Ecological Baseline Survey

prepared for

Glasnamullen Commonage

as part of the Commonage Management Plan for SUAS

Final Report

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1. Introduction

This commonage extends from the lower slopes of Glasnamullen townland at 360m west to the ridge between the summits of Djouce Mountain and White Hill as shown on **Figure 1** below. It encompasses the eastern sides of the summits of Djouce Mountain (733m) and White Hill (635m) and the col and ridge between them both. The slopes of the commonage are known locally as Barrack Hill. Lands within the commonage are partly under the ownership of the state and are included within the boundaries of the Wicklow Mountains National Park, whilst other areas are owned by the Powerscourt Estate. The lands within the commonage are of international importance for the habitats and species they contain and hence are included within the boundaries of the Wicklow Mountains SAC and Wicklow Mountains SPA.

Plate 1. Looking upstream towards the summit of Djouce Mountain.

The Glasnamullen Stream (also known locally as Barrack River) rises within the site almost bisecting the commonage and a smaller watercourse (known locally as the Ballinastoe Stream) is found along the southern boundary of the commonage where it adjoins the Ballinastoe Woods, which are owned by Coillte. Both of these watercourses are tributaries of the Vartry River, which feeds the Vartry Reservoir and as such form part of the drinking water supply for North County Wicklow and Dublin.

This area contains both schistose and granitic rocks with the summit of Djouce culminating in a number of bare tors of schist. The remaining solid geology of the back of Djouce and War Hill is granitic with one notable feature being The Coffin Stone, which is a very large granite boulder set amongst a field of smaller glacial erratics on the north-west flanks of the mountain. The ridge from the summit of Djouce to White Hill has significant outcrops of metamorphic rock along its west-facing side known as the Black Crag (Fox Rock).

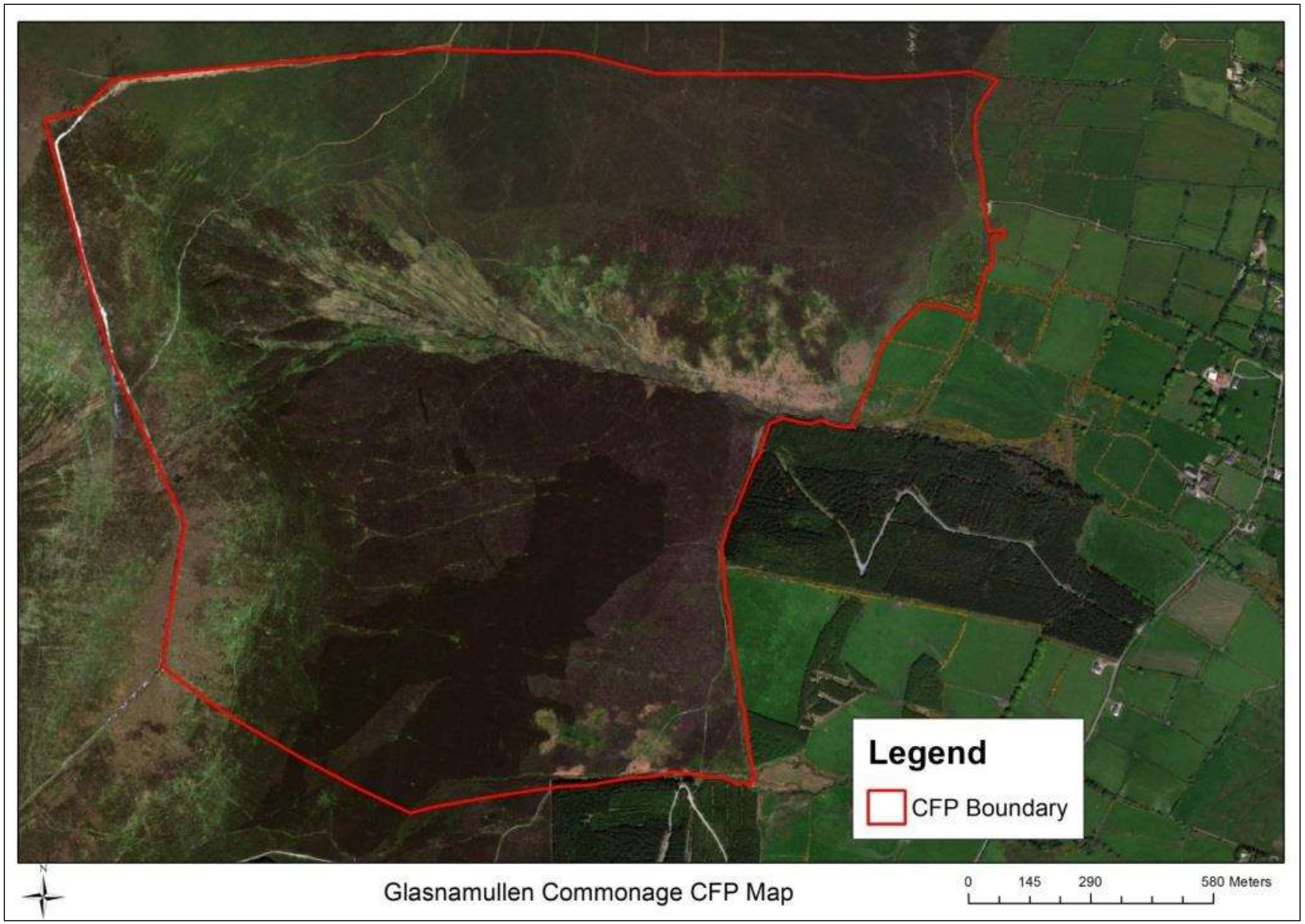

Figure 1. Glasnamullen Commonage.

The commonage is owned by the Powerscourt Estate and National Parks and Wildlife Service. Five local farmers have grazing right on the commonage as do Coillte (who do not exercise that right). They are: George Power, Tobias Power, Johnny Power, Richard Turner and Peter Molloy.

This commonage was assessed as part of the joint NPWS/Department of Agriculture commonage framework plans, which were drawn up in the early 2000s as shown on **Figure 2** below. This assessment identified that the commonage was generally undamaged but that some destocking (4.82%) was required to allow recovery in some affected areas. The habitats were roughly classified in the commonage framework plan as wet heath, dry heath, acid grassland or a mosaic of each.

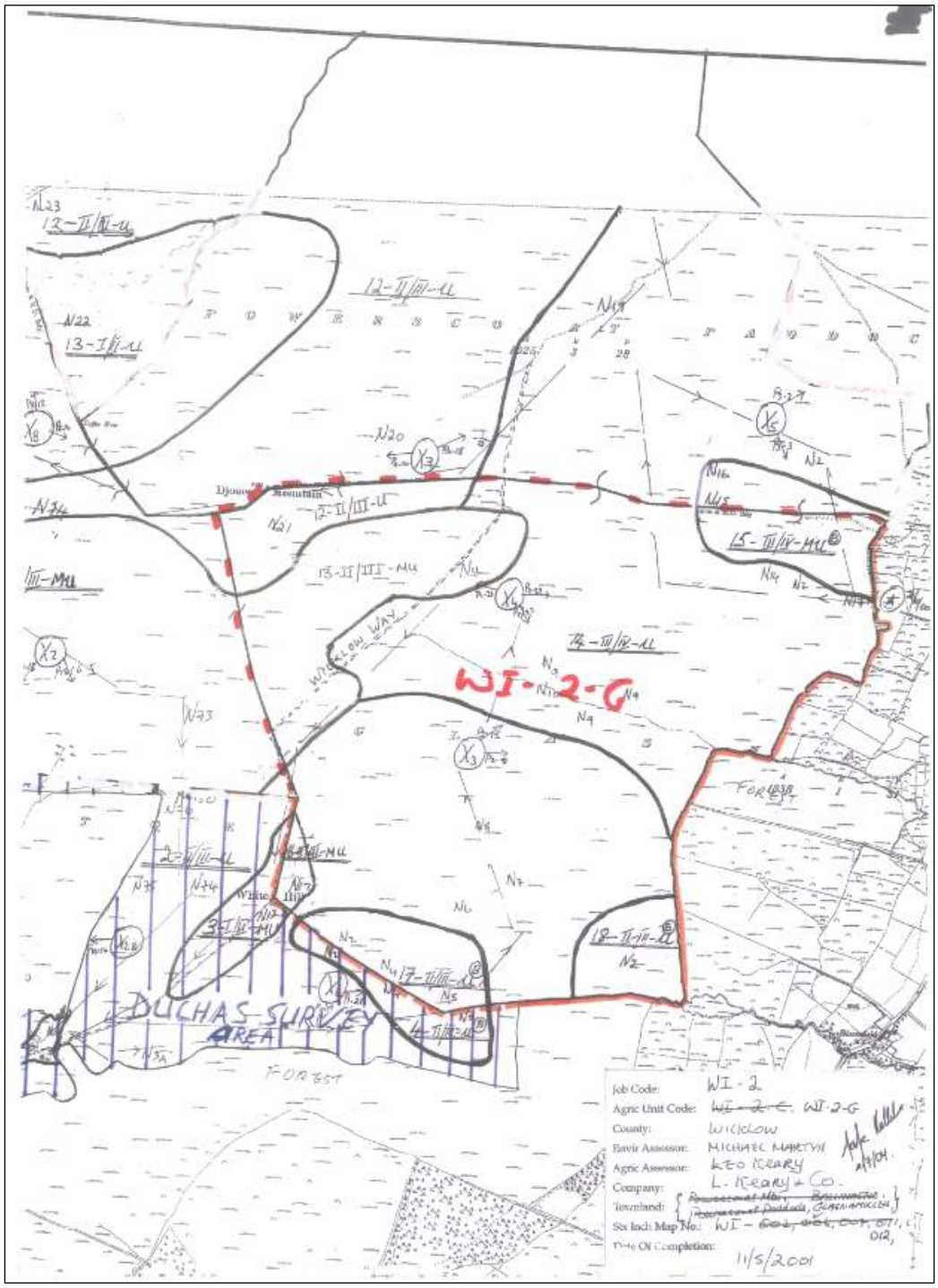

Figure 2. Commonage Framework Plan Map (2001).

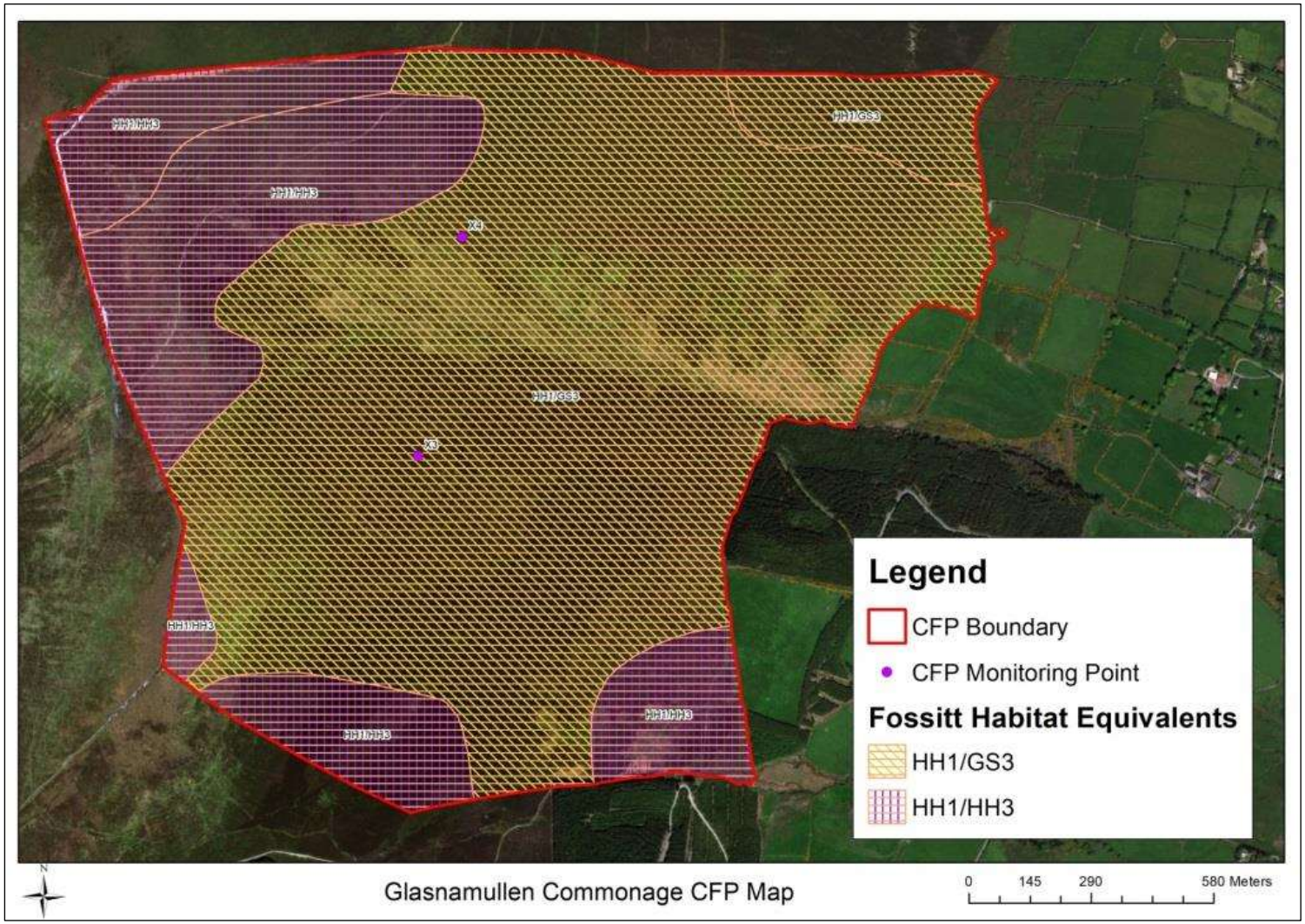

Figure 3. Commonage Framework Plan Habitat Map showing monitoring locations (X3 and X4). (HH1 – Dry Heath, HH3 – Wet Heath, GS3 – Acid grassland).

2. Receiving Environment - 2018

2.1 Habitats Present

Under Fossitt's (2000) habitat classification scheme the dominant habitat within the Glasnamullen commonage is that of **Dry Heath (HH1)** (which corresponds to the Annex I habitat **4030 Dry Heath**). This habitat is dominated by ling heather (*Calluna vulgaris*) with occasional bell heather (*Erica cinerea*) and less frequently bilberry (*Vaccinium myrtillus*). This habitat is found to the north and south of the Glasnamullen Stream where the slopes are gentle and on the lower slopes of the commonage.

Plate 2. The Glasnamullen Stream rises on the slopes of Djouce Mountain. South of the stream is dominated by dry heath, whereas acid grassland and bracken is found on the northern slopes with wet heath, wet grassland and poor fen and flush in the upper sections.

This habitat has been subject to uncontrolled burns in the past on the lower slopes (see **Appendix 2**) as evidenced by the condition of the vegetation and the National Parks and Wildlife Service history of site management files. However much of the ground to the south of the stream has very tall dense leggy heather, which does not appear to have been burnt in recent years.

Interspersed through the areas of dry heath, particularly on the slopes immediately either side of the Glasnamullen Stream are localised areas of **Acid Grassland (GS3).** Small areas are damper/wetter and here heath rush (*Juncus squarrosus*) and cross leaved heath (*Erica tetralix*) are common indicating **Wet Heath (HH3**) (which corresponds to the Annex I habitat **4010 Northern Atlantic Wet Heaths with *Erica tetralix***) with occasional localised flushes rich in sedges. The open mosaic of acid grassland and wet/dry heath is maintained in this location by grazing. Red grouse were recorded in this area.

The Glasnamullen Stream is described as an eroding upland river (FW1) and has little in the way of any instream vegetation. At one location near the bottom of the slope along this watercourse is a single oak tree which gives an indication of how wooded this upland valley could be in the absence of grazing and burning, should a seed source for tree re-establishment be available.

The upper slopes of the valley particularly on the northern side of this watercourse are flushed in places corresponding to the habitat **Poor Fen and Flush (PF2)** and in some areas rushes dominate corresponding to the habitat **Wet Grassland (GS4).** Flushed areas have several species of sedge

(carnation sedge (*Carex panicea*), common sedge (*Carex nigra*), glaucous sedge (*Carex flacca*), star sedge (*Carex echinata*) and common yellow sedge (*Carex demissa*)), along with species such as lesser spearwort (*Ranunculus flammula*), sharp flowered rush (*Juncus acutiflorus*), marsh lousewort (*Pedicularis palustris*), tormentil (*Potentilla erecta*), marsh violet (*Viola palustris*), marsh pennywort (*Hydrocotyle vulgaris*), bog cottons (*Eriophorum angustifolium*, *E. vaginatum*), bog pondweed (*Potamogeton polygonifolius*), Marsh St. John's-wort (*Hypericum elodes*) and Sphagnum mosses (*Sphagnum capillifolium* and *S. papillosum*). These flushed areas merge into areas of **Wet Heath (HH3)** and **Wet Grassland (GS4)**. Sheep regularly forage and congregate in this sheltered part of the hill.

The underlying geology of the Djouce Mountain and the White Hill peaks is illustrated by the relatively lush growth of **Montane Heath HH4** (which corresponds to the Annex I habitat 4060 Alpine and Boreal heath) and upland acidic grassland on the sheltered, south-eastern flanks of Djouce and the significant areas of metamorphic rock at its summit and ridge to White Hill.

Areas of acid grassland often form a mosaic with dry heath and exposed rocks are frequent in some areas. Species typically recorded include ling heather, with occasional bell heather, scattered bilberry, heath bedstraw, sheep's fescue, common bent, tormentil, and sheep's sorrel (*Rumex acetosella*).

Plate 3. Looking downstream along the Glasnamullen Stream. Note the presence of an oak – an indicator of potential woodland in the absence of grazing and burning.

The upper slopes of the commonage on Djouce Mountain are dominated by **Montane Heath (HH4)** with frequent crowberry (*Empetrum nigrum*) growing though a sward of ling, heath rush, and heath bedstraw (*Galium saxatile)*. Interspersed with this and on the ridge the montane heath forms a mosaic with areas of montane grassland with frequent mat grass (*Nardus stricta*), sheep's fescue (*Festuca ovina*) and the mosses *Rhytidiadelphus squarrosus, Polytrichum commune,* and *Dicranum* spp. The wooly hair moss (*Racomitrium lanuginosum*) is rare and alpine species which were historically recorded from Djouce such as fir clubmoss (*Huperzia selago*), stag's-horn clubmoss (*Lycopodium clavatum*), and dwarf willow (*Salix herbacea*) have declined or were not refound.

Plate 4. The track along the northern side of the Glasnamullen Stream avoids the wet flushed areas.

Plate 5. Areas of dry heath and grassland form a mosaic of habitats north of the Glasnamullen Stream. The open areas of grassland are maintained by grazing.

The Wicklow Way walking route, which is extremely popular, passes through the upper portions of the commonage and the rough track here is very eroded in portions.

The schist tors on Djouce summit which are N-facing support a small area of habitat, which corresponds to the Annex I Habitat **Siliceous Rocky Slope (8220)** below these is a very short turf mixture of **Montane Heath (HH4)** and **Dry-humid Acid grassland (GS3).** The alpine species dwarf willow is limited to the tors where browsing pressure is lessened.

Plate 6. The dry heath on the northern side of the commonage, adjacent to Powerscourt Paddock, is bisected by the Wicklow Way walking track.

Plate 7. The severely eroded track leading up to the summit of Djouce Mountain.

Plate 8. Looking south towards White Hill from the shoulder of Djouce Mountain. The areas of upland blanket bog and dystrophic pools can be seen in the distance.

A small area of eroding **Upland Blanket Bog (PB2)** is found in the col between White Hill and Djouce adjacent to the track. Here the surface is dominated by mostly by bog cottons (*Eriophorum* sp.), deer grass (*Trichophorum cespitosum*) and ling heather. A small area of tear pools (**Dystrophic pools (FL1)**, which correspond to the Annex I Habitat **3160 Natural Dystrophic Lakes and Ponds**) is also present. This section of the Wicklow Way is crossed by a boardwalk constructed of railway sleepers to protect the habitat.

Plate 9. Areas of montane heath and upland blanket bog between White Hill and Djouce Mountain are traversed by the raised boardwalk created by NPWS to protect the sensitive habitat.

Plate 10. Areas of montane heath with cowberry (*Empetrum nigrum*) and ling heather (*Calluna vulgaris*).

The Annex I habitats present within the commonage include:

- 3160 Natural Dystrophic Lakes and Ponds
- 4010 Northern Atlantic Wet Heaths with *Erica tetralix*
- 4030 Dry Heath
- 4060 Alpine and Boreal Heath
- 7130 Blanket Bog
- 8220 Siliceous Rocky Slopes (on the tors on Djouce Mountain)

Plate 11. Junction of the Wicklow Way track and the track Djouce summit looking south west towards Luggala.

Plate 12. Looking south east over the commonage from the slopes of Barrack Hill towards the Vartry Reservoir.

Plate 13. Self-seeded Sitka spruce becoming established on the hillside.

2.2 Rare Plants

The ridge between White Hill and Djouce Mountain and the ridge towards War Hill were surveyed as part of The Montane Flora of County Wicklow[1], which was conducted in 2008 by Dr Tom Curtis and Faith Wilson. The results of the report for Djouce Mountain and War Hill are presented in full **Appendix 1**.

Of the montane specialist plant species previously recorded by Brunker in the Flora of County Wicklow (1950) from this area (these were ***Lycopodium clavatum, Huperzia selago, Salix herbacea, Vaccinium vitis-idaea, Vaccinium myrtillus, Empetrum nigrum*** and ***Listera cordata***) only ***Salix herbacea, Vaccinium vitis-idaea, V. myrtillus*** and ***Empetrum nigrum*** were recorded in 2008**.** 4 of the 7 alpine plants noted from the area historically were re-located in 2008, the rarest being dwarf willow, several new populations of which were noted. There was an absence of club-mosses in the areas of montane heath and it was proposed that these have been lost as a result of trampling. No new populations of these montane species were recorded in 2018.

Other rare plant species recorded from the 10km squares in which this commonage is located (O11) include:

- Bog orchid (*Hammarbya paludosa*)
- Small white orchid (*Pseudorchis alba*)

Neither of these orchids is known from the Djouce Mountain area based on historic records.

Plate 14. Tall leggy ling heather (c.1m high) dominates much of the central southern portion of the commonage. The area previously burnt can be seen by the change on colour of the heath vegetation (indicated by the red arrow).

[1] T.G.F Curtis and F. Wilson (2008). The Montane Flora of County Wicklow. A survey funded by the Heritage Council. Unpublished report.

2.3 Rare Fauna

The commonage is within the known range of Merlin (*Falco columbarius*), which breed outside the commonage in the Wicklow Mountains but hunt within it. There have been recent sightings of Merlin including in 2018 and 2016.

The Irish hare (*Lepus timidus* subsp. *hibernicus*) would be expected and large herds of deer (red/Sika hybrids) graze the commonage. The following species were recorded during this survey; Common Frog (*Rana temporaria*), Fox (*Vulpes vulpes*), Snipe (*Gallinago gallinago*), Red Grouse (*Lagopus lagopus*) in the adjacent commonage, Wheatear (*Oenanthe oenanthe*), Meadow Pipit (*Anthus pratensis*) and Raven (*Corvus corax*). Common Lizard (*Zootoca vivipara*) and Snow Bunting (*Plectrophenax nivalis*) have also been recorded from here in previous years (pers. obs.).

Scarce species occur such as Dotterel (*Charadrius morinellus*) which was recorded on Djouce Mountain in 2010 and Ring Ouzel (*Turdus torquatus*) in 2011 (Source: www.irishbirding.com).

Downstream of the commonage within the main channel of the Vartry River below the reservoir is a population of Freshwater pearl mussel (*Margaritifera margaritifera*). There have been no recent surveys of this population by National Parks and Wildlife Service, the population is known from historic records. Other fauna known from the Vartry River include Otter (*Lutra lutra*), Freshwater Pearl Mussel (*Margaritifera margaritifera*), Atlantic salmon (*Salmo salar*) and Brown trout (*Salmo trutta*).

2.4 Fisheries and Water Quality

The commonage is located within the Eastern River Basin District within the Ovoca-Vartry catchment (10) and the Vartry Sub Catchment (Vartry_SC_010). Two headwater streams of the Varty River rise within the commonage. These are the Glasnamullen Stream (River Code IE_EA_10V010050, also known locally as Barrack River) and a smaller watercourse (known locally as the Ballinastoe Stream). The Ballinastoe Stream joins the Glasnamullen Stream which then meets the Vartry River just upstream of Ballinastoe Bridge. Recent water quality monitoring by the EPA/Wicklow County Council at Ballinastoe Bridge downstream of the commonage indicates that the Vartry at this location is assigned a Q value of 4-5, which has declined from the 1990s when Q values of 5 were recorded (see **Table 1** below). Both these water courses are deemed as being 'High Status' watercourses. The Vartry River supplies the main drinking water supply for North Wicklow and South Dublin and is impounded at the Vartry Reservoir where water extraction and treatment occurs at the plant operated by Irish Water. Water quality within this river and it's headwaters are therefore of utmost importance.

Table 1. Water Quality values for the Vartry River at Ballinastoe Bridge (1990 – 2015).

Water Quality Monitoring Results								
1990	**1994**	**1997**	**2000**	**2003**	**2006**	**2009**	**2012**	**2015**
5.0	4.5	5.0	4.5	4.0	4.5	4.0	4.5	4.5

The main channel of the River Vartry is a Salmonid Watercourse under the EU Freshwater Fish Directive. The Directive was transposed into Irish law in 1988 through the European Communities Regulation on Quality of Salmonid Waters (S.I. No. 293/1988). The Regulation designates waters in order to protect and improve "Salmonid Waters." Salmonid waters must be able to sustain Atlantic salmon (*Salmo salar*), trout (*Salmo trutta*), char (*Salvelinus*) and whitefish (*Coregonus*). The Vartry River is one of only 22 watercourses in Ireland designated under this legislation.

Under the Water Framework Directive the Vartry Reservoir Lower (waterbody) was deemed at risk of not achieving 'good' status by 2015 due to impoundments while the River Vartry itself, which is currently at good status is at risk of not achieving 'good' status by 2015 due to impoundments and water abstraction.

2.5 Recreation

The commonage provides access to the Wicklow uplands and is used by large numbers of hill walkers particularly at the weekends. A well-used and worn track (the route of the Wicklow Way) leads from Crone Wood in the Glencree valley above the Powerscourt Waterfall through the adjoining commonage to the north (Powerscourt Paddocks) where it travels across the eastern flank of Djouce (Paddock Hill) to the head of the Glasnamullen River in Mason's Glen (bypassing the summit of Djouce Mountain) to Fox Rock and then south along the ridge to White Hill and on to the car park on the R759 above Lugalla estate.

There are a number of other well-worn paths through the commonage including one from the Coillte woods at Glasnamullen through Mason's Glen to the Wicklow Way and one on the lower slopes of the commonage that contours across towards the woods at Ballinastoe.

The tracks leading to the summit of Djouce from the Wicklow Way on both the north eastern and southern sides are significantly eroded despite some attempts at intervention in the past by National Parks and Wildlife Service in collaboration with the Mountain Meitheal group.

Parts of the slope here have been fenced off to allow recovery and there are notices explaining why this has been done.

3. 2018 Ecological Assessment

3.1 Field Survey

Following the background review and desktop research the site was visited in October 2018 when the extent of habitats present within the commonage and their affinities to either Fossitt (Level 3) or Annex I habitats were mapped as shown on **Figures 4, 5** and **6** below and as described above.

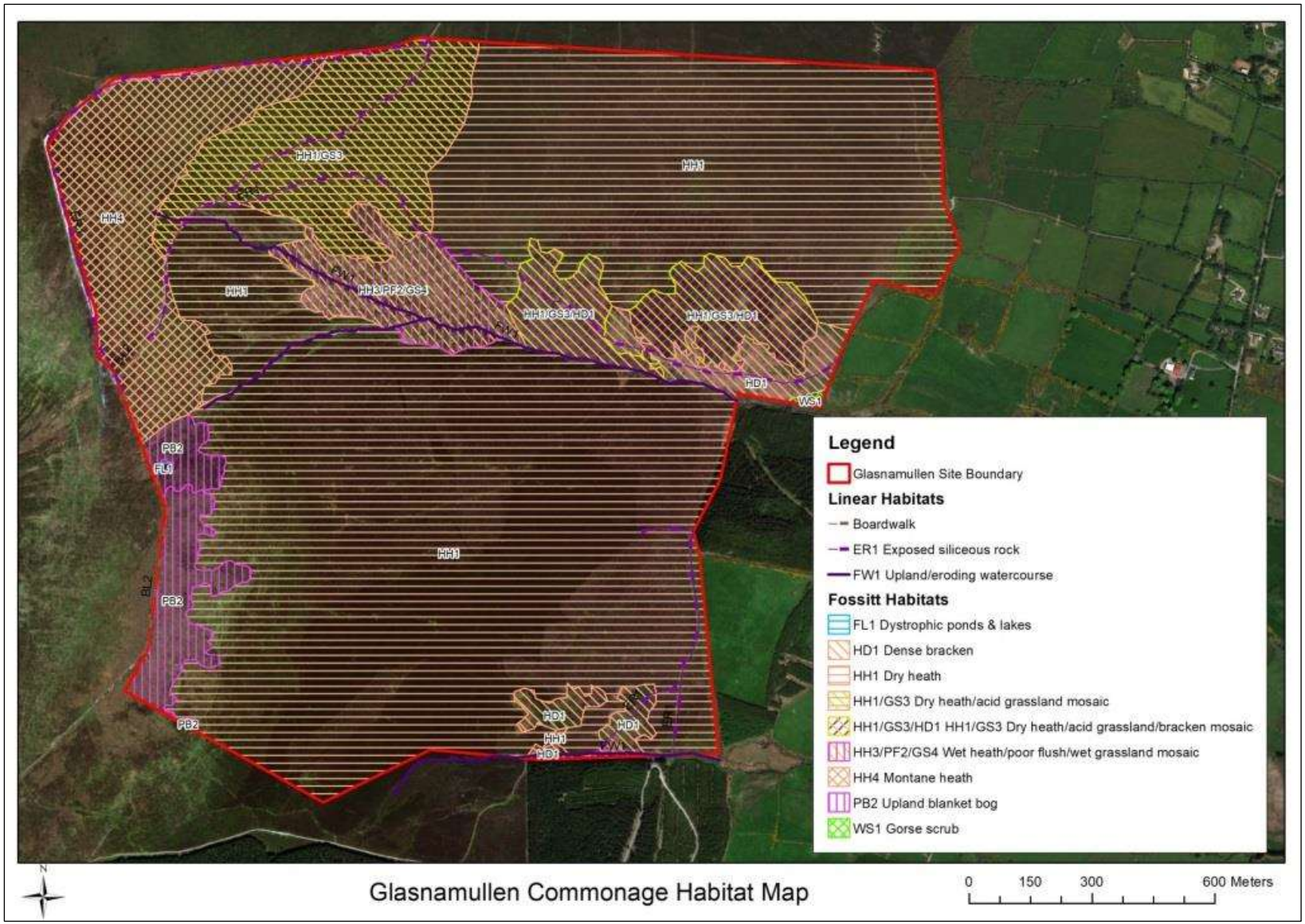

Figure 4. Habitats mapped to Level Three (Fossitt, 2000) within the Glasnamullen commonage.

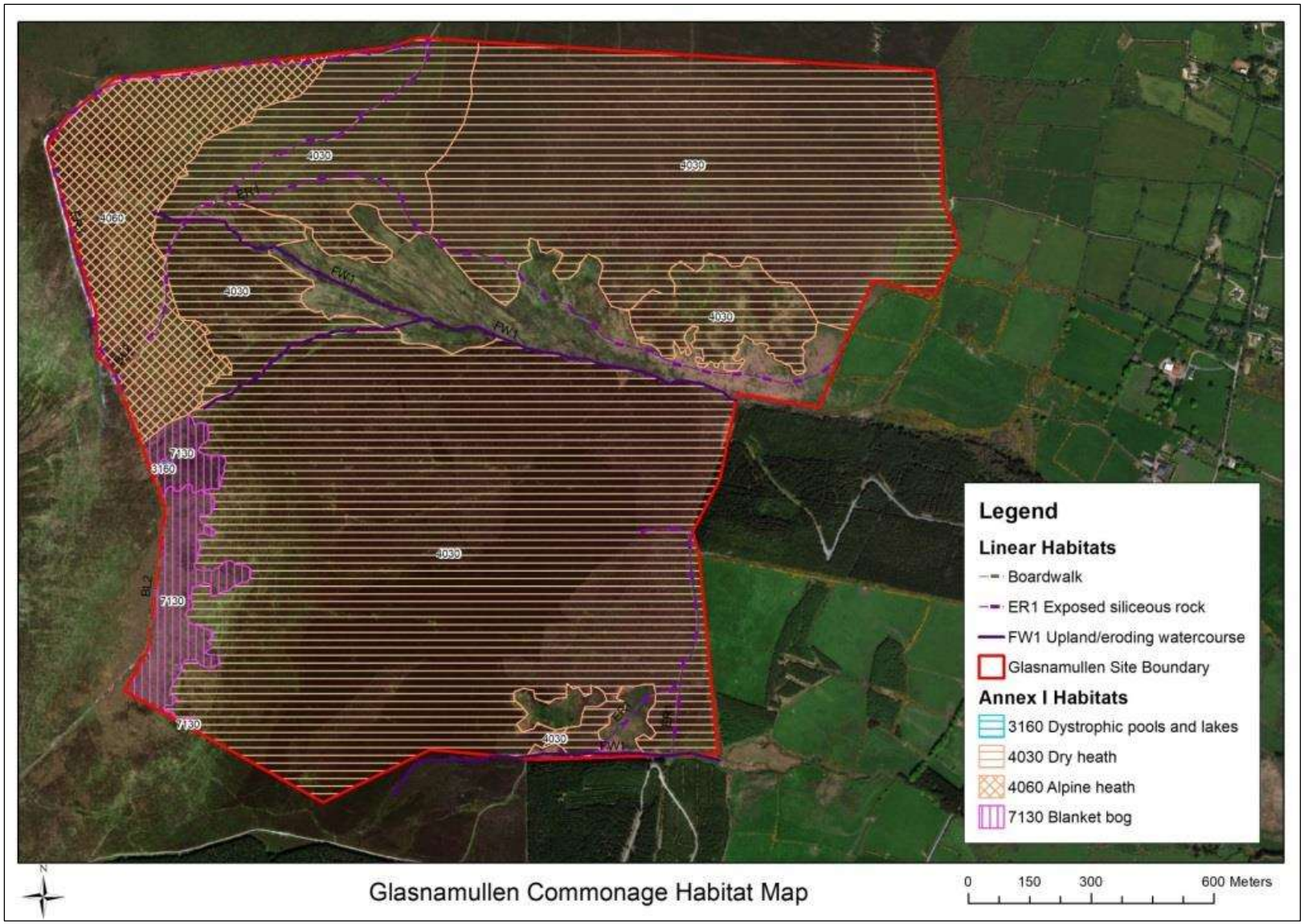

Figure 5. Habitats mapped according to their correspondence with Annex I habitats within the Glasnamullen commonage.

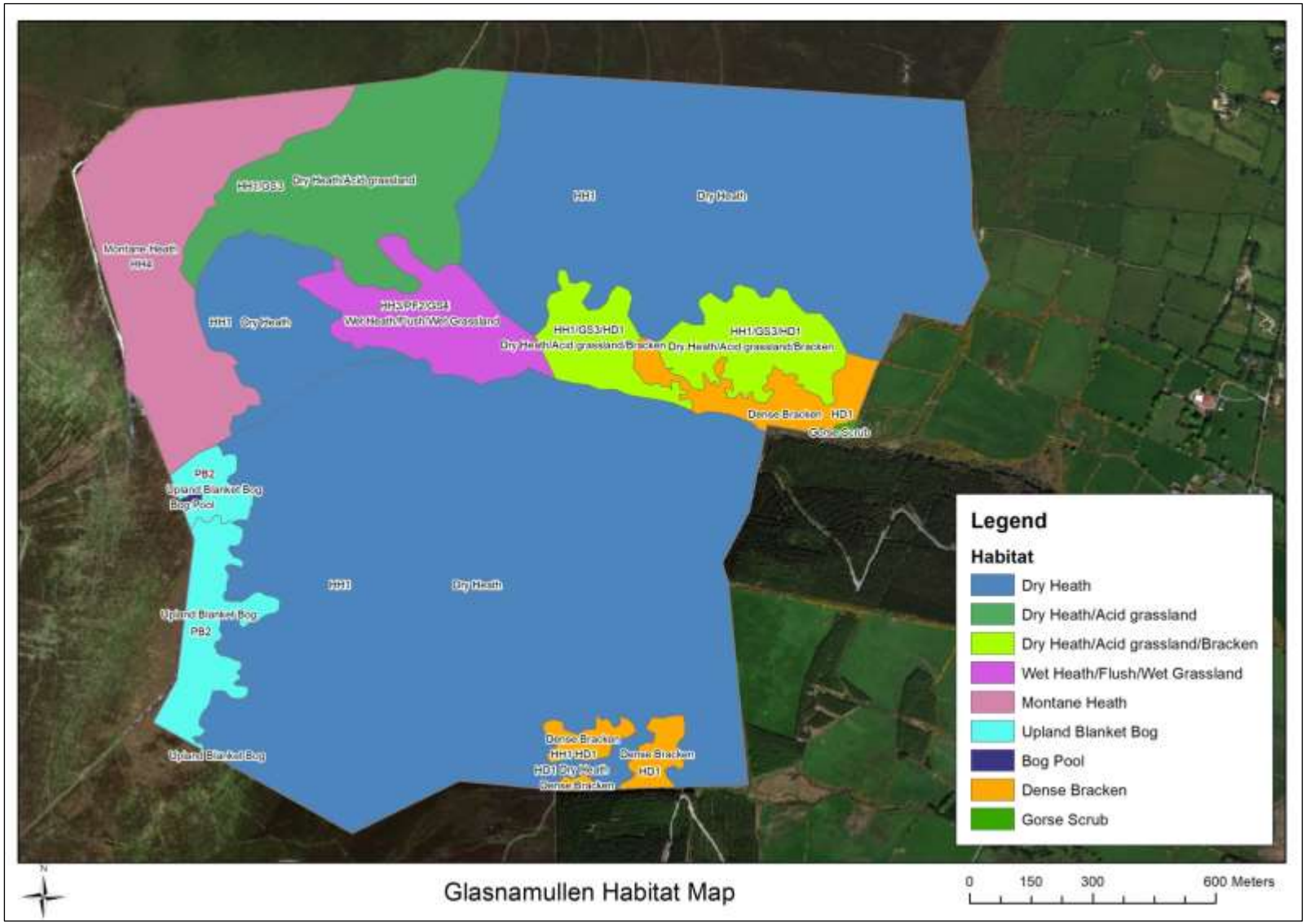

Figure 6. Habitats mapped using general vegetation descriptions.

3.2 Habitat Condition Assessments

A standardised protocol for assessing the habitat condition of those habitats listed under Annex I of the EU Habitats Directive was developed at EU level. Member states across the European Union must conduct monitoring of the habitats in their jurisdiction and report on the national condition of each habitat under Article 17 of the EU Habitats Directive on a six year basis.

The conservation status of a habitat is defined in Article 1 of the EU Habitats Directive as the sum of the influences acting on a natural habitat and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species.

The conservation status of a natural habitat will be taken as favourable when:

- its natural range and the areas it covers within that range are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The Overall Conservation Status Assessment for each habitat is listed as either:

- Favourable
- Unfavourable inadequate (change in management or policy is required to return the habitat to favourable status but there is no danger of extinction in the foreseeable future)
- Unfavourable bad (serious danger of becoming extinct, at least regionally)

There is also an 'Unknown' class which can be used where there is insufficient information available to allow an assessment.

Achieving Favourable Conservation Status (FCS) is the overall objective to be reached for all Annex I habitat types and Annex II species of European Community interest listed in the EU Habitats Directive 92/43/EEC. **It is defined in positive terms such that a habitat type must be prospering and have good prospects of continuing to do so.**

There have been two rounds of monitoring of habitats in Ireland, which date from the period 2001 – 2007 and 2007 – 2013. The habitats of relevance to the Wicklow Uplands were assessed at a national level in 2007 and 2013 as shown in **Table 4** below. There have been very few detailed assessments of the habitats in the Wicklow Mountains to date. In general the upland habitats of Ireland, when assessed at a national level are in very poor condition. The next round of monitoring results is due in 2019.

Table 4. Condition of upland habitats in Ireland (those habitats of relevance to the Wicklow uplands are shown).

Habitat	Area		Structure & Functions		Future Prospects		Overall Status	
	2007	2013	2007	2013	2007	2013	2007	2013
4010 Wet heaths	Unknown	Unfavourable – Inadequate	Unfavourable – Bad	Unfavourable – Bad	Unfavourable – Bad	Unfavourable – Bad	Unfavourable – Bad	Unfavourable – Bad
4030 Dry heaths	Favourable	Unfavourable – Inadequate	Unfavourable – Inadequate	Unfavourable – Bad	Unfavourable – Inadequate	Unfavourable – Bad	Unfavourable – Inadequate	Unfavourable – Bad
4060 Alpine and Boreal heaths	Unfavourable – Inadequate	Favourable	Unfavourable – Inadequate	Unfavourable – Bad	Unfavourable – Inadequate	Unfavourable – Bad	Unfavourable – Inadequate	Unfavourable – Bad
6230 Nardus grasslands*,	Unfavourable – Bad	Unfavourable – Bad	Unfavourable – Bad	Unfavourable – Bad	Unfavourable – Bad	Unfavourable – Bad	Unfavourable – Bad	Unfavourable – Bad
7130 Blanket bogs (* if active bog),	Unfavourable – Bad	Unfavourable – Bad	Unfavourable – Inadequate	Unfavourable – Bad	Unfavourable – Bad	Unfavourable – Bad	Unfavourable – Bad	Unfavourable – Bad
8110 Siliceous screes	Unfavourable – Inadequate	Favourable	Unfavourable – Inadequate	Unfavourable – Inadequate	Unfavourable – Inadequate	Unfavourable – Inadequate	Unfavourable – Inadequate	Unfavourable – Inadequate
8210 Calcareous rocky slopes	Unfavourable – Inadequate	Favourable	Unfavourable – Inadequate	Unfavourable – Inadequate	Unfavourable – Inadequate	Unfavourable – Inadequate	Unfavourable – Inadequate	Unfavourable – Inadequate
8220 Siliceous rocky slopes	Unfavourable – Inadequate	Favourable	Unfavourable – Inadequate	Unfavourable – Inadequate	Unfavourable – Inadequate	Unfavourable – Inadequate	Unfavourable – Inadequate	Unfavourable – Inadequate

The main pressures, damaging activities and threats to the upland habitats which have been identified in the national assessments are presented below:

Wet Heath - There are ongoing losses in habitat Area due to afforestation and agricultural improvement. The quality of the habitat has been impacted by overgrazing and trampling, burning, invasive non-native species, drainage and erosion. Stock reductions implemented through commonage framework plans have led to an increase in height and cover of dwarf shrubs and reduction in extent of bare peat at many sites. Nevertheless, the Overall Status of this habitat is assessed as Bad due to the continued impact of the pressures listed above. The overall trend is considered to be stable due to the improvements resulting from stock reductions that balance out losses in Area.

Dry Heath - There have been ongoing losses in Area due to afforestation and agricultural improvement. Although the quality of the habitat has been impacted by overgrazing, burning, invasive non-native species and drainage, destocking brought about from the commonage framework plans has led to recovery in many upland areas. The Overall Status is assessed as Bad due to the impacts of the pressures listed. The overall trend is considered to be stable, the losses in Area balanced by the improvements in quality. The 2007 assessment was not underpinned by extensive survey and expert judgement was used to give an Overall Status of Inadequate. In light of current data it is likely that the 2007 assessment should have also been Bad.

Alpine & Sub-alpine Heath - Sheep grazing is widespread in uplands where alpine and subalpine heath occurs and, where levels of grazing are high, is problematic within this habitat. Hill walking is often concentrated on the ridges and summits where this habitat is found and can cause trampling and erosion of the habitat. Abandonment, scrub encroachment and decline in traditional farming methods are widely viewed to have negative effects on the conservation status of habitats in the Burren. For these reasons the Overall Status of this habitat is considered to be Bad. Conservation measures undertaken in the uplands and the Burren to address grazing problems have resulted in an improving trend. The 2007 assessment was not underpinned by extensive survey and expert judgement was used to give an Overall Status of Inadequate. In light of current data it is likely that the 2007 assessment should have also been Bad.

Species-rich Nardus Grassland - The Overall Status is assessed as Bad due to ongoing losses caused by forestry planting and agricultural improvement (fertilisation and re-seeding of the habitat) and also succession to heath and scrub. Due to ongoing losses to this habitat there is a declining trend for the habitat since the 2007 assessment.

Blanket Bog - The main threats to blanket bog include overgrazing and trampling, drainage, afforestation, mechanical peat-extraction, burning and windfarm and other infrastructural development. Reductions in sheep numbers on upland commonages over the last decade has had a major positive impact on overgrazed areas, however recovery is a slow process and restoration measures are required to prevent further erosion of blanket bog. The Overall Status of this habitat is assessed as Bad with an ongoing decline of extent and quality.

Siliceous Scree - This habitat that may be threatened by ecologically unsuitable grazing levels, recreational activities such as rock-climbing and invasive non-native species. The Overall Status is assessed as Inadequate, but with an improving trend. This trend is brought about by the implementation of the Commonage Framework Plans which address ecologically unsuitable grazing levels.

Calcareous Rocky Slopes - This habitat is threatened by ecologically unsuitable grazing levels, recreational activities such as rock climbing, quarrying and invasive non-native species. The Overall Status of this habitat is assessed as Inadequate with no major changes since 2007.

Siliceous Rocky Slopes - This habitat is threatened by ecologically unsuitable grazing levels, recreational activities such as rockclimbing, and invasive non-native species. For these reasons the Overall Status of this habitat is assessed as Inadequate with no major changes since 2007.

For a habitat to be deemed in Favourable Conservation Status an assessment is made on the following criteria:

- **Area –** there should be no decrease in the area of the habitat. For example areas of heathland habitat may have been lost to grassland as a result of overgrazing/animals congregating in one area or by the invasion of a species such as bracken.

- **Structure and Functions** - Structure and functions relates to the physical components of a habitat ("structure") and the ecological processes that drive it ("functions"). For blanket bogs and associated habitats, these include a range of aspects such as soil chemistry, vegetation composition, hydrological regime, community diversity, habitat quality, species occurrence, indicators of local distinctiveness, disturbed ground, evidence of burning and negative species occurrence.

- **Future Prospects** - The impacts of pressures and threats on the habitat coupled with the general condition of the habitat are used to determine the Future Prospects (i.e. the long term viability of the habitat).

- **Overall Status** - For a "favourable" Overall Assessment for the habitat all parameters must be assessed as "favourable" (with one "unknown" acceptable); if any one of the parameters is assessed as "unfavourable - bad", the Overall Assessment is also "bad"; any other combination would result in an "unfavourable - inadequate" Overall Assessment.

Active measures by the members of the commonage framework group as set out in the management recommendations will assist in beginning to improve the conservation status of the habitats. However it should be recognised that it may take in some instances over twenty years for habitats to begin to recover depending on the severity of the former negative impacts such as a severe uncontrolled burn. More than one parameter may need to be addressed to see a move towards habitat recovery (e.g. restoration of hydrological condition, appropriate grazing levels (sheep/deer/sheep in combination with deer, reintroduction of seed material where a species has been lost/has declined to such an extent that seed production is low, etc.) and in some instances factors outside the site (and beyond the control of the commonage group) may be having a negative effect (such as the deposition of atmospheric nitrogen, drainage measures associated with adjacent forestry, etc.).

Under the SUAS project the habitats that correspond to the Annex I habitats have been assessed using the methodology outlined in Perrin *et al* (2014).

A number of monitoring stops were completed in each of the Annex I habitats present within the commonage (**4030 Dry Heath** and *4060 Alpine and Boreal Heath*) following the methodology outlined in Perrin *et al* (2014). The number of monitoring stops completed depended on the size of the habitat. These are detailed below. There were no monitoring stops conducted in the area of blanket bog on account of its size within the commonage and the protection afforded to it from the boardwalk.

For those habitats which are not Annex I habitats such as acid grassland or fens and flushes the habitat condition is based on best expert judgement or in some cases from the perspective of the hill farmer.

The results of these habitat condition assessments for the various parts of the commonage are presented on **Figure 7** below.

3.2.1 4030 Dry Heath

A total of 8 monitoring stops were recorded within the **4030 Dry Heath** habitat within the commonage. The results of the eight monitoring stops are presented below in **Table 3.2.1**.

Table 3.2.1: Monitoring criteria and failure rates for 4030 Dry heath (*n* = 8).

Criteria	Scale of assessment	No. of Assessments	No of Failures	Failure Rate (%)
Vegetation composition				
1. Number of bryophyte or non-crustose lichen species present, excluding *Campylopus* spp. and *Polytrichum* spp. ≥ 3	Relevé	8	6	75
2. Number of positive indicator species present ≥ 2 (Appendix VI)	Relevé	8	1	12.5
3. Siliceous heaths: cover of positive indicator species ≥ 50% (Appendix VI)	Relevé	8	0	0
4. Proportion of dwarf shrub cover composed of *Myrica gale*, *Salix repens*, *Ulex gallii* collectively < 50%	Relevé	8	0	0
5. Cover of the following weedy negative indicator species: *Cirsium arvense, C. vulgare, Ranunculus repens*, large *Rumex* species (except *R. acetosa*), *Senecio jacobea*, *Urtica dioica* collectively < 1%	Relevé	8	0	0
6. Cover of non-native species < 1%	Relevé	8	0	0
7. Cover of non-native species < 1%	Local vicinity	8	0	0
8. Cover of scattered native trees and scrub < 20%	Local vicinity	8	0	0
9. Cover of *Pteridium aquilinum* < 10%	Local vicinity	8	0	0
10. Cover of *Juncus effusus* < 10%	Local vicinity	8	0	0
Vegetation structure				
11. Senescent proportion of *Calluna vulgaris* cover < 50%	Relevé	8	0	0
12. Last complete growing season's shoots of ericoids and *Empetrum nigrum* showing signs of browsing collectively < 33% (Assess a minimum of 10 shoots distributed across the plot)	Relevé	8	0	0
13. No signs of burning inside boundaries of sensitive areas[2]	Local vicinity	8	0	0
14. Outside boundaries of sensitive areas, all growth phases of *Calluna vulgaris* should occur throughout, with ≥ 10% of cover in mature phase[3]	Local vicinity	8	6	75
Physical structure				
15. Cover of disturbed bare ground < 10%	Relevé	8	0	0
16. Cover of disturbed bare ground < 10%	Local vicinity	8	0	0

[2] Sensitive areas
(a) Areas where soils are thin and less than 5 cm deep.
(b) Hill slopes greater than 1 in 2 (26°), and all the sides of gullies.
(c) Ground with abundant, and/or an almost continuous carpet of *Sphagnum*, liverworts and/or lichens.
(d) Areas of H21 and H22 heath as defined by the NVC (Rodwell 1991a). These are heaths primarily composed of mixtures of *Calluna vulgaris* and *Vaccinium myrtillus* over a moist carpet of bryophytes that often has a high *Sphagnum* content. Within the provisional classification, these communities are comparable to DH4 and damper elements of DH6 respectively.
(e) Areas with noticeably uneven structure, at a spatial scale of around 1 m² or less. The unevenness (e.g. more commonly found in very old heather stands) will relate to distinct, often large, spreading dwarf-shrub bushes. The dwarf-shrub canopy will not be completely continuous, and some of its upper surface may be twice as high as other parts. Layering is likely to be present and may be common.
(f) Pools, wet hollows, haggs and erosion gullies, and within 5 – 10 m of the edge of watercourses.

[3] *Calluna vulgaris* growth phases
1. Pioneer < 10 cm
2. Building 10 – 30 cm
3. Mature > 30 cm

Area
A review of the aerial photography from the 1990s and other data sources for the commonage indicate that there has been no significant change in the overall area of **4030 Dry Heath** in the commonage. There is a lack of detailed information on what the previous extent of acid grassland habitat in the commonage was (this forms a mosaic with dry heath in places) but based on the locations of where sheep were seen to favour the hill (in the sheltered slopes below Djouce Mountain) they would appear to be focusing their grazing efforts here thus resulting in a localised increase in grassland vs heath habitat. There is also a dominance of acid grassland over dry heath on the areas adjoining the Wicklow Way track – again associated with grazing pressure but also with trampling from walkers. For this reason the overall area of **4030 Dry Heath** within the commonage was therefore assessed as **Unfavourable – Inadequate**.

Structure and Functions
In the assessment of structure and functions, 6 monitoring stops failed one criterion or more. Following a review of the ecological condition of those stops, expert judgement determined that no changes should be made, resulting in an overall failure rate of 75%. The structure and functions of **4030 Dry Heath** were therefore assessed as **Unfavourable – Inadequate**.

The vegetation composition of **4030 Dry heath** was often poor and 75% of the monitoring stops failed – the majority of them on account of lack of bryophytes or lichens and in one stop the dry heath was almost completely dominated by ling heather (lacking diversity of the other positive indicator species such as bilberry and bell heather). This is on account of a lack of grazing/burning which would encourage diversity within the sward. This has allowed the sward of ling to dominate outcompeting the other species and shading out the mosses and lichens below.

The vegetation structure of **4030 Dry heath** was poor in many locations as there was a lack of diversity of ages of heather in many of the stops conducted with many being dominated by tall leggy heather.

In some parts of the commonage Sitka spruce is beginning to regenerate on the hillside and in other areas bracken (*Pteridium aquilinum*) and/or autumn gorse (*Ulex gallii*) is also starting to dominate.

A lack of appropriate management (burning and appropriate grazing), along with more minor associated impacts such as trampling by recreational users, appears to be the most significant impact on the structure and functions of **4030 Dry Heath** in the commonage. The effects of this impact are apparent in the vegetation composition, vegetation structure and physical structure of this habitat.

The reduction in numbers of sheep on the hill and active farming has reduced grazing pressure and the current condition of the commonage would indicate a lack of active management and appropriate grazing in the intervening period resulting in an overall poor condition of this habitat in many areas. Only a small area of habitat (near where the Glasnamullen Stream rises) and where sheep congregate was deemed to be in favourable condition and it was here that the red grouse on the site were documented.

Future Prospects
The future prospects for the habitat **4030 Dry Heath** are assessed as **Unfavourable – Inadequate** in the absence of active management by the commonage group.

Conservation Status Assessment
Overall the conservation status assessment for **4030 Dry Heath** habitat within the commonage is assessed as **Unfavourable – Inadequate.**

3.2.2. 4060 Alpine and Boreal Heath

A total of 2 monitoring stops were recorded within the **4060 Alpine and Boreal Heath** habitat within the commonage. Only one of these passed as shown below in **Table 3.2.2**.

Table 3.2.2: Monitoring criteria and failure rates for the **4060 Alpine and Boreal Heath (*n* = 2).**

Vegetation composition	**Scale of assessment**	**No. of Assessments**	**No of Failures**	**Failure Rate (%)**
1. Number of bryophyte or non-crustose lichen species present ≥ 3	Relevé	2	1	50
2. Cover of positive indicator species ≥ 66% (Appendix VI)	Relevé	2	0	
3. Cover of dwarf shrubs ≥ 10%	Relevé	2	0	
4. Cover of the following negative indicator species: *Agrostis capillaris, A. vinealis, Anthoxanthum odoratum, Deschampsia flexuosa, Festuca ovina, F. vivipara, Galium saxatile, Potentilla erecta* and *Poa* spp. (except *Poa alpina*) collectively < 10%	Relevé	2	0	
5. Cover of non-native species < 1%	Relevé	2	0	
Vegetation structure				
6. Live leaves of *Carex bigelowii, Deschampsia flexuosa, Festuca ovina, F. vivipara* showing signs of grazing collectively <10%	Relevé	2	0	
7. Last complete growing season's shoots of ericoids and *Empetrum nigrum* showing signs of browsing collectively < 33% (Assess a minimum of 10 shoots distributed across the plot)	Relevé	2	0	
8. No signs of burning inside feature	Local vicinity	2	0	
Physical structure				
9. Cover of disturbed bare ground < 10%	Relevé	2	0	
10. Cover of disturbed bare ground < 10%	Local vicinity	2	0	

Area

A review of the aerial photography from the 1990s and other data sources for the commonage indicate that there has been a loss in the overall area of **4060 Alpine and Boreal Heath** in the commonage. This loss is mostly focused on either side of the walking track to Djouce Mountain arising from trampling from walkers, other trampling pressures (such as deer and sheep) and natural erosion. For this reason the area of the **4060 Alpine and Boreal Heath** within the commonage was therefore assessed as **Unfavourable – Inadequate**.

Structure and Functions

In the assessment of structure and functions, 1 monitoring stop failed one criterion or more. Following a review of the ecological condition of those stops, expert judgement determined that no changes should be made, resulting in an overall failure rate of 50%. The structure and functions of the **4060 Alpine and Boreal Heath** were therefore assessed as **Unfavourable – Inadequate**.

The vegetation composition of the **4060 Alpine and Boreal Heath** was often poor on account of the lack of bryophytes or lichens and other species. In many areas on the hill adjoining the walking tracks the vegetation structure of the habitat has been compromised from erosion resulting in exposure of the siliceous subsoil and bedrock beneath. Some of this activity is also likely to be on account of grazing animals and is compounded by natural erosion.

Future prospects

The future prospects for the habitat **4060 Alpine and Boreal Heath** are assessed as **Unfavourable – Bad** in the absence of active management by the commonage group.

Conservation Status Assessment

Overall the conservation status assessment for the **4060 Alpine and Boreal Heath** habitat within the commonage is assessed as **Unfavourable – Bad.**

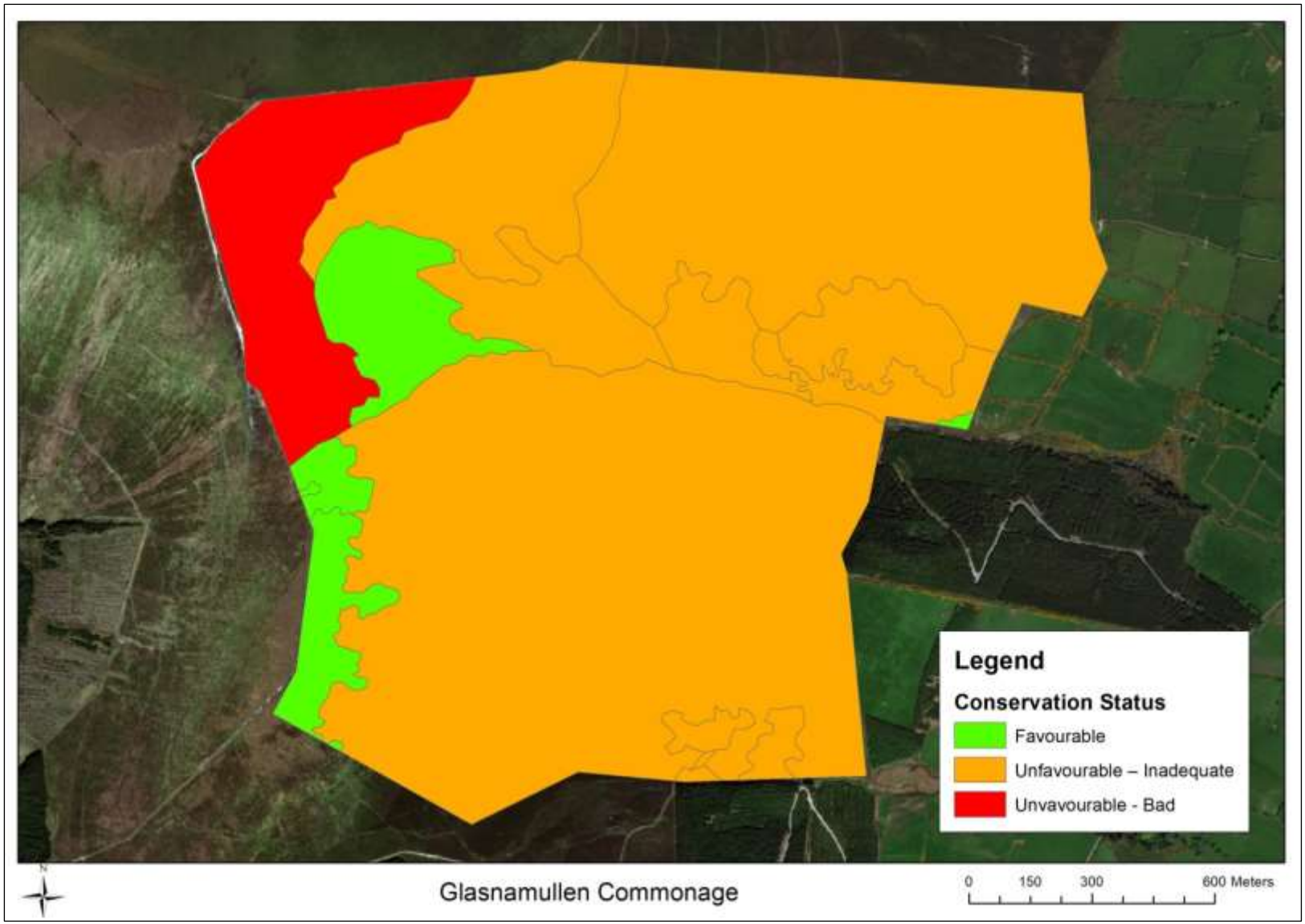

Figure 7. Habitat Condition Assessment for Glasnamullen Commonage.

4. Management Recommendations for the Glasnamullen Commonage

A Commonage Management group has been established for the commonage and a management plan will be developed by the members, which will utilise and be informed by the information provided in this report and assessment.

The management prescriptions in the plan need to address the impacts highlighted in this report if progress is to be made towards attaining **Favourable status** for the Annex I habitats present on the site – principally **4030 Dry Heath** and **4060 Alpine and Boreal Heath**. The major impacts arise from under grazing, lack of active shepherding, lack of vegetation management, and recreational access resulting in localised peat erosion.

The levels of livestock grazing (by sheep) were initially addressed through the Commonage Management Plan drawn up in the early 2000s, which found the commonage to generally be in an undamaged condition and recommended a minor destocking rate of 4.82%. However this was not implemented as only areas with a recommended destocking rate of >10% were destocked. In fact sheep numbers on the hill have declined since that time and although these reductions in sheep numbers appears to have resulted in some improvement to Annex I habitats, these habitats are not currently attaining **Favourable status.**

Best expert judgement would indicate that this is generally on account of several factors including a lack of sheep on the hills, a lack of grazing by sheep at the appropriate time of year, and a lack of active management of the grazing whereby those sheep that are on the hill are congregating on one area of the hill (allowing the spread of acid grassland) and not grazing in others. This has resulted in large parts of the hill becoming dominated by tall leggy heather and in some areas western gorse is becoming dominant. This has resulted in a requirement to address the leggy heather through burning.

Self seeding of Sitka spruce and rhododendron in the southern part of the commonage also needs to be addressed. Encroachment of bracken into grassland areas also needs to be managed.

4.1 General Management Measures

Information on the principles of the management measures that can be utilised as recommended in the Natural England Upland Management Handbook and other best practice guidance from Scotland, are presented in detail in **Appendix 3**. This guidance has been modified for the Irish situation.

Cutting/flailing

Cutting/flailing could be applied on parts of the Glasnamullen Commonage. Given that cutting/flailing has been implemented with mixed success on the adjoining commonage at Powerscourt Paddock information from the Natural England Upland Management Handbook is provided in **Appendix 3** to inform same.

Burning

Burning will be required on Glasnamullen and so information from the Natural England Upland Management Handbook is provided in **Appendix 3** to inform same.

The various parts of the commonage requiring specific management are mapped on **Figure 8** and summarised in **Table 5**.

4.2 Measures for the Annex I Habitat 4060 Dry Heath

Several measures are required. In some areas sheep are congregating resulting in the loss of dry heath habitat in favour of acid grassland. Other areas are completely undergrazed and avoided by sheep. It is recognised that this has resulted in areas that are simply inaccessible for sheep and these areas can only be recovered through heather management – either flailing or controlled burning. There is also a tendency for sheep to gather and graze at the bottom of the commonage near the improved enclosed fields and this alters the local ecology here even further through dunging, trampling, etc. in favour of acid grassland.

Overall dry heath dominates much of the commonage. In some areas it exists as a pure stand of the habitat (c.199 ha) whereas in other areas it forms part of a mosaic with acid grassland/bracken/gorse (c.38 ha). It is recommended that some areas of controlled burning is conducted in those areas where the worst of the tall inaccessible heather is. These areas will then regenerate and encourage the movement of sheep to these areas for grazing. They should be located at some distance from where sheep are currently congregating to encourage this and should avoid areas that have been burnt within the last fifteen years (these can be seen on the aerial photographs in **Appendix 2**).

As set out above it is recommended that a patchwork of widely scattered, small areas across the commonage (i.e. long narrow strips up to 30 m wide and covering about 0.5-1.0 ha) are burnt. These should also be located away from the watercourses on the commonage.

In the absence of having detailed information on how many years it takes for the heather to reach the desired height on Glasnamullen, we cannot define the average figure for the area to be burnt each year but using a conservative estimate of ten years an indicative area would be in the order of 20 hectares.

The burning needs to be combined with active shepherding and other measures such as the use of sheep licks to draw animals into certain areas and move them away from those currently favoured.

4.3 Measures for the Habitat 4060 Alpine and Boreal Heath

The erosion of peat is a major impact for the habitat **4060 Alpine and Boreal Heath** as this provides the underlying structure on which the habitat relies. The areas of severe erosion such as along the Wicklow Way path will require active restoration measures for this habitat to begin to move towards **Favourable status**.

Some work was done on this in 2006 by Mountain Meitheal volunteers in conjunction with National Parks and Wildlife Service. These measures do not appear to have been terribly successful as evidenced in the photos supplied. The seed mix used would not be that of native upland grass species. Future measures should be discussed with Mountaineering Ireland who may be able to provide some best practice information and advice.

Some measures that could be considered could include temporary fencing and signage to encourage walkers to choose an alternative route, the stabilisation of bare eroded peat with geotextiles or heather brash, the seeding of bare peat with *Sphagnum* propagules and other track repairs. Any temporary fencing erected will need flight diverters to be added to reduce potential collision risk by red grouse which use the commonage.

4.4 Rhododendron Control

Other measures required include the removal of the self-seeded Rhododendron on the commonage. Best practice guidance from Invasive Species Ireland for the control and eradication of rhododendron is set out below:

8. Successfully managing *Rhododendron*

Cut and remove stems by hand or chainsaw, cutting as close to the ground as possible to remove above ground growth. Chip or remove the cut material from the area to allow for effective follow-up work and prevent regrowth. Chipped material can provide good weed barrier around ornamental garden areas. Flailing has also been effectively used in Ireland to treat young or immature growth. Although not suitable on all sites and locations, especially steeply sloping or wet sites, it is very effective as it breaks up woody stems upon contact.

The removal of above ground growth will not prevent regrowth as *Rhododendron* will regrow from cut stems and stumps. There are four recommended methods to achieve successful management after the initial cut and removal:

1. Digging the stumps out. The effectiveness of this technique is increased by removing all viable roots. This can be done manually or with a tractor and plough. To avoid regrowth, stumps should be turned upside down and soil should be brushed off roots.

2. Direct stump treatment by painting or spot spraying freshly cut low stumps with a herbicide immediately after been cut. Glyphosate (20% solution), tryclopyr (8% solution) or ammonium sulphate (40% solution) are known to be effective during suitable weather conditions i.e. dry weather. The herbicide concentrations used and timings of applications vary according to which chemical is used. Use of a vegetable dye is recommended to mark treated stumps and all stumps should be targeted. A handheld applicator will help avoid spray drift onto surrounding non-target species. Always read the label and follow the manufacturers guidelines when using herbicides. Remember that using

3. A variation on the stump treatment method is stem injection, using a 'drill and drop' methodology, whereby, if the main stem is cut and is large enough for a hole to be drilled into it, the hole can be used to facilitate the targeted application of glyphosate (25% solution). The main drawback is that the dead *Rhododendron* may persist in situ for 10-15 years.

4. Stump regrowth and seedlings can be effectively killed by spraying regrowth with a suitable herbicide, usually glyphosate. Best practice spraying protocols should be carefully followed. General broadcast spraying is not as effective as stump spot treatment and has the potential to impact on surrounding non-target species. Rhododendron leaves are thick and waxy. For herbicide treatment to be effective **each individual leaf needs be thoroughly wetted with herbicide to kill the plant**.

Remember: If the initial infestation was of flowering age or a seed source is nearby, then follow-up seedling removal work will be necessary. The intensity of this work will vary according to the severity and duration of infestation.

See also: Higgins, G.T. (2008) *Rhododendron ponticum*: A guide to management on nature conservation sites. Irish Wildlife Manuals, No. XX. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

4.

4.5 Upland Gully Woodland

Consideration could be given to the establishment of upland gully woodland along the Glasnamullen Stream (and in the bracken slopes nearby as recommended above) and the protection of existing trees along this watercourse from browsing. Such woodland would further act as protection measure for water quality within this stream and the drinking water supply for the Vartry Reservoir as well as adding to the biodiversity of the uplands. Suitable species would include mountain ash (*Sorbus aucuparia*), willows (*Salix cinerea*), holly (*Ilex aquifolium*), birch (*Betula pubescens*) and ultimately oak (*Quercus petraea*), Scot's pine (*Pinus sylvestris*) and aspen (*Populus tremula*). Any trees would require protection from grazing animals including sheep and deer.

4.6 Sitka Spruce Removal

Other measures required include the removal of the self-seeded Sitka spruce on the commonage. The Sitka spruce can be removed simply by felling with a saw. The cut must be made below the lowest green branch to ensure that no regrowth occurs. If this fails any regrowth of spruce could be dealt with by cutting as described above or the application of glyphosate or similar to the cut stump using a sponge applicator taking care to avoid surrounding vegetation.

4.7 Measures for Bracken Control

Consideration should be given to some control of the areas of bracken within the commonage. Information and recommendations for bracken control from the Natural England Upland Management Handbook is provided in **Appendix 3** to inform same.

4.8 Monitoring

Continued monitoring is required to determine what affect active shepherding of stock on the hill coupled with some limited burning would have bearing in mind that there may be a considerable delay between changes in livestock levels and a response in the vegetation.

4.9 Appropriate Assessment

Once the plan is agreed with the commonage group it will need to be agreed with National Parks and Wildlife and undergo appropriate assessment before being implemented.

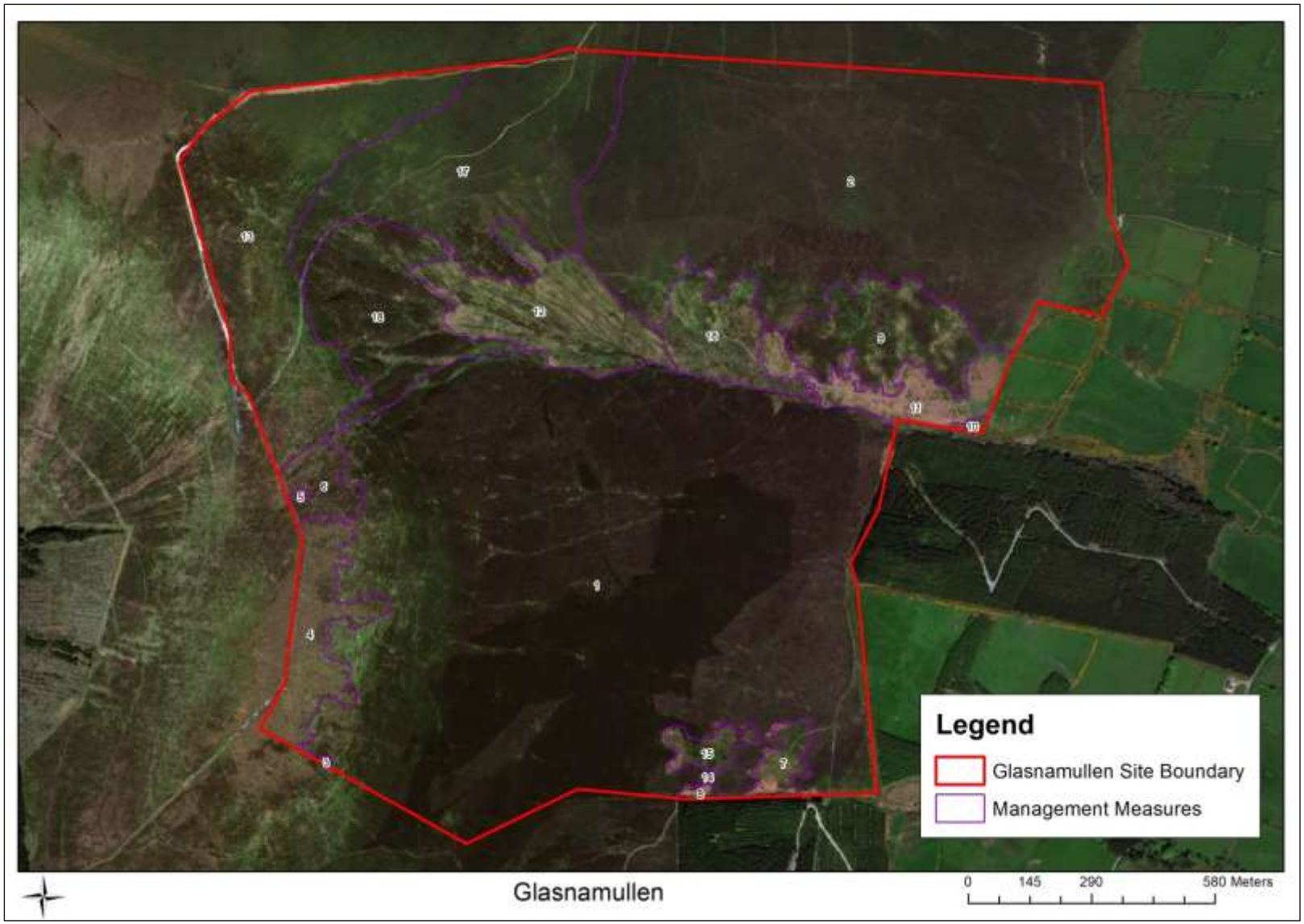

Figure 8. Management measures for Glasnamullen.

Table 5. Habitats present on Glasnamullen Commonage and Management Recommendations.

Id	Annex I Code	Fossitt Code	Conservation Status	Habitat	Area (m Sq)	Area (hectares)	Management Measure
1	4030	HH1	Unfavourable - Inadequate	Dry Heath	1201285	120.13	Controlled burning measures as detailed above. Removal of Sitka spruce and rhododendron regeneration.
2	4030	HH1	Unfavourable - Inadequate	Dry Heath	669959	67.00	Controlled burning measures as detailed above.
3	7130	PB2	Favourable	Upland Blanket Bog	598	0.06	Monitor grazing and sheep movements to keep in good condition.
4	7130	PB2	Favourable	Upland Blanket Bog	65059	6.51	Monitor grazing and sheep movements to keep in good condition.
5	3160	FL1	Favourable	Bog Pool	1117	0.11	Monitor grazing and sheep movements to keep in good condition.
6	7130	PB2	Favourable	Upland Blanket Bog	24676	2.47	Monitor grazing and sheep movements to keep in good condition.
7		HD1	Not assessed but needs management	Dense Bracken	16654	1.67	Control bracken.
8		HD1	Not assessed but needs management	Dense Bracken	2955	0.30	Control bracken.
9	4030	HH1/GS3/HD1	Unfavourable - Inadequate	Dry Heath/Acid grassland/Bracken	83534	8.35	Monitor grazing and sheep movements. Control bracken.
10		WS1	Retained for breeding birds	Gorse Scrub	1973	0.20	No measures required.
11		HD1	Not assessed but needs management	Dense Bracken	51663	5.17	Control bracken.
12		HH3/PF2/GS4	Unfavourable - Inadequate	Wet Heath/Flush/Wet Grassland	103105	10.31	Monitor grazing and sheep movements. Move sheep out of this area where they tend to congregate.
13	4060	HH4	Unfavourable - Bad	Montane Heath	251955	25.20	Restoration work to the walking path.
14	4030	HH1	Unfavourable - Inadequate	Dry Heath	982	0.10	Very small area – monitor.
15		HD1	Not assessed but needs management	Dense Bracken	14494	1.45	Control bracken.
16		HH1/GS3/HD1	Unfavourable - Inadequate	Dry Heath/Acid grassland/Bracken	55680	5.57	Monitor grazing and sheep movements. Move sheep out of this area where they tend to congregate. Control bracken.
17	4030	HH1/GS3	Unfavourable - Inadequate	Dry Heath/Acid grassland	238734	23.87	Monitor grazing and sheep movements. Move sheep out of this area where they tend to congregate. Monitor erosion along the walking track.
18	4030	HH1	Favourable	Dry Heath	116876	11.69	Monitor grazing and sheep movements. Move sheep out of this area if it begins to get overgrazed.

5. Appendix 2. Historic Imagery of the Glasnamullen Commonage

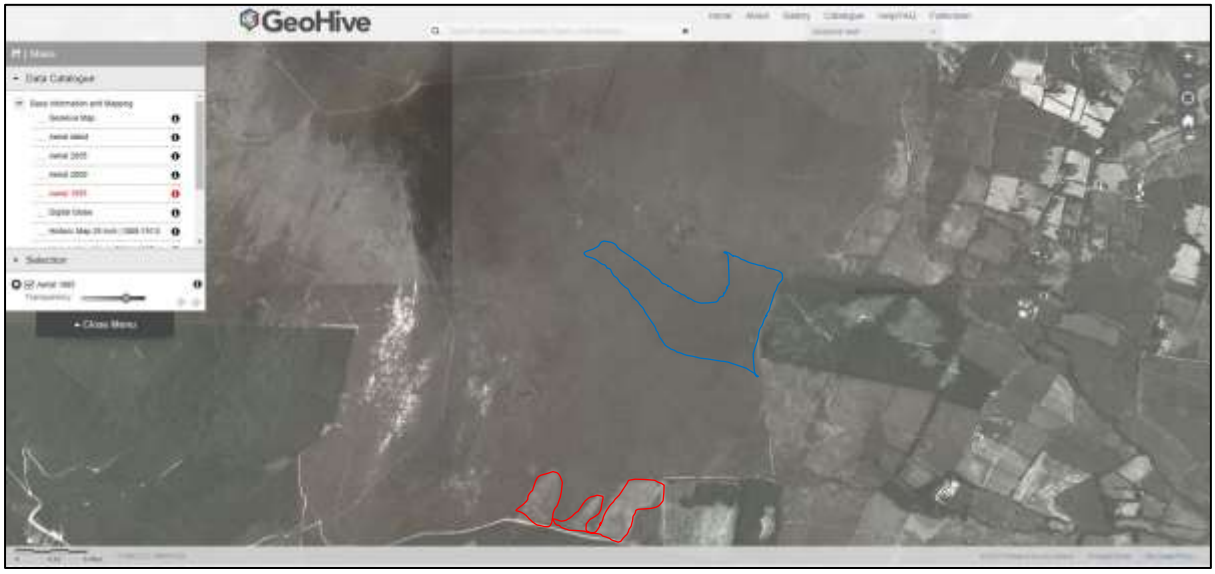

Plate 1. OSI Aerial photography 1995. Note the burn areas on the southern side of the commonage indicated in red. It is unclear what caused the change in vegetation in the area highlighted in blue.

Plate 2. OSI Aerial photography 2000. Note the flailed/burnt area on the southern side of the commonage indicated in red. It is unclear what caused the change in vegetation in the area highlighted in blue.

Plate 3. OSI Aerial photography 2005. Note the very extensive burn highlighted in red.

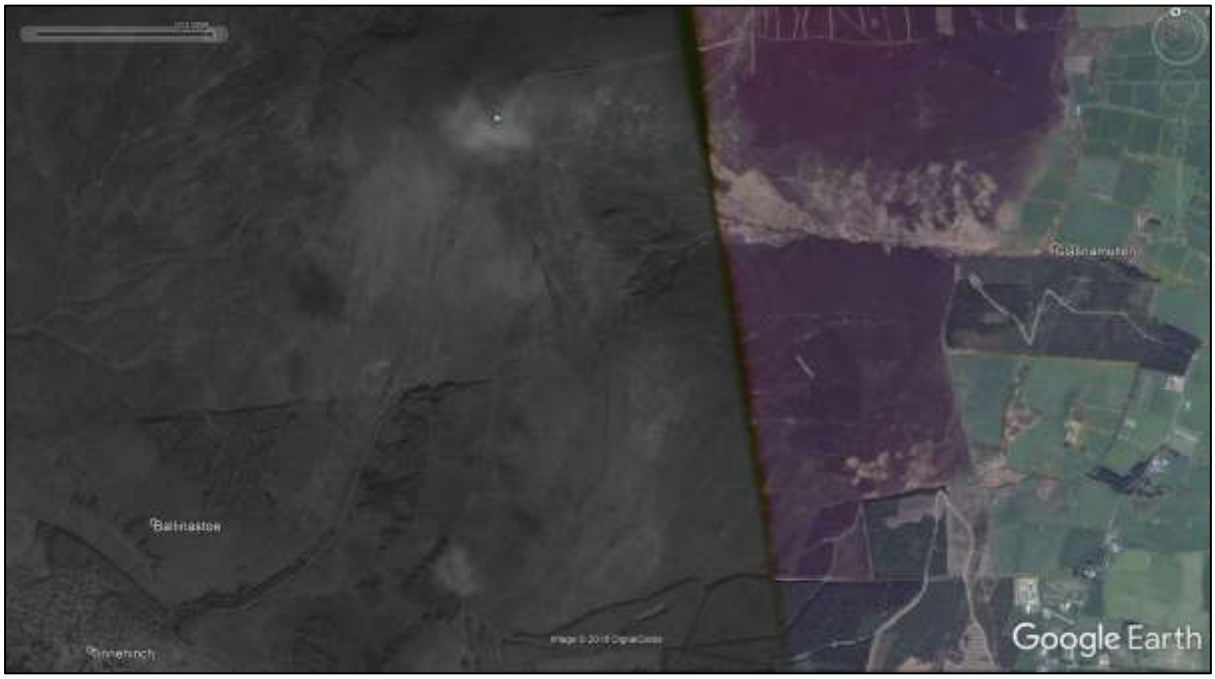

Plate 4. May 2009 (Source: Google Image). The mosaic of habitat condition caused by burning is evident.

Plate 5. May 2013 (Source: Google Image). Note extensive burn indicated in red.

Plate 6. April 2015 (Source: Google Image). The legacy of the previous burns is still evident.

Plate 7. June 2016 (Source: Google Image). The legacy of the previous burns is still evident.

Plate 8. July 2016 (Source: Google Image). Note how visible the bracken is. The legacy of the previous burns is still evident.

Plate 9. January 2017 (Source: Google Image). The legacy of the previous burns is less evident.

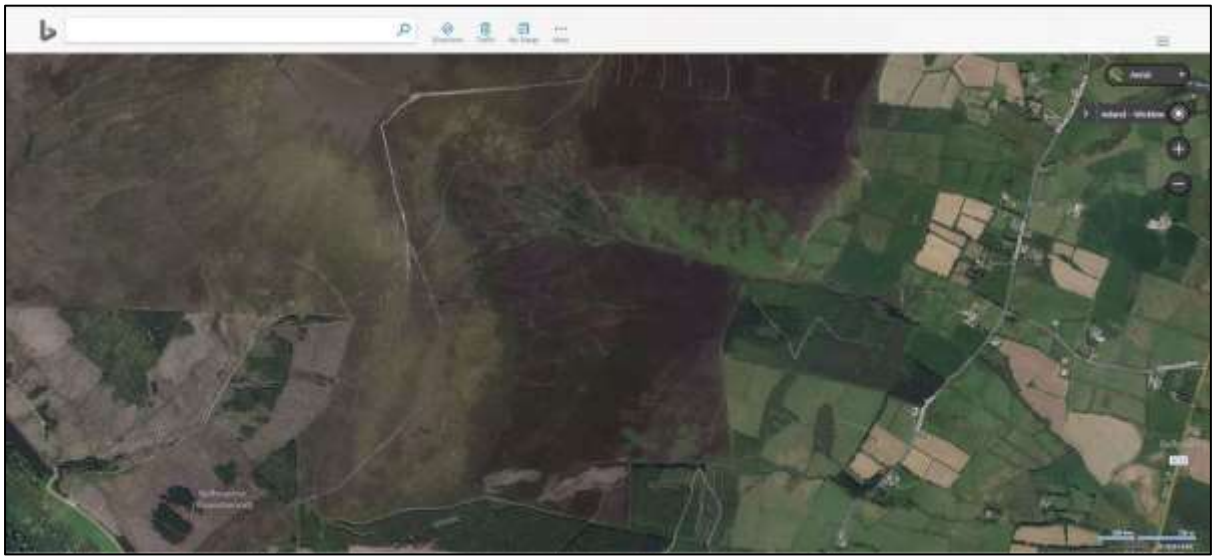

Plate 10. Undated (Source: Bing Maps).

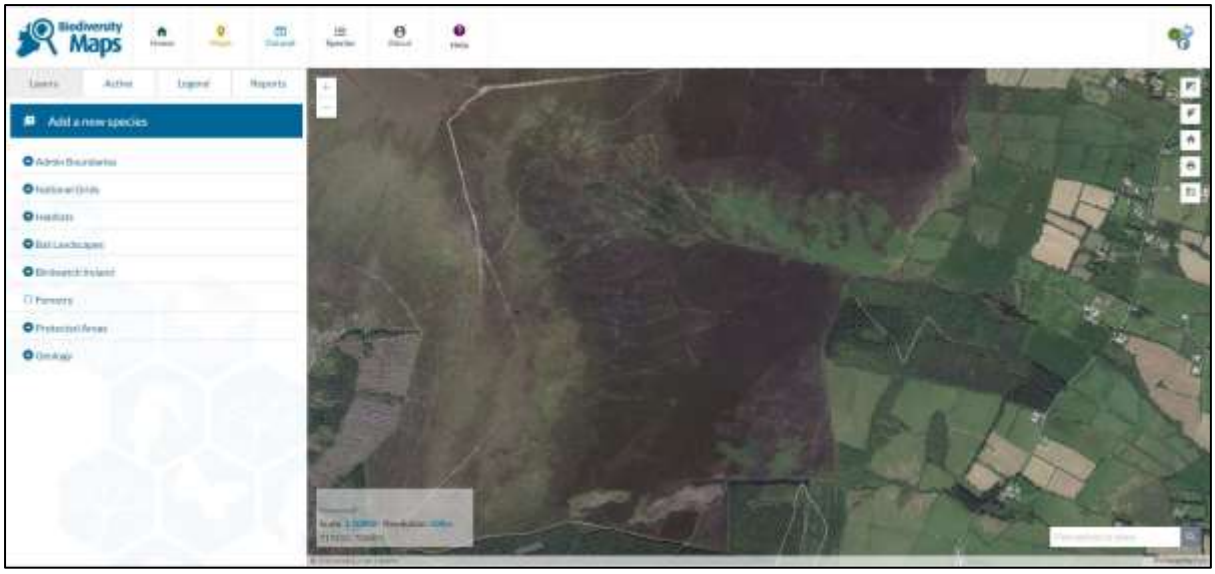

Plate 11. National Biodiversity Data Centre (Undated, looks like Bing Imagery).