs generally see low browsing impacts with some plants showing impacts, usually just the tips of shoots browsed off, but many being untouched and with a median browsing percentage of between 10 and 25%. The less palatable species such as cowberry *Vaccinium vitis-idaea* mostly show no browsing impacts, and the more palatable blaeberry *Vaccinium myrtillus* does show consistent browsing impacts but these are most often moderate in nature, between 25 and 50% of shoots being browsed on average.

Figure 2: Map showing current herbivore impacts on dry heath within the Allt Mòr.

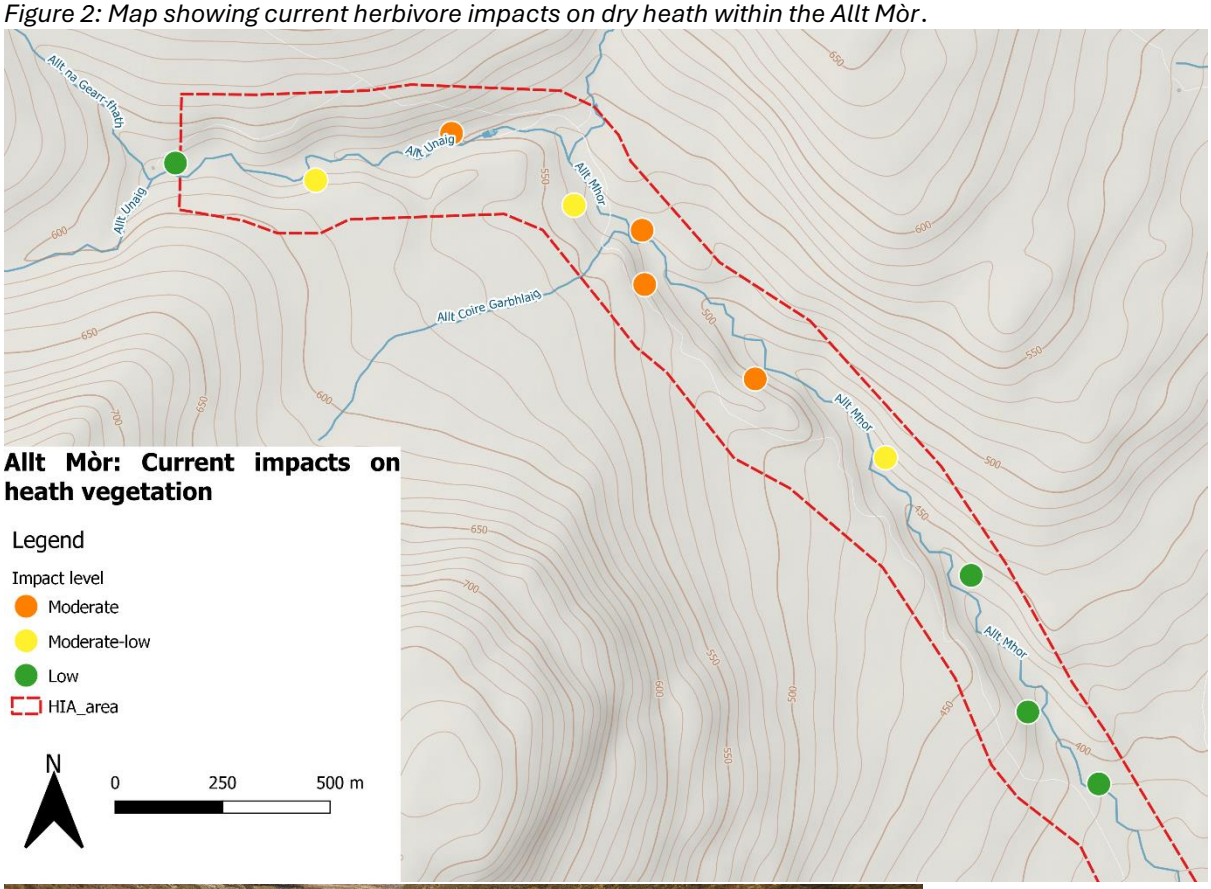
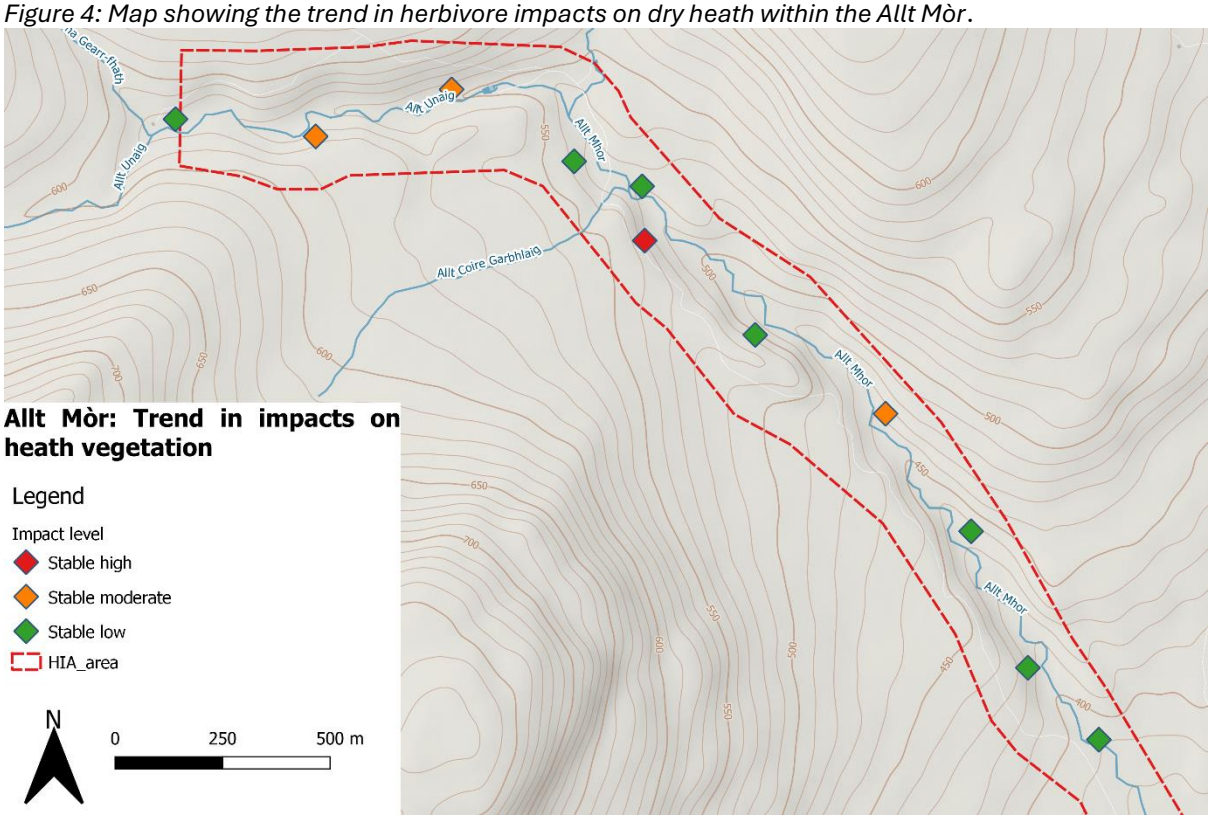


Figure 3: Photo showing a well-worn track used by sheep accessing the bank of the burn for grazing, next to plot AM3.

One indicator that may be of particular interest is that assessing the amount of trampled ground, and the median value for this across plots was moderate, with the surveyor noting localised trampling around seven of the eleven plots. Whilst this trampling was often only moderately impactful (likely caused by sheep as deer are heavier and can cause more serious tramping impacts), this could still have disproportionate effects on already unstable ground or ground where the vegetation cover is reduced from what it currently is, or exacerbate erosion on areas where this is already taking place.

The trend suggests that impacts have been low for the period leading up to the survey with all three trend indicators showing a median value of stable low across the plots. Two plots did show increasing grass coverage which suggests dwarf shrubs are unable to maintain themselves under current pressure, with one of these plots also showing stable high impacts on the dwarf shrubs themselves. This plot, AM6, was also assessed using smooth grassland indicators which showed some moderate impacts; moderate impacts on grassland are not equal to moderate impacts on heathland, instead being more equitable with high or even very high impacts on heathland as the latter cannot tolerate the same level of browsing pressure as grassland can.

Figure 4: Map showing the trend in herbivore impacts on dry heath within the Allt Mòr.



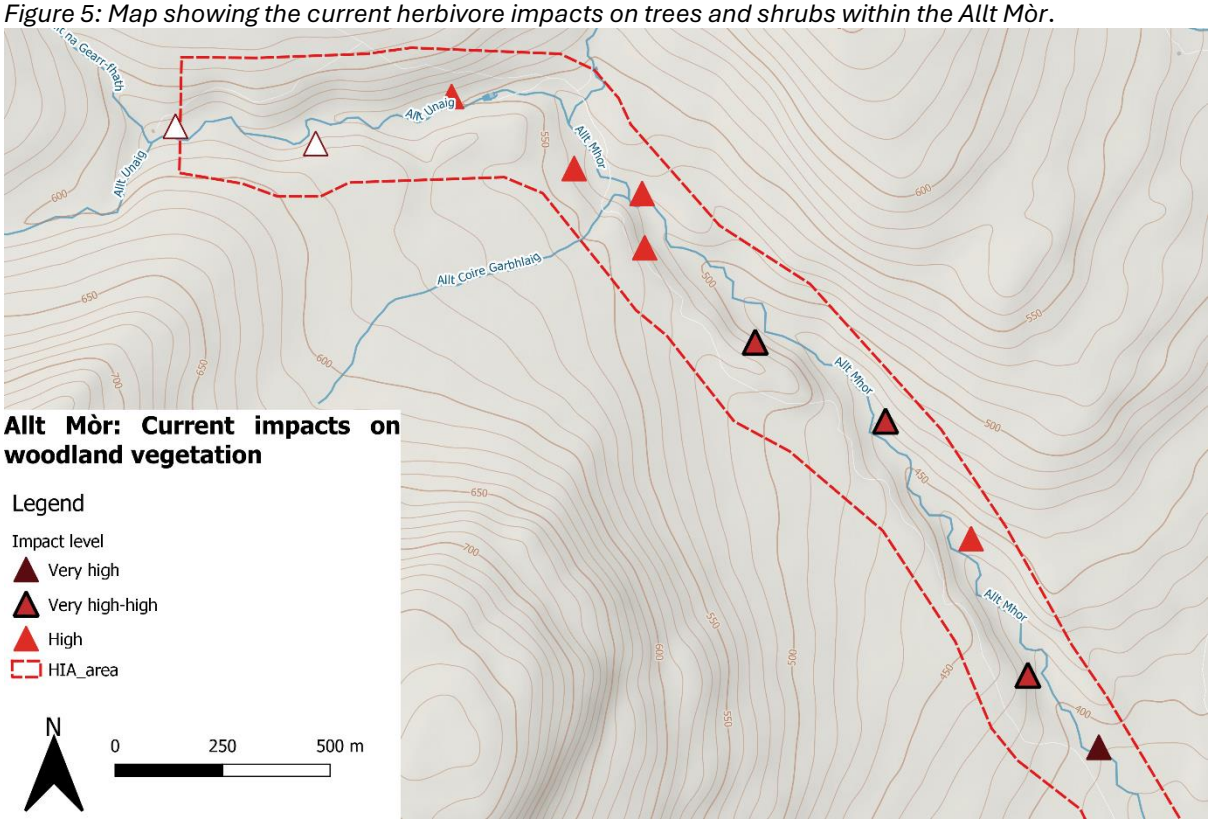
Given sheep will likely preferentially forage in areas of grassland over heathland (Williams *et al.*, 2012), it is unlikely that areas currently covered by grassland will regenerate to heathland (Milligan *et al.*, 2016), and should pressure increase, some of the heathland may convert to grassland. This simplification of the vegetation structure could leave the banks more susceptible to erosion (Capobianco *et al.*, 2021). Whilst grassy vegetation is generally less susceptible to surface erosion (e.g. trampling), it is the woodier vegetation that reduces the chance of landslips according to a review by Lann *et al.*, 2024.

