

# **National Survey of Upland Habitats**

**(Phase 2, 2011-2012)**

## **Site Report No. 9:**

### **Galtee Mountains cSAC (000646), Cos. Tipperary and Limerick (Revision)**



**Jenni R. Roche, Philip M. Perrin, Simon J. Barron and Orla H. Daly**

**January 2014**

**Commissioned by National Parks and Wildlife Service**

**Department of Arts, Heritage and the Gaeltacht**



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Cover photo: Galtymore Mountain, Co. Tipperary, taken by John Conaghan.

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## EXECUTIVE SUMMARY

- The Galtee Mountains cSAC (000646), in Counties Tipperary and Limerick was surveyed between August and September 2011 as part of the National Survey of Upland Habitats (NSUH). This report revises an original report, produced in 2012 by the same authors, by updating the structure and functions assessment criteria for 8210 Calcareous rocky slopes to those finalised during Phase 3 of the NSUH (2012-2013).
- The area of the site is 64.2 km<sup>2</sup>. Using GIS and aerial photograph interpretation, the site was divided into 906 polygons, each representing areas of relatively homogeneous habitat mosaic. Each polygon was surveyed on the ground to create a habitat map for the site.
- A total of 13 Annex I habitats, 39 Fossitt habitats and 61 provisional upland vegetation communities were recorded. Annex I habitats comprise 63.0% of the site. The Annex I upland habitats present which are primary focus habitats for the NSUH are 4030 Dry heath (33.7%), \*7130 Active blanket bog (15.6%), 4010 Wet heath (11.3%), 4060 Alpine and Boreal heath (1.0%), 8110 Siliceous scree (0.9%), 7130 Inactive blanket bog (0.2%), 8220 Siliceous rocky slopes (0.1%), 8210 Calcareous rocky slopes (0.04%) and 7230 Alkaline fens (0.01%).
- Rare and notable species recorded during the survey include *Oxyria digyna*, *Saxifraga rosacea*, *Sphagnum warnstorffii* and *Sphagnum skyense*.
- Areas of particular botanical interest include the corries surrounding Lough Curra, Lough Diheen, Borheen Lough and Lough Muskry, each of which contains several rare vascular plant and bryophyte species, and Carrignabinnia, a peak which supports rare bryophytes and the arctic-alpine *Salix herbacea*.
- The conservation status of the upland Annex I habitats that form the primary focus of the NSUH was assessed. A total of 66 monitoring stops were recorded in these habitats. The conservation status of 7230 Alkaline fens was assessed as Favourable while that of 4010 Wet heath, \*7130/7130 Blanket bog and 8210 Calcareous rocky slopes was assessed as Unfavourable – Bad. The remaining primary focus habitats were assessed as having an Unfavourable – Inadequate conservation status.
- The main impacts/activities affecting the site are sheep grazing, burning and peat erosion.
- It is recommended that :

Whilst destocking levels implemented c. 2002 according to Commonage Framework Plans appear to have resulted in some improvement to Annex I habitats, continued monitoring is required to assess the recovery of these habitats. The available data do not support an increase in stocking levels.

Whilst burning can be an important tool in heathland management, uncontrolled, high-frequency burning can damage the long-term viability of heaths and bogs. Burning should be regulated at a site level to ensure compliance with a maximum area of 5 ha and maximum frequency of once every 15 years for any area.

The feasibility of active restoration measures in severely eroded bog should be examined if these areas are to achieve Favourable conservation status.

In many areas the cSAC boundary follows no obvious feature on the ground such as a river, forest edge or fenceline. In these areas, expanses of Annex I habitat may continue for some distance beyond the cSAC boundary. Consideration should be given to reviewing the cSAC boundary in these locations and/or how these habitats are to be effectively managed when the land parcels straddle the current boundary.

Consideration should be given to increasing the area of Annex I 4030 Dry heath by allowing it to recolonise non-Annex I GS3 Dry-humid acid grassland.

\* Priority Annex I habitat

## **ACKNOWLEDGEMENTS**

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## **FILES ACCOMPANYING REPORT**

ESRI format polygon shapefile with habitat data

ESRI format point shapefile with waypoint data

ESRI format point shapefile with monitoring stop / relevé data

ESRI format point shapefile with rare and notable species data

Microsoft Excel format polygon attributes table

Microsoft Excel format image databank

Microsoft Access condition assessment database

Turboveg relevé database

Site, relevé and waypoint photographs

## 1. INTRODUCTION

### Overview

- 1.1 The principal objectives of the National Survey of Upland Habitats (NSUH) are to classify and map the location and extent of upland habitats within a range of sites using the schemes of Fossitt (2000) and Annex I of the EU Habitats Directive, and to assess the conservation status of a suite of upland Annex I habitats. Selected sites largely comprise upland candidate Special Areas of Conservation (cSACs). The assessment procedure involves evaluation of habitat condition indicators at a network of monitoring stops (point samples) distributed across the range of these habitats at the surveyed sites.
- 1.2 These data are required to provide a scientific basis for the development of policies and management practices for the maintenance (or restoration) of favourable conservation status of Annex I habitats and to provide a scientific basis for monitoring of their status into the future. This site report should be read in conjunction with Irish Wildlife Manual No. 48 (Perrin *et al.*, 2010) and No. 79 (Perrin *et al.*, 2014) which detail the methodologies used for all aspects of this survey. These were initially devised during a scoping study and pilot survey of upland habitats completed in 2009 (Perrin *et al.*, 2009).
- 1.3 This report summarises the results of the field survey of the Galtee Mountains cSAC (000646) for the NSUH (Phase 2, 2011-12). This report revises an original report, produced by the same authors in 2012, by updating the structure and functions assessment criteria for **8210 Calcareous rocky slopes** to those finalised during Phase 3 of the NSUH.
- 1.4 Section 2 of this report presents a detailed description of the habitats within the site, which should be read in conjunction with the relevant O.S. Discovery Series map and the figures associated with the report. It also contains summary statistics on the extent of each habitat type recorded and a compilation of rare and notable floral records for the site.
- 1.5 Section 3 presents a detailed account of the conservation assessment for the upland Annex I habitats that are the primary focus of the NSUH. This is presented on a habitat-by-habitat basis and for each habitat the parameters of area, structure and functions and future prospects are examined. Available data from the Commonage Framework Plan are also presented.
- 1.6 Section 4 of this report recommends amendments to the Natura 2000 Standard Data Form based on the results of this survey and makes additional recommendations in regard to monitoring and management.
- 1.7 Fieldwork was conducted between August and September 2011. The boundary of the cSAC as used in this survey is the version that was provided by NPWS in September 2010.

### Background site information

- 1.8 The Galtee Mountains cSAC, Cos. Tipperary and Limerick, (Fig. 1) is a medium-sized site, being 64.2 km<sup>2</sup> in extent and covering the upper slopes of the Galtee Mountains range. It stretches from Pigeonrock Glen and Assaroola Glen in the west to near Sturrakeen in the east

(O.S. Discovery Series map 74). The underlying geology is mainly sandstone and shales with some areas of conglomerates. The main peaks are Galtymore (alt. 919 m), Lyracappul (alt. 825 m), Carrignabinnia (alt. 822 m), Greenane (alt. 802 m), Galtybeg (alt. 799 m), Slievecushnabinnia (alt. 766 m) and Farbreaga (alt. 724 m). The peak of Temple Hill (alt. 785 m) is not within the site, lying just outside the western boundary, nor are some of the easternmost peaks near Sturrakeen. The north side of the range is punctuated by four corries containing Lough Curra, Lough Diheen, Borheen Lough and Lough Muskry.

- 1.9 The site has been designated for a number of Annex I habitats (Table 1). The full category titles for Annex I habitats mentioned in this report are found in Appendix 1.