3.3 Woodland features

The woodland HIA showed high-to-very high impacts on shrubs and trees on the site. This may seem conflicting with the heathland HIA results but heathland can be maintained under a higher herbivore pressure than woodland as the vegetation in heaths is more tolerant of browsing; trees need low browsing pressure to regenerate.

This means there is blanket overbrowsing of trees and shrubs; all species, from the very palatable rowan to the unpalatable juniper, are showing browsing pressure. It should be reiterated here, though, that the sample size is not big enough to give a statistically significant result particularly here, where not every plot had trees or shrubs to assess, and some only had a single tree or shrub. The potential here for further establishment of woody vegetation to assist in stabilising the banks of the burn still is likely to be low. If the very unpalatable, non-native Sitka spruce *Picea sitchensis*, which was regenerating quite prolifically in one section of the burn, is seeing high browsing impacts on seedlings and saplings then it is unlikely that any native species will be able to establish.

Figure 5: Map showing the current herbivore impacts on trees and shrubs within the Allt Mòr.



3.4 Regeneration

Additional to the herbivore impact assessment on woodland features, a regeneration survey was carried out across all plots. Regeneration is generally quite low but does show the potential for moderate natural regeneration within the Allt Mòr gorge and on its floodplain. Species diversity is what one might expect from such a site with native species including rowan, juniper, birch and willow, plus Scots pine *Pinus sylvestris* from plantations as well as non-native conifers including Sitka spruce and Norway spruce *Picea abies*. The maps also demonstrate that not many individuals are getting above 50cm in height which is often the height of the

surrounding heathland, further suggesting browsing levels are too high for establishment. Most regeneration is situated in the lower two thirds of the site, downstream of the bridge.

Pigure 6: A map showing the amount of regeneration of native trees and shrubs under 50cm tall.

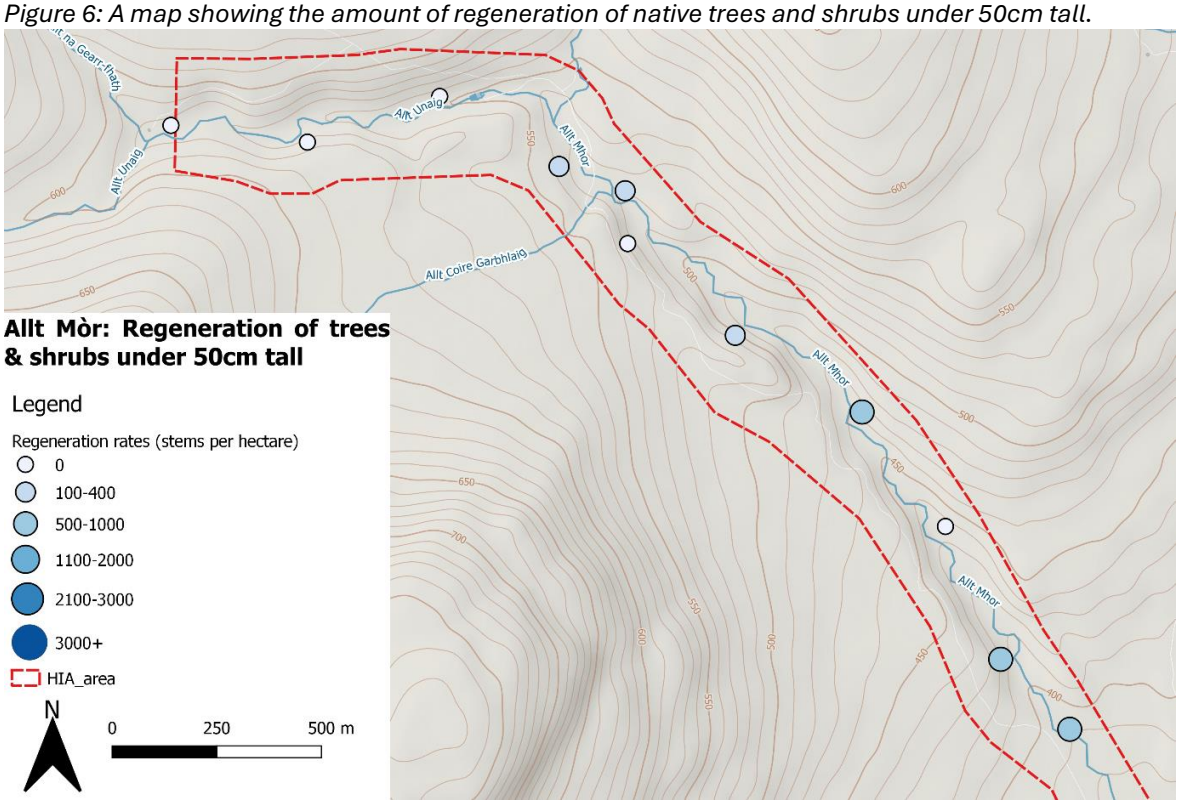
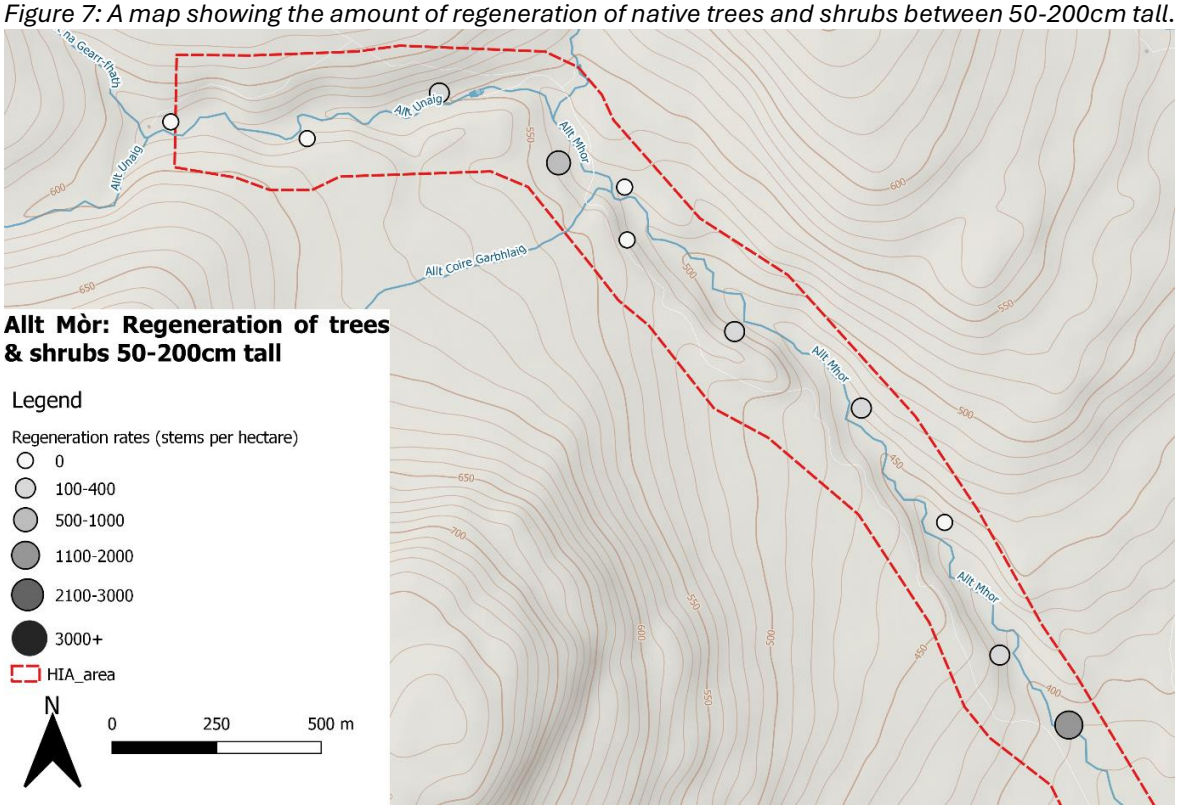


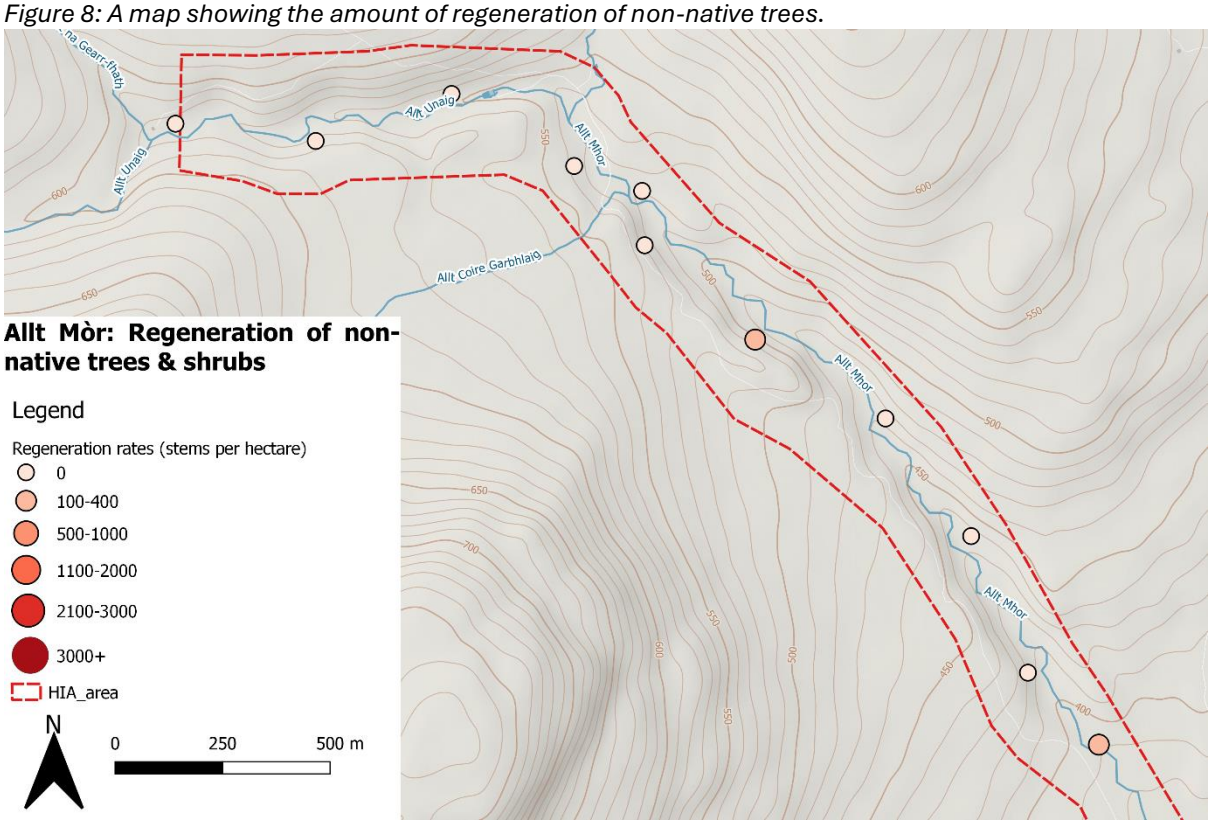
Figure 7: A map showing the amount of regeneration of native trees and shrubs between 50-200cm tall.



The survey also shows that non-native regeneration is occurring on the lower reaches of the burn, with large numbers of Sitka spruce seedlings and saplings occurring both on the slopes

and on the bouldery debris beside the burn. There is a risk that, if herbivory is reduced to a small degree, then these very unpalatable species will be able to establish whilst more palatable, native species will not be able to, promoting the successful establishment of these non-native species. The surveyor could see that most, if not all, the Sitka spruce had been felled from the small plantation above the burn on its south side, and it is assumed these seedlings and saplings are a legacy from that rather than still seeding in though it is entirely possible that seeds may blow in from further down the catchment.

Figure 8: A map showing the amount of regeneration of non-native trees.



4. Future management

It is understood the main aims of the project are:

- to stabilise the banks, especially the main erosion scars
- to reduce the amount of sediment running down the watercourse (particularly in high-flow events)
- establishing woody vegetation including to assist slope stabilisation of main erosion scars and surrounding slopes at risk of erosion
- increases in biodiversity.

The herbivore impact assessment suggests current impacts are too high to allow further establishment of woody vegetation, and it is possible that heathland would struggle to recover if it were lost from the ground it covers currently, even if the current vegetation cover is stable. It may be advisable to avoid burning on these steep slopes, particularly if sheep are going to be accessing them, as doing so could encourage new erosion scars to form. Burning such areas could be deemed against the Muirburn Code (NatureScot, 2021) in multiple ways including burning on steep slopes, or burning close to waterbodies.

Establishing new areas of woody vegetation is likely to require some exclusion of herbivores from these areas. The juniper scrub already provides this to some degree but the sheep can still gain access to its understory to browse seedlings that try to establish.

One of the most certain ways to ensure vegetation recovery in the gorge and on the reprofiled erosion scars would be to exclude livestock totally. Alongside the deer fence already being put in place, this would greatly reduce the pressure on the vegetation and will mean areas of heath should spread or recover, and regeneration of woody species such as juniper and willow are much more feasible. Aside from stock fencing the entire gorge, small stock exclusion "pens" could be erected along the burn to begin the process of establishing scrub such as around the reprofiled erosion scars, but this could be difficult beside the watercourse which is liable to spate with strong currents. These small exclosures have been used somewhat effectively in riparian planting schemes but do require ongoing monitoring and potential future adjustments to management to ensure success; the author has seen such schemes totally failing, even with both wooden exclosures and tree tubes being used, seemingly due to the high numbers of deer that are too hungry to pass up on the opportunity to browse newly-planted trees.

Judging by the species already present, mixes including juniper and eared *Salix aurita* or grey willow *S. cinerea* to establish a shrubby "nursery" may prove more effective than establishing more upright trees such as rowan and birch (Hegland *et al.*, 2021). Willows in particular have been shown to be effective in enriching soils and producing conditions that encourage further vegetation succession through producing leaf litter, providing shelter and binding soil (Rahmonov, 2016), and can also facilitate establishment of other trees through establishing mycorrhizal networks (Martius *et al.*, 2025).

Gorse *Ulex europaeus* and, to a lesser extent, broom *Cytisus scoparius* can also be used in this way though often these are best left to establish themselves as they find their niche, on recently disturbed ground, quite readily themselves (Gaynor & MacCarter, 1981). Perhaps some seed scattering of these species in areas of recently-disturbed ground would increase the chance of establishment but some prefer to limit the spread of gorse, particularly as fire promotes its establishment and the surrounding landscape is subject to burning on a relatively regular basis (Cárdenas-Cárdenas & Cortés-Pérez, 2023).

Natural regeneration would be a more preferable approach as this maintains genetic diversity; reduces the risk of pathogens (e.g. *Phytophthora austrocedrae* on juniper (Donald, 2022)); ensures species establish in the most natural of circumstances; reduces the economic and environmental cost of sourcing, growing, planting, treating and protecting the plantings; and encourages long-term, holistic, ecosystem-focused management of the site. The area is also clearly capable of natural regeneration as all species are attempting to do so but are being browsed too heavily to establish.

It is understood that natural regeneration may not be compatible with current land management practices, in which case planting should be done in as unobtrusive way as possible, preferably with just a small cross cut into the soil with a spade and the seedling/sapling planted in the centre, rather than any form of mounding or breaking up of the soil surface. Shrubs to be planted would ideally be sourced from as close to the site as possible and grown as close to the site as possible too. Willow lends itself to this as cuttings can be taken and grown on, though growing on from seed, which is relatively easy to collect, can yield much higher numbers of shrubs for planting back into the environment.

Figure 9: The Allt Mòr already hosts a good mix of woody species suitable for naturally regenerating into areas currently bereft of such vegetation including juniper, willows, birch and rowan.

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