Table 1: Annex I habitat data from the Natura 2000 Standard Data Form for Galtee Mountains cSAC. Data retrieved from [www.npws.ie](http://www.npws.ie) 26th October 2011. Rep. = Representativity, Surf. = Relative Surface, Cons. = Conservation status, Glob. = Global Assessment.

<b>Annex I code</b>	<b>Habitat</b>	<b>Area (%)</b>	<b>Rep.</b>	<b>Surf.</b>	<b>Cons.</b>	<b>Glob.</b>
4030	Dry heath	30	B	B	B	B
4060	Alpine and Boreal heath	2	B	C	A	A
*6230	Species-rich <i>Nardus</i> grasslands	1	B	C	B	C
*7130/7130	Blanket bog	13	C	C	C	B
8210	Calcareous rocky slopes	1	B	C	A	A
8220	Siliceous rocky slopes	1	B	C	A	A

## 2. FIELD SURVEY

### Description of habitats

#### *Lyracappul, Carrignabinnia and Slievecushnabinnia*

- 2.1 These three peaks form a ridge in the western part of the site. The flat summit of Slievecushnabinnia supports an area of montane blanket bog classified as **PB2 Upland blanket bog** in the classification scheme of Fossitt (2000). This is in poor condition with severe erosion in places and expanses of bare peat (**PB5 Eroding blanket bog**). It is rather species-poor being dominated by a mixture of *Calluna vulgaris*, *Eriophorum vaginatum* and *Eriophorum angustifolium* with *Hypnum jutlandicum* and small amounts of *Sphagnum capillifolium*. The summit here also supports areas of **HH4 Montane heath** in which the chief species are *Racomitrium lanuginosum*, *C. vulgaris* and *Vaccinium myrtillus*. On the upper slopes of Slievecushnabinnia on all sides except to the north are areas of scree composed of small talus (**ER3 Siliceous scree and loose rock**). These are sparsely vegetated with *R. lanuginosum* being the primary species, accompanied by *Diplophyllum albicans*, *Huperzia selago* and *Festuca* spp., with *Hymenophyllum wilsonii* tucked away in the crevices. On the northern spur of the mountain at Knockanuss, the area is covered in **HH1 Siliceous dry heath** dominated by *C. vulgaris* with some *V. myrtillus*, and *Rhytidiadelphus loreus* forming the moss layer. On the summit of Carrignabinnia and the top of Lyracappul there are further areas of **PB2 Upland blanket bog** with *E. vaginatum* and *C. vulgaris* that has been previously surveyed by Mooney *et al.* (1991). It is fringed on the southern slopes by **HH1 Siliceous dry heath**.
- 2.2 On the northern side of the ridge, almost the whole slope from Assaroola Glen to Knockmoyle is an expanse of rather species-poor grassland (**GS3 Dry-humid acid grassland**) composed largely of *Nardus stricta*, *Agrostis capillaris* and *Juncus squarrosus*. At Moneynaboola, where the waymarked trail leads up towards Lough Curra along the old ice road, there are areas of both *Calluna*-dominated **HH1 Siliceous dry heath** and **HH3 Wet heath** with *Calluna vulgaris* and *Molinia caerulea*.
- 2.3 On the southern side of the ridge below Lyracappul is a spur with two lower peaks, Knockaterriff and Knockaterriff Beg. The sides of this spur are dominated by **HH1 Siliceous dry heath**, whilst on the top are further areas of **PB2 Upland blanket bog**. This is eroding particularly in the col between the two peaks. Above the col is an area where numerous old drainage channels have been cut through the peat. The steep-sided spur that lies to the south of Carrignabinnia also supports **HH1 Siliceous dry heath**, with a small area of **HH4 Montane heath** at the summit. High up on this spur is another area of bog which has been drained. The upper part of the glen of the Blackrock River is largely **GS3 Dry-humid acid grassland**.

#### *Galtymore, Galtybeg and Knockeenatoung*

- 2.4 On the summit of Galtymore occur several rock outcrops but these are too exposed to harbour communities of much botanical interest. Sheep-grazing and trampling by walkers have created a very sparse and species-poor grassland sward across much of the peak. Just below the peak on the southern side occurs a band of **HH4 Montane heath** with *Calluna vulgaris*, *Racomitrium*

*lanuginosum* and a high cover of *Juncus squarrosus*. The summit of Galtybeg is covered by a combination of scree (**ER3 Siliceous scree and loose rock**) and **HH1 Dry siliceous heath**.

- 2.5 Below these peaks, on the shoulders of the mountain on the southern side, is a large area of **PB2 Upland blanket bog** which stretches eastwards along the ridge towards Greenane and Farbreaga. This area is the largest expanse of bog within the cSAC and one of its most distinctive features. It supports a typical high altitude bog community with the main species being *Calluna vulgaris*, *Eriophorum vaginatum* and *Eriophorum angustifolium*. *Sphagnum* cover is largely composed of *Sphagnum capillifolium*, but is frequently sparse. Erosion is widespread throughout this area resulting in exposed bedrock and gravel in some places. Eastern parts of this area of bog were surveyed by Mooney *et al.* (1991) who noted at that time that the area was beset by gully erosion. Due southwest of Dawson's Table is a further area where there are numerous old parallel drainage ditches.
- 2.6 South of Galtybeg lies the lower peak of Knockeenatoung. On the peak itself is a good example of **HH4 Montane heath**. Most of the rest of this area is **HH1 Dry siliceous heath**. This is again dominated by *Calluna vulgaris*, with small amounts of *Erica cinerea* and *Vaccinium myrtillus* and a bryophyte layer of *Rhytidiadelphus loreus*, *Hypnum jutlandicum* and *Hylocomium splendens*. Much of the heath in this area has been burnt and is at various stages of recovery. This burning appears to be conducted to encourage better grazing for livestock. There are some areas of **PB2 Upland blanket bog** in this area with some small pools which are examples of **FL1 Dystrophic lakes**. To the east in the valley above the Burncourt River, **HH3 Wet heath** characterised by *Trichophorum germanicum* is abundant.

#### *Greenane and Farbreaga*

- 2.7 The eastern part of the cSAC is much less heavily grazed than western parts and is also less rugged in morphology. The undulating landscape here is covered in a mosaic of heaths and bog with very little acid grassland. Along the ridge at Greenane and Farbreaga is a continuance of the area of **PB2 Upland blanket bog** described above. This is still badly eroded in many places including around the conglomerate tor of O'Loughnan's Castle that lies on the ridge above Lough Muskry. There are however still good areas of intact *Calluna-Eriophorum* bog. Close to the eastern boundary of the site near Carrigphierish is an example of a *Sphagnum*-rich upland bog with *Drosera rotundifolia*.
- 2.8 The penultimate summit along this ridge when heading east across the site supports an excellent example of **HH4 Montane heath**. The main species include *Calluna vulgaris*, *Racomitrium lanuginosum*, *Empetrum nigrum*, *Erica cinerea* and *Huperzia selago*.
- 2.9 Below this ridge bog both to the north and south are large expanses of **HH1 Dry siliceous heath**. On the northern slopes there has been widespread burning of this habitat which occurs in mosaic with **HH3 Wet heath** that is chiefly composed of *Trichophorum germanicum* and *Calluna vulgaris* and rushy poor flushes (**PF2 Poor fen and flush**).
- 2.10 On the southern side of the ridge in the valley of the Glennyreea River is a large area of **HH3 Wet heath**, dominated by *Molinia caerulea* and *Calluna vulgaris* with *Juncus squarrosus*, *Sphagnum palustre*, *Sphagnum tenellum*, *Sphagnum compactum* and *Sphagnum cuspidatum*. Further upslope in

this area *Molinia* becomes scarcer and *Trichophorum*-dominated wet heath becomes more common. There are substantial areas of **HD1 Dense bracken** in this valley also.

- 2.11 In the southeastern corner of the site at Bohernarnane a further area of **HH3 Wet heath** breaks up the dominance of dry heath. This occurs on fairly deep peats on shallowly sloping ground. *Molinia caerulea* and *Calluna vulgaris* dominate here in very dense and tussocky vegetation that sees little grazing. On steeper ground, *Trichophorum*-dominated wet heath becomes more common.

#### *Cush and Knockastakeen*

- 2.12 Cush is a prominent hill that lies due north of Galtybeg. The western slopes are dominated by species-poor **GS3 Dry-humid acid grassland**, whilst on the lower eastern slopes are large areas of poor flush (**PF2 Poor fen and flush**) characterised by *Juncus effusus* and *Sphagnum* spp. The northern slopes are a mosaic of **HH1 Dry siliceous heath** and **HH3 Wet heath**.
- 2.13 Knockastakeen is a spur that runs north from the main ridge. It is largely covered in **HH1 Dry heath**. On its lower slopes are some *Juncus*-dominated areas of **GS4 Wet grassland** and poor flush (**PF2 Poor fen and flush**). Below Lough Muskry and Borheen Lough are some areas of **PB2 Upland blanket bog** with *Calluna vulgaris* and *Eriophorum vaginatum*.

#### *The corries*

- 2.14 The four corrie lakes on the northern side of the Galtees are all examples of **FL2 Acid oligotrophic lakes**. The corrie of Lough Muskry is of particular interest in terms of habitats. The back wall of the corrie appears to be a mixture of sandstone and conglomerates but the majority of it receives a great deal of base-rich flushing, resulting in vegetation more attributable to **ER2 Exposed calcareous rock**. Species of clefts and overhangs in these areas include *Ctenidium molluscum*, *Tortella tortuosa*, *Oxyria digyna*, *Asplenium viride*, *Amphidium mougeotii*, *Anoetangium aestivum*, *Cystopteris fragilis* and *Campanula rotundifolia*. Tall herb communities on ledges here support *Angelica sylvestris*, *Sedum rosea*, *Succisa pratensis*, *Festuca vivipara* and *Breutelia chrysocoma*. Where there is considerable flushing a **FP1 Calcareous springs** community occurs on the rock face with *Palustriella commutata*, *Koeleria macrantha*, *Cratoneuron filicinum*, *Pellia endiviifolia* and the rare *Saxifraga hypnoides*. In areas where there is little or no flushing, a more acidophilous community attributable to **ER1 Exposed siliceous rock** occurs. Large patches of *Saxifraga spathularis* occur in some of these clefts accompanied by *Hymenophyllum wilsonii* and *Herbertus aduncus*, this latter species forming hepatic mats in some locations. Close to the lake itself is an area of **PB2 Upland blanket bog** that has been severely damaged by quad bikes and scramblers.
- 2.15 The corrie of Borheen Lough also supports **ER1 Exposed siliceous rock** communities with *Hymenophyllum wilsonii*, *Polypodium vulgare* and *Diplophyllum albicans*. Tall herb communities of base-rich ledges here are characterised by *Agrostis stolonifera*, *Angelica sylvestris*, *Festuca rubra*, *Breutelia chrysocoma*, *Luzula sylvatica*, *Saxifraga hypnoides* and *Ctenidium molluscum*. Where there is flushing of the rock face, spring-like vegetation with *Chrysosplenium oppositifolium*, *Philonotis fontana*, *Saxifraga hypnoides* and *Palustriella commutata* occurs. The majority of the corrie is however, dominated by **GS3 Dry-humid acid grassland**.

- 2.16 Lough Diheen is the smallest of the four lakes and sits in a deep corrie bowl with a high unbroken moraine to the north. Much of the corrie wall is **ER1 Exposed siliceous rock** but is rather lacking cleft vegetation. Some base-rich flushing occurs here also, however, creating patches of vegetation again attributable to **ER2 Exposed calcareous rock** with *Asplenium viride*, *Amphidium mougeotii*, *Anoetangium aestivum*, *Cystopteris fragilis*, *Carex viridula* ssp. *oedocarpa* and *Festuca vivipara*. On the rocky ledges, *Cochlearia officinalis* agg. occurs along with *Saxifraga rosacea*, *Angelica sylvestris*, *Campanula rotundifolia* and *Luzula sylvatica*.
- 2.17 The corrie of Lough Curra at the western end of the site is dominated by acid grassland (**GS3 Dry-humid acid grassland**) and rocky slopes (**ER1 Exposed siliceous rock**). Tall-herb ledge communities with *Luzula sylvatica* and *Cochlearia officinalis* agg. again occur here and there are both siliceous and calcareous cleft communities.
- 
- 2.18 A selection of photographs taken during fieldwork of landscapes, habitats and species are presented in Appendix 2.

### Habitat statistics

- 2.19 The NSUH maps habitats and vegetation communities on a polygon basis. Following aerial photograph interpretation, a survey site is divided into numerous polygons based on areas of homogeneous patterning and topography. The majority of these polygons represent mosaics of habitats rather than single habitats. Each polygon is surveyed on the ground and the habitats and vegetation communities present in each are listed and their percentage cover estimated. For further details see Perrin *et al.* (2009; 2014). The field maps for this site, which present the amended and numbered polygons, accompany this report (Field maps 1-11).
- 2.20 The most abundant habitat within a polygon is termed the primary habitat. The primary Fossitt habitat types for the Galtee Mountains cSAC are shown in Fig. 2 and the primary Annex I habitat types are presented in Fig. 3. It is important to note that these maps do not convey the full complexity of habitats within the site. For full details of the habitat composition of each polygon refer to the polygon attribute table associated with the GIS. This information also accompanies this report in Microsoft Excel format.
- 2.21 A total of 39 Fossitt (2000) habitats were recorded during this survey within the Galtee Mountain cSAC and details of their coverage are presented in Table 2. **HH1 Dry siliceous heath** was the most extensive habitat, covering 33.8% of the site, followed by **GS3 Dry-humid acid grassland** at 26.4%, **PB2 Upland blanket bog** at 15.7% and **HH3 Wet heath** at 11.3%.
- 2.22 A total of 13 Annex I habitats were recorded during this survey within the Galtee Mountain cSAC, covering 63.0% of the site (Table 3). The main Annex I habitat was **4030 Dry heath**, which covered 33.7% of the site, followed by **\*7130 Active blanket bog** and **4010 Wet heath** which covered 15.6% and 11.3% of the site respectively. The next most frequent habitat was **4060 Alpine and Boreal heath** at 1.0%. Note that significant areas of non-Annex habitats may occur within an SAC. These may occur in intimate mosaic with Annex I habitats. They may



have an important protective or support function in relation to associated Annex habitats, be the target of restoration objectives or improve the coherence and connectivity between fragmented areas of Annex I habitat.

Table 2: Extent of Fossitt habitats within the Galtee Mountains cSAC.

<b>Fossitt code</b>	<b>Habitat</b>	<b>Area (ha)</b>	<b>% of site</b>
BL1	Stone walls and other stonework	1.4	0.02
BL2	Earth banks	0.3	0.004
BL3	Buildings and artificial surfaces	0.6	0.01
ED1	Exposed sand, gravel or till	5.8	0.09
ED2	Spoil and bare ground	22.4	0.35
ED3	Recolonising bare ground	2.1	0.03
ER1	Exposed siliceous rock	26.3	0.41
ER2	Exposed calcareous rock	3.7	0.06
ER3	Siliceous scree and loose rock	108.7	1.69
ER4	Calcareous scree and loose rock	0.01	0.0002
FL1	Dystrophic lakes	0.7	0.01
FL2	Acid oligotrophic lakes	18.1	0.28
FP1	Calcareous springs	0.04	0.001
FP2	Non-calcareous springs	2.6	0.04
FS1	Reed and large sedge swamps	0.1	0.001
FW1	Eroding/upland rivers	14.2	0.22
FW2	Depositing/lowland rivers	0.1	0.002
FW4	Drainage ditches	0.04	0.001
GA1	Improved agricultural grassland	0.6	0.01
GA2	Amenity grassland (improved)	0.03	0.001
GM1	Marsh	0.1	0.002
GS3	Dry-humid acid grassland	1698.3	26.44
GS4	Wet grassland	132.3	2.06
HD1	Dense bracken	92.0	1.43
HH1	Dry siliceous heath	2169.7	33.78
HH3	Wet heath	722.7	11.25
HH4	Montane heath	95.9	1.49
PB2	Upland blanket bog	1011.0	15.74
PB5	Eroding blanket bog	17.4	0.27
PF1	Rich fen and flush	2.7	0.04
PF2	Poor fen and flush	258.4	4.02
WD4	Conifer plantation	5.9	0.09
WD5	Scattered trees and parkland	1.1	0.02
WL1	Hedgerows	0.1	0.002
WL2	Treelines	0.2	0.003
WN1	Oak-birch-holly woodland	0.2	0.003
WN6	Wet willow-alder-ash woodland	4.2	0.07
WS1	Scrub	2.9	0.04
WS5	Recently-felled woodland	0.02	0.0003
	<b>Total site area</b>	<b>6422.6</b>	

Table 3: Extent of Annex I habitats within the Galtee Mountains cSAC. \* denotes priority habitat.

Annex I code	Habitat	Area (ha)	% of site
3130	Upland oligotrophic lakes	18.0	0.28
3160	Dystrophic lakes	0.3	0.004
3260	Floating river vegetation	1.5	0.02
4010	Wet heath	722.7	11.25
4030	Dry heath	2165.7	33.72
4060	Alpine and Boreal heath	62.7	0.98
6430	Hydrophilous tall herb communities	0.5	0.01
*7130	Active blanket bog	1001.0	15.59
7130	Inactive blanket bog	9.5	0.15
7230	Alkaline fens	0.5	0.01
8110	Siliceous scree	54.8	0.85
8210	Calcareous rocky slopes	2.8	0.04
8220	Siliceous rocky slopes	6.1	0.09
	non-Annex I habitats	2376.6	37.00
	<b>Total site area</b>	<b>6422.6</b>	
	<b>Total area of Annex I habitats</b>	<b>4046.1</b>	<b>63.00</b>

- 2.23 A total of 61 provisional upland vegetation communities and sub-communities (Perrin *et al.*, 2014) were recorded within the Galtee Mountain cSAC. Details of their coverage are presented in Table 4.
- 2.24 Gradated maps displaying the cover of Annex I habitats currently assessed under the NSUH plus **6430 Hydrophilous tall herb communities** are shown in Figs. 4a-j. These maps present the actual distributions of individual habitats within the site which may be masked in the primary habitat maps which show only the most extensive habitat in each polygon.

### Rare and notable flora

- 2.25 Rare and notable plant records for the site are listed in Table 5 and their locations, where accurately known, are presented in Figs. 5a-b. The list is compiled from records made during the present survey and from existing records. For each species it is indicated whether it is listed on the Flora Protection Order, 1999 and/or the relevant Red Data List. For vascular plants this is Curtis & McGough (1988) and for bryophytes the provisional list of Lockhart *et al.* (2012) was used. For lichens a preparatory list provided by D. McFerran, National Museums Northern Ireland was used; this is very much provisional and IUCN status has not been assigned to these species. Notable records comprise plants which are not rare but are of particular interest in an upland context.
- 2.26 Some rare arctic-alpines were recorded during the NSUH at this site. *Carex bigelowii* was found on the summit of Galtybeg, while *Salix herbacea* was found on the northern slopes below Carrignabinnia.

Table 4: Extent of provisional vegetation communities within the Galtee Mountains cSAC.

Code	Provisional communities and sub-communities	Area (ha)	% of site	% of habitat
PO1	<i>Menyanthes trifoliata</i> - <i>Carex limosa</i> pool community			
PO1b	aquatic sub-community	0.1	0.001	100.0
SW1	<i>Potamogeton polygonifolius</i> soakway	0.5	0.01	100.0
SPG1	<i>Philonotis fontana</i> - <i>Saxifraga stellaris</i> spring			
SPG1a	typical sub-community	1.2	0.02	46.7
SPG1b	species-poor <i>Sphagnum denticulatum</i> sub-community	1.4	0.02	51.7
SPG2	<i>Palustriella commutata</i> spring			
SPG2ii	non-Annex I variant	0.04	0.001	1.6
PFLU1	<i>Carex nigra/echinata</i> - <i>Sphagnum denticulatum</i> flush	16.7	0.26	4.3
PFLU2	<i>Juncus effusus</i> - <i>Sphagnum cuspidatum/palustre</i> flush	234.2	3.65	60.6
PFLU3	<i>Juncus acutiflorus/effusus</i> - <i>Calliergonella cuspidata</i> flush	128.5	2.00	33.3
PFLU4	<i>Molinia caerulea</i> - <i>Sphagnum palustre</i> flush			
PFLU4a	typical sub-community	6.9	0.11	1.8
RFLU1	<i>Carex viridula oedocarpa</i> - <i>Pinguicula vulgaris</i> - <i>Juncus bulbosus</i> flush			
RFLU1a	brown moss sub-community	0.5	0.01	18.9
RFLU1b	species-poor sub-community	2.2	0.03	79.6
RFLU3	<i>Carex panicea</i> - <i>Carex viridula</i> subsp. <i>oedocarpa</i> flush	0.04	0.001	1.5
UG1	<i>Agrostis capillaris</i> - <i>Festuca ovina</i> upland grassland			
UG1a	typical sub-community	565.3	8.80	33.2
UG1b	<i>Sphagnum</i> spp. sub-community	1.6	0.03	0.1
UG1d	<i>Juncus squarrosus</i> sub-community	248.6	3.87	14.6
UG2	<i>Nardus stricta</i> - <i>Galium saxatile</i> upland grassland			
UG2a	typical sub-community	367.3	5.7	21.6
UG2b	<i>Sphagnum</i> spp. sub-community	62.8	0.98	3.7
UG2d	<i>Juncus squarrosus</i> sub-community	452.7	7.05	26.6
UG4	<i>Molinia caerulea</i> – <i>Anthoxanthum odoratum</i> wet grassland	3.4	0.05	0.2
BK1	<i>Pteridium aquilinum</i> community	92.0	1.43	100.0
DH1	<i>Ulex gallii</i> - <i>Erica cinerea</i> dry heath	9.1	0.14	0.4
DH3	<i>Calluna vulgaris</i> - <i>Erica cinerea</i> dry heath	2017.3	31.41	93.2
DH4	<i>Calluna vulgaris</i> - <i>Sphagnum capillifolium</i> dry/damp heath	97.1	1.51	4.5
DH6	<i>Calluna vulgaris</i> - <i>Vaccinium myrtillus</i> dry heath	42.1	0.66	2.0
WH2	<i>Trichophorum germanicum</i> - <i>Cladonia</i> spp. - <i>Racomitrium lanuginosum</i> wet heath	0.8	0.01	0.1
WH3	<i>Calluna vulgaris</i> - <i>Molinia caerulea</i> - <i>Sphagnum capillifolium</i> wet/damp heath	253.2	3.94	35.0
WH4	<i>Trichophorum germanicum</i> - <i>Eriophorum angustifolium</i> wet heath			
WH4a	typical sub-community	71.3	1.11	9.9
WH4b	<i>Calluna vulgaris</i> sub-community	364.5	5.68	50.4
WH4c	<i>Juncus squarrosus</i> sub-community	15.4	0.24	2.1
WH5	<i>Trichophorum germanicum</i> - <i>Nardus stricta</i> - <i>Racomitrium lanuginosum</i> montane wet heath	17.3	0.27	2.4
WH6	<i>Schoenus nigricans</i> – <i>Molinia caerulea</i> – <i>Myrica gale</i> wet heath	0.2	0.003	0.03
WH7	<i>Molinia caerulea</i> – <i>Ulex gallii</i> wet heath	0.02	0.0003	0.002

Table 4: continued.

Code	Provisional communities and sub-communities	Area (ha)	% of site	% of habitat
MH1	<i>Calluna vulgaris</i> - <i>Racomitrium lanuginosum</i> montane heath			
MH1a	typical sub-community	35.3	0.55	36.8
MH1b	<i>Juncus squarrosus</i> sub-community	14.6	0.23	15.2
MH3	<i>Vaccinium myrtillus</i> - <i>Rhytidiadelphus loreus</i> - <i>Anthoxanthum odoratum</i> montane heath	12.8	0.20	13.3
MH5	<i>Nardus stricta</i> - <i>Carex binervis</i> - <i>Racomitrium lanuginosum</i> montane grass-heath	32.7	0.51	34.1
MH8	<i>Festuca vivipara</i> - <i>Thymus polytrichus</i> - <i>Galium saxatile</i> montane vegetation	0.6	0.01	0.6
BB3	<i>Eriophorum vaginatum</i> - <i>Sphagnum papillosum</i> bog	40.1	0.62	4.0
BB4	<i>Trichophorum germanicum</i> - <i>Eriophorum angustifolium</i> bog	237.4	3.70	23.8
BB5	<i>Calluna vulgaris</i> - <i>Eriophorum</i> spp. bog			
BB5a	typical sub-community	574.3	8.94	57.5
BB5b	<i>Juncus squarrosus</i> sub-community	147.3	2.29	14.7
BB6	<i>Eriophorum angustifolium</i> - <i>Juncus squarrosus</i> bog			
BB6a	typical sub-community	0.2	0.003	0.02
HW1	<i>Sphagnum denticulatum/cuspidatum</i> hollow			
HW1i	upland variant	1.7	0.03	14.9
HW1iii	flush variant	0.4	0.01	3.3
HW2	<i>Eriophorum angustifolium</i> - <i>Sphagnum fallax</i> hollow			
HW2i	upland variant	9.5	0.15	81.2
HW4	<i>Eleocharis multicaulis</i> hollow			
HW4ii	flush variant	0.1	0.001	0.6
DP1	<i>Campylopus introflexus</i> - <i>Polytrichum</i> spp. degraded peat community	2.1	0.03	60.6
DP2	<i>Nardus stricta</i> - <i>Eriophorum angustifolium</i> degraded peat community	1.4	0.02	39.4
TH1	<i>Luzula sylvatica</i> - <i>Vaccinium myrtillus</i> tall herb vegetation			
TH1i	rock face variant	2.2	0.03	32.8
TH1ii	dry heath variant	4.0	0.06	60.3
TH2	<i>Cochlearia pyrenaica</i> tall herb vegetation	0.01	0.0001	0.1
TH3	<i>Sedum rosea</i> - <i>Angelica sylvestris</i> tall herb vegetation	0.5	0.01	6.8
SC1	Siliceous scree community	1.5	0.02	100.0
RS1	<i>Saxifraga spathularis</i> - <i>Asplenium adiantum-nigrum</i> rock cleft community	0.3	0.004	59.9
RS2	<i>Saxifraga aizoides</i> - <i>Asplenium</i> spp. - <i>Orthothecium rufescens</i> rock cleft community	0.2	0.003	40.1
HM1	<i>Calluna vulgaris</i> - <i>Scapania gracilis</i> hepatic mat			
HM1i	non-Annex I grassland variant	0.1	0.001	32.2
HM1iii	dry heath variant	0.001	0.00002	0.6
HM1v	montane heath variant	0.02	0.0003	13.8
HM2	<i>Calluna vulgaris</i> - <i>Herbertus aduncus</i> hepatic mat			
HM2i	non-Annex I grassland variant	0.01	0.0002	6.8
HM2vi	non-Annex I siliceous rock face variant	0.03	0.001	20.6
HM2vii	Annex I siliceous rock face variant	0.04	0.001	26.0
	<b>Total area of vegetation communities</b>	6193.3	96.43	
	Not covered	16.1	0.25	
	Non-vegetation cover types	213.3	3.32	
	<b>Total site area</b>	6422.6		

- 2.27 *Oxyria digyna* has previously been recorded on the corrie walls above Lough Curra and Lough Muskry, the population at Lough Muskry was refound during the NSUH. Other notable plants recorded from the corries include *Cochlearia officinalis* agg. and *Saxifraga rosacea* at Lough Diheen, *Saxifraga hypnoides* at Borheen Lough and Lough Muskry, and *Thalictrum minus* at Lough Muskry. The ferns *Asplenium viride* and *Cystopteris fragilis* were recorded from the corrie walls of both Lough Muskry and Lough Diheen. *Vaccinium vitis-idaea* was noted growing on rocky slopes below Carrignabinnia and to the east of Borheen Lough.
- 2.28 Previous records for rare plants include *Arabis petraea* above Lough Curra, this is one of only two known stations for this species in Ireland and a population of *Pseudorchis albida* in Ballygleanna. *Saussurea alpina* has previously been recorded from the cliffs above Lough Diheen by Hart (1883). In 1969, *Euphrasia frigida* was recorded from the north side of Galtymore, below the summit and on the cliff ledges above Borheen Lough; these records represented a new addition to the flora of South Tipperary (Scannell 1973). *Meconopsis cambrica* has also been recorded in the past. *Thalictrum alpinum* is noted on the Natura 2000 Standard Data Form but no original source for this record could be found.
- 2.29 Rare bryophytes recorded during the present survey include *Leiocolea bantriensis* from the corrie surrounding Lough Muskry and *Metzgeria leptoneura* from Lough Diheen corrie. *Sphagnum capillifolium* subsp. *capillifolium* was recorded from the south western facing slopes of Greenane and from the col south of Galtybeg, this constitutes a new vice county record for South Tipperary. Other new vice county records for South Tipperary include *Sphagnum teres* and *Sphagnum warnstorffii* that were recorded on the north facing slopes below Lough Muskry, and *Sphagnum skyense* found in the corries surrounding Lough Muskry, Lough Curra, Lough Diheen and Borheen Lough. *Plagiochila exigua* was recorded from the corries surrounding Lough Muskry and Borheen Lough; although not on the Red Data List, this constitutes another new vice county record for South Tipperary. New vice county records for Co. Limerick include *Sphagnum skyense* which was recorded on the slopes north-west of Carrignabinnia and *Tetraplodon mnioides* recorded on the col between Knockaterriff and Templehill; the latter species is not on the Red Data List but is notable as it constitutes a new vice county record.
- 2.30 Previous rare bryophyte records include the Critically Endangered *Encalypta ciliata* and the Vulnerable *Amphidium lapponicum*, *Bartramia ithyphylla* and *Marsupella funckii*.
- 2.31 The NSUH survey did not actively seek to relocate previous rare plant records; therefore no inference should be made from the absence of a record in the current survey.
- 2.32 A list of the scientific and common names of all vascular plants, bryophytes and lichens recorded during the survey of this site are presented in Appendix 3.

## Fauna

- 2.33 Faunal records during this survey include Irish Hare (*Lepus timidus hibernicus*), Fox (*Vulpes vulpes*), an active Badger (*Meles meles*) sett, Common Lizard (*Zootoca vivipara*), Red Grouse (*Lagopus lagopus*), Kestrel (*Falco tinnunculus*), Dippers (*Cinclus cinclus*), Common Snipe (*Gallinago gallinago*) and Pheasant (*Phasianus colchicus*).

Table 5: Records of rare and notable plant species from Galtee Mountains cSAC.

Species	Red Data List	FPO	Annex II	Year of record (s)	NSUH	Previous records
Vascular plants						
<i>Arabis petraea</i>	RA	•	-	1880, 1989, 2008	-	1, 2, 3, 5
<i>Asplenium viride</i>	-	-	-	1943, 1944, 2005, 2011	•	4, 5, 6
<i>Carex bigelowii</i>	-	-	-	1880, 1943, 1944, 1991, 2005, 2011	•	3, 4, 6, 11
<i>Cochlearia officinalis</i> agg.	-	-	-	1880, 2005, 2011	•	4, 5
<i>Cystopteris fragilis</i>	-	-	-	1880, 1944, 2011	•	5, 6
<i>Euphrasia frigida</i>	-	-	-	1969	-	9
<i>Meconopsis cambrica</i>	-	-	-	1880, 1943	-	5, 6
<i>Oxyria digyna</i>	-	-	-	1880, 1943, 1944, 2005, 2011	•	2, 4, 5, 6, 12
<i>Pseudorchis albida</i>	VU	•	-	1945, 1991, 1996	-	1, 2, 3
<i>Salix herbacea</i>	-	-	-	1880, 1943, 1944, 2011	•	3, 5, 6
<i>Saussurea alpina</i>	RA	-	-	1880, 1881, 1945	-	2, 3, 5
<i>Saxifraga hypnoides</i>	-	-	-	1880, 1900, 1943, 2005, 2011	•	4, 5, 7
<i>Saxifraga rosacea</i>	-	-	-	1880, 1943, 1944, 1880, 2005, 2011	•	1, 4, 5, 6, 7
<i>Thalictrum alpinum</i>	-	-	-	?	-	2
<i>Thalictrum minus</i>	-	-	-	2011	•	-
<i>Vaccinium vitis-idaea</i>	-	-	-	1880, 1943, 1944, 2011	•	5, 6
Bryophytes						
<i>Amphidium lapponicum</i>	VU	-	-	2005	-	1
<i>Bartramia ithyphylla</i>	VU	-	-	2005	-	1
<i>Encalypta ciliatata</i>	CR	-	-	2005	-	1
<i>Fontinalis antipyretica</i> var. <i>gracilis</i>	NT	-	-	1966	-	10
<i>Grimmia donniana</i>	NT	-	-	1966	-	10
<i>Grimmia torquata</i>	NT	-	-	2005	-	1
<i>Leiocolea bantriensis</i>	NT	-	-	2011	•	-
<i>Marsupella funckii</i>	NT	-	-	1966	-	10
<i>Metzgeria leptoneura</i>	NT	-	-	2011	•	-
<i>Plagiobryum zieri</i>	NT	-	-	2005	-	1
<i>Plagiochila exigua</i>	-	-	-	2011	•	-
<i>Plagiothecium denticulatum</i> var. <i>obtusifolium</i>	NT	-	-	2005	-	1
<i>Pohlia elongata</i> var. <i>elongata</i>	NT	-	-	2005	-	1
<i>Schistidium strictum</i>	NT	-	-	2005	-	1
<i>Sphagnum capillifolium</i> subsp. <i>capillifolium</i>	DD	-	-	2011	•	-
<i>Sphagnum russowii</i>	NT	-	-	1966	-	10
<i>Sphagnum skyense</i>	DD	-	-	2011	•	-
<i>Sphagnum teres</i>	NT	-	-	2011	•	-
<i>Sphagnum warnstorffii</i>	VU	-	-	2011	•	-
<i>Tetraplodon mnioides</i>	-	-	-	2011	•	-
<i>Tortella densa</i>	NT	-	-	2005	-	1
Lichens						
<i>Cladonia rangiferina</i>	•	-	-	1991	-	1, 11
<i>Massalonia carnosa</i>	•	-	-	1989	-	8

† Located just outside cSAC boundary

Previous records:	1, NPWS Recorder database and associated data	7, Webb (1943)
	2, Natura 2000 Standard Data Form	8, LichenIreland database
	3, cSAC site synopsis	9, Scannell (1973)
	4, Goodwillie (2005)	10, Synnott (1966)
	5, Hart (1883)	11, Mooney <i>et al.</i> (1991)
	6, Stelfox (1944, 1946)	12, Praeger (1934)
Red Data List:	CR, Critically Endangered	RA, Rare
	EN, Endangered	NT, Near Threatened
	VU, Vulnerable	

2.34 Previous faunal records from the cSAC include the Otter (*Lutra lutra*), a species listed on Annex II of the EU Habitats Directive and Fallow Deer (*Dama dama*). Merlins (*Falco columbarius*) and Peregrine Falcons (*Falco peregrinus*), which are listed on Annex I of the EU Birds Directive, have also previously been recorded onsite, with the latter species breeding within the cSAC (NPWS, 2005). Other notable bird species include Hen Harriers (*Circus cyaneus*), Sparrowhawks (*Accipiter nisus*), Skylark (*Alauda arvensis*), Meadow Pipit (*Anthus pratensis*), Wheatear (*Oenanthe oenanthe*), Grey Heron (*Ardea cinerea*) and Ravens (*Corvus corax*). Brown Trout (*Salmo trutta*) occur within some of the rivers and corries lakes within the cSAC.

### 3. CONSERVATION ASSESSMENT

3.1 The conservation status of Annex I habitats that form the primary focus of the NSUH was assessed using the methodology detailed in Perrin *et al.* (2014). The assessments comprise three parameters: area, structure and functions, and future prospects. The area parameter examines gains or losses in an Annex I habitat. The structure and functions parameter examines the vegetation composition and structure of the habitats and the physical structure of the substrate; a total of 66 monitoring stops were recorded within the Galtee Mountains cSAC for this purpose (Fig. 6 and Table 6); 8 additional relevés were recorded in habitats that were not assessed including 3 relevés from the Annex I habitat **6430 Hydrophilous tall herb communities** and 5 relevés from non-Annex habitats. The future prospects parameter examines the current impacts to the site that are affecting area and structure and functions, and predicts the future status of the habitat based on future trends where there is sufficient data. The future prospects parameter can also be informed by available data from the Commonage Framework Plan project (CFP).

Table 6: The number of monitoring stops recorded in primary focus Annex I habitats

Annex I code	Habitat	Number of stops
4010	Wet heath	11
4030	Dry heath	25
4060	Alpine and Boreal heath	4
*7130/7130	Blanket bog	15
7230	Alkaline fens	2
8110	Siliceous scree	3
8210	Calcareous rocky slopes	3
8220	Siliceous rocky slopes	3

#### Commonage Framework Plan

3.2 Surveys were initiated in 1998 to assess livestock impacts on commonages in Ireland and to devise Commonage Framework Plans (CFP) to improve commonage condition. Assessments were made on an area basis by dividing the commonage into subunits based on areas of a consistent level of damage. Point sample assessments were made at a series of stations, of 10 x 10 m, within the subunits. The habitats identified by the CFP relevant to the NSUH sites were blanket bog, wet heath, dry heath and upland grassland. The damage assessment scale used was undamaged (U), moderately damaged to undamaged (MU), moderately damaged (MM), moderately to severely damaged (MS), severely damaged (S) or very severely damaged (S\*). Further details of CFP methodology can be found in Anon. (1998) and use of this data by the NSUH has been reviewed by Perrin (2012).

3.3 The Galtee Mountains cSAC is predominantly commonage with these areas comprising 61.0 km<sup>2</sup> or 95.0% of the site. A baseline CFP survey of the majority of these areas occurred in August 2000 with reductions in stock number resulting from these assessments occurring c.2002. Small additional areas were baseline surveyed in May 2004. A resurvey of all stations



and a subset of subunits occurred in 2008. Results from these surveys are shown in Figs. 7a,b.

- 3.4 Of the 37 subunits within or partially within the cSAC, 29 subunits were resurveyed in 2008 (Table 7). The baseline survey indicates commonage within the site was in relatively good condition at this time with 33.7% of subunit area being undamaged (U) and only 0.7% of subunit area being moderately to severely damaged (MS) or worse. However, pairwise comparison of the resurveyed subunits indicates that only 4 subunits (13.8%) improved, 15 subunits (51.7%) did not change significantly and 10 subunits (34.5%) disimproved. The main change was a decrease in the area of undamaged (U) subunits and an increase in the area of moderately damaged to undamaged (MU) subunits. There was also a decrease in the area subunits that were moderately damaged (MM) subunits or worse.

Table 7: Frequency of CFP subunit damage levels in the Galtees Mountain cSAC, baseline surveys and 2008 resurvey.

Damage level	Baseline (n = 37)		Resurvey (n = 29)	
	Frequency	Area %	Frequency	Area %
U	19 (51.4%)	33.7	10 (34.5%)	19.6
MU	11 (29.7%)	55.3	17 (58.6%)	75.5
MM	6 (16.2%)	10.3	2 (6.9%)	4.8
MS	0 (0.0%)	0.0	0 (0.0%)	0.0
S/S*	1 (2.7%)	0.7	0 (0.0%)	0.0

- 3.5 The CFP recorded 38 stations within the Galtee Mountains cSAC (Table 8). The baseline survey indicates commonage within the site was in moderate condition at this time with 68.4% of stations being undamaged (U) but 10.5% of stations being moderately severely damaged (MS) or worse. The main changes between the baseline survey and the resurvey in 2008 were a decrease in the proportion of undamaged (U) stations and an increase in the number of moderately damaged (MM) and moderately damaged to undamaged (MU) stations.

Table 8: Frequency of CFP station damage level in the Galtee Mountains cSAC, baseline surveys and 2008 resurvey. Percentages indicate proportion of stations within each column.

Damage level	Wet heath/Dry heath/ Blanket bog		Upland grassland		All habitats	
	Baseline	Resurvey	Baseline	Resurvey	Baseline	Resurvey
	(n = 32)	(n = 31)	(n = 6)	(n = 7)	(n = 38)	(n = 38)
U	22 (68.8%)	17 (54.8%)	4 (66.7%)	3 (42.9%)	26 (68.4%)	20 (52.6%)
MU	4 (12.5%)	7 (22.6%)	1 (16.7%)	1 (14.3%)	5 (13.2%)	8 (21.1%)
MM	2 (6.3%)	4 (12.9%)	1 (16.7%)	3 (42.9%)	3 (7.9%)	7 (18.4%)
MS	3 (9.4%)	1 (3.1%)	0 (0.0%)	0 (0.0%)	3 (7.9%)	1 (2.6%)
S/S*	1 (3.1%)	2 (6.5%)	0 (0.0%)	0 (0.0%)	1 (2.6%)	2 (5.3%)

3.6 Summary data for some of the key indicators recorded at CFP stations are compared with NSUH data in Table 9. There has been no significant change in bare peat cover but there is a trend of increasing *Calluna* height and sward height since the baseline survey. The apparent increase in *Calluna* cover since the resurvey may be due to a greater proportion of dry heath plots being recorded by the NSUH than in the CFP, as dry heath tends to have a higher cover on average than wet heath or blanket bog.

Table 9: Mean values for key indicators from CFP stations in the Galtee Mountains cSAC, baseline survey (2000) and the 2008 resurvey, with related data from NSUH survey (2011).

	Wet heath/Dry heath/ Blanket bog			Upland grassland	
	Original	Resurvey	NSUH	Original	Resurvey
	(n = 27-32)	(n = 31)	(n = 55)	(n = 5-6)	(n = 6-7)
Bare peat cover (%)	1.1	2.9	1.5	0.0	0.0
Sward height (cm)	17.3	18.5	21.3	10.2	14.7
<i>Calluna</i> height (cm)	12.4	20.1	21.4†	-	-
<i>Calluna</i> cover					
D (>50%)	10 (31.3%)	11 (35.5%)	33 (60.0%)	-	-
A (26-50%)	12 (37.5%)	11 (35.5%)	7 (12.7%)	-	-
F (5-25%)	9 (28.1%)	7 (22.6%)	12 (21.8%)	-	-
O (<5%)	1 (3.1%)	2 (6.5%)	2 (3.6%)	-	-
Absent	0 (0.0%)	0 (0.0%)	1 (1.8%)	-	-

† Dwarf shrub height is used here as an estimate of *Calluna* height

3.7 Disimprovement that occurred between the 2000 and 2008 surveys is likely to have occurred prior to the CFP reductions in stock numbers being implemented c. 2002. This additional damage to habitats appears to outweigh any improvement that occurred between c. 2002 and 2008. Since 2008, there are indications from the key indicator analysis that vegetation structure is improving. This may tentatively be seen as a positive trend for **4010 Wet heath**, **4030 Dry heath** and **\*7130/7130 Blanket bog**.

#### 4010 Wet heath

##### Area

3.8 Changes in the area of **4010 Wet heath** were recorded for the period 1995 to 2011 through a combination of observations in the field and analysis of aerial photographs (Table 10). Satellite coverage of the area available through Google Earth was of poor resolution and could not be used. Only losses in habitat were found, there were no gains in habitat area. These data are

restricted to obvious changes in habitat; less obvious changes from one habitat type to another cannot be reliably identified by this process. All losses identified were minor, being less than 1 ha in total. The impacts and trends are discussed later under future prospects. The overall change in habitat area was a loss of less than 1% per year resulting in a status of Unfavourable – Inadequate.

Table 10: Impacts causing obvious losses in area of 4010 Wet heath, 1995-2011.

Impact code	Impact	Area (ha) 1995-2000	Area (ha) 2000-2005	Area (ha) 2005-2011	Area (ha) 1995-2011
D01.01	Paths, tracks, cycling tracks	0.00	<0.01	0.00	<0.01
E01.03	Dispersed habitation	0.11	0.00	0.00	0.11
J01.01	Burning down	0.00	0.31	0.00	0.31
L05	Collapse of terrain landslide	<0.01	0.01	0.00	0.01
All impacts		0.11	0.32	0.00	0.43
% of habitat		0.02	0.04	0.00	0.06
% loss per year		<0.01	0.01	0.00	<0.01

### Structure and functions

- 3.9 A total of 11 monitoring stops were recorded within **4010 Wet heath** in the Galtee Mountains cSAC. In the assessment of structure and functions, eight stops failed one criterion or more. Following a review of the ecological condition of the stops that failed one criterion or more, expert judgement determined that no changes should be made, resulting in an overall failure rate of 72.7%. The structure and functions of **4010 Wet heath** were assessed as Unfavourable – Bad.
- 3.10 The vegetation composition of **4010 Wet heath** was poor, with multiple failures being recorded under several criteria (Table 11). The cover of ericoid species was inadequate at 27.3% of stops, while *Erica tetralix* was absent from the local vicinity of 36.4% of stops. The cover of *Cladonia* spp., *Sphagnum* spp. and pleurocarpous mosses was inadequate at 27.3% of stops while the cover of positive indicator species was inadequate at 18.2%. The cover of the negative indicator species *Agrostis capillaris* was excessive at one stop (9.1%).
- 3.11 The vegetation structure of **4010 Wet heath** has been significantly affected by burning. Burning in the moss, liverwort or lichen layer or exposure of the peat surface due to burning was recorded in the local vicinity of 36.4% of stops, while burning within sensitive areas was observed within the local vicinity of 20.0% of the stops where this criterion was applicable. Burning at this intensity is likely to have killed dwarf shrub species and damaged the soil seed bank which, combined with burning of particularly sensitive examples of wet heath habitat, may result in slower recovery of the vegetation, alterations in vegetation structure or even a shift towards another vegetation type and the loss of Annex I habitat. Browsing of dwarf shrubs by sheep was also recorded at most wet heath monitoring stops, but was only

considered excessive in 9.1% of cases. Excessive disturbance of *Sphagnum* spp. was recorded at one of the stops where this criterion was applicable (11.1%).

Table 11: Monitoring criteria and failure rates for 4010 Wet heath ( $n = 11$ ).

Criteria	Scale of assessment	Number of assessments	Number of failures	Failure rate (%)
<b>Vegetation composition</b>				
1 <i>Erica tetralix</i> present	20m radius	11	4	36.4
2 Cover of positive indicator species $\geq 50\%$	Relevé	11	2	18.2
3 Total cover of <i>Cladonia</i> species, <i>Sphagnum</i> species, <i>Racomitrium lanuginosum</i> and pleurocarpous mosses $\geq 10\%$	Relevé	11	3	27.3
4 Cover of ericoid species and <i>Empetrum nigrum</i> $\geq 15\%$	Relevé	11	3	27.3
5 Cover of dwarf shrub species $< 75\%$	Relevé	11	0	0
6 Cover of the following negative indicator species: <i>Agrostis capillaris</i> , <i>Holcus lanatus</i> , <i>Phragmites australis</i> , <i>Ranunculus repens</i> collectively $< 1\%$	Relevé	11	1	9.1
7 Cover of non-native species $< 1\%$	Relevé	11	0	0
8 Cover of non-native species $< 1\%$	Local vicinity	11	0	0
9 Cover of scattered native trees and scrub $< 20\%$	Local vicinity	11	0	0
10 Cover of <i>Pteridium aquilinum</i> $< 10\%$	Local vicinity	11	0	0
11 Cover of <i>Juncus effusus</i> $< 10\%$	Local vicinity	11	0	0
<b>Vegetation structure</b>				
12 Crushed, broken and/or pulled up <i>Sphagnum</i> species $< 10\%$ of <i>Sphagnum</i> cover	Relevé	9	1	11.1
13 Last complete growing season's shoots of ericoids, <i>Empetrum nigrum</i> and <i>Myrica gale</i> showing signs of <u>browsing</u> collectively $< 33\%$	Relevé	11	1	9.1
14 No signs of <u>burning</u> into the moss, liverwort or lichen layer, or exposure of peat surface due to burning	Local vicinity	11	4	36.4
15 No signs of <u>burning</u> inside boundaries of sensitive areas*	Local vicinity	10	2	20.0
<b>Physical structure</b>				
16 Cover of <u>disturbed</u> bare ground $< 10\%$	Relevé	11	1	9.1
17 Cover of <u>disturbed</u> bare ground $< 10\%$	Local vicinity	11	1	9.1
18 Area showing signs of <u>drainage</u> resulting from heavy trampling or tracking or ditches $< 10\%$	Local vicinity	11	1	9.1

\*Sensitive areas

- (a) Vegetation severely wind-clipped, mostly forming a mat less than 10 cm thick.
- (b) Areas where soils are thin and less than 5 cm deep.
- (c) Slopes greater than 1 in 3 ( $18^\circ$ ) and all the sides of gullies.
- (d) Ground with abundant, and/or an almost continuous carpet of *Sphagnum*, liverworts and/or lichens.
- (e) Pools, wet hollows, hags and erosion gullies, and within 5 – 10 m of the edge of watercourses.
- (f) Areas above 400 m in altitude.
- (g) Areas within 50 m of functioning drains.

- 3.12 The physical structure of one monitoring stop (9.1%) was poor, with excessive cover of disturbed bare ground, both in the relevé and local vicinity, and drainage due to trampling by sheep.
- 3.13 The poor vegetation composition of **4010 Wet heath** in the Galtee Mountains cSAC is likely to be related to the combined effects of ongoing severe burning and previously high levels of sheep grazing. Due to the CFP reductions in stock numbers, the level of sheep grazing on this site has declined in recent years. This is reflected in the current relatively low levels of browsing and physical disturbance. Despite this, the vegetation composition remains poor, indicating that the vegetation has not yet recovered fully.

*Future prospects*

- 3.14 The impacts codes (Ssymank, 2009) and associated data recorded for **4010 Wet heath** are presented in Table 12. Nine impacts were recorded for this habitat.

Non-intensive grazing by cattle (A04.02.01)

- 3.15 The Galtee Mountains cSAC Conservation Plan (NPWS, 2005) stated that cattle were occasional grazers on the site. Cattle were only observed grazing on the slopes above Cullenagh during the present survey. Signs of damage, such as poaching, were very apparent here. The intensity of the impact of cattle grazing was assessed as high and the area of **4010 Wet heath** affected was estimated at 5%.

Table 12: Assessment of impacts for 4010 Wet heath. Under trend, Dis = Disimproving, Imp = Improving, Ins = Insufficient data.

Impact code	Impact	Intensity	Influence	Habitat area	Source	Score	Trend
A04.02.01	Non-intensive cattle grazing	High	Negative	5%	Inside	-1.50	Ins
A04.02.02	Non-intensive sheep grazing	Medium	Negative	100%	Inside	-3.00	Imp
D01.01	Paths, tracks, cycling tracks	High	Negative	<1%	Inside	-0.75	Ins
E01.03	Dispersed habitation	High	Negative	<1%	Inside	-0.75	Ins
G01.02	Walking, horseriding and non-motorized vehicles	Low	Negative	<1%	Inside	-0.25	Dis
G01.03.02	Off-road motorised driving	Medium	Negative	<1%	Inside	-0.50	Dis
I01	Invasive non-native species	Low	Negative	5%	Outside	-0.50	Ins
J01.01	Burning down	High	Negative	3%	Inside	-1.50	Ins
L05	Collapse of terrain, landslide	High	Negative	<1%	Inside	-0.75	Ins
<b>Overall score</b>						<b>-9.50</b>	

Non-intensive grazing by sheep (A04.02.02)

- 3.16 The main land use within the Galtee Mountains cSAC is year-round sheep grazing. The Galtee Mountains cSAC Conservation Plan (NPWS, 2005) stated that, at that time, livestock densities were causing overgrazing on most slopes. The high stocking density of sheep was thought to be causing reduced ecological diversity and a shift from heath to upland grassland vegetation. The associated trampling, peat erosion and unauthorised burning, which is regularly carried

out to encourage better grazing for livestock, were also identified as threats. The majority of the site is unfenced so livestock can access most areas.

- 3.17 The findings of the CFP resulted in stock reductions and informed the management strategies and zoning sections of the Galtee Mountains cSAC Conservation Plan. The Conservation Plan identified the maintenance of sustainable grazing levels as a primary strategy in achieving Favourable conservation status for the Annex I habitats found on-site. It also recommended that grazing assessments were also conducted on privately owned lands as part of a Rural Environmental Protection Scheme or governmental farm plans. The grazing of livestock above a sustainable density in heath habitats was listed as a notifiable action i.e. an action which could cause damage to the site and for which prior approval is required.
- 3.18 The assessment of structure and functions recorded excessive grazing within 9.1% of **4010 Wet heath** monitoring stops and several examples of overgrazed **4010 Wet heath** were noted during vegetation mapping. The intensity of this impact has been assessed as medium overall and its influence as negative. Due to the CFP reductions in stock numbers, the trend is viewed as improving.

#### Paths, tracks, cycling tracks (D01.01)

- 3.19 There have been some apparent minor losses of **4010 Wet heath** habitat due to the cutting of farm tracks near Coolgarranroe.

#### Dispersed habitation (E01.03)

- 3.20 There have been some apparent minor losses of **4010 Wet heath** habitat due to the construction of a house in the Knockmoyle area in the north of the site.

#### Walking, horseriding and non-motorized vehicles (G01.02)

- 3.21 Recreational hill walking is a common activity within the Galtee Mountains cSAC. There are no marked walkways, but published information is available about informal tracks in the area. As the highest peak at 919 m, Galtymore is the most popular destination within the site. Most people walk along the main ridge, particularly between Lyracappul and Galtymore where a dry stone wall acts as a convenient line to follow. The Galtee Walking Club organises frequent trips within the site (Anon., 2011). The Galtee Mountains cSAC Conservation Plan estimates that the number of people present on the mountains exceeds 100 on busy days and notes that numbers have increased in recent years (NPWS, 2005).
- 3.22 Damage is caused by walking on popular routes with localised poaching and peat erosion occurring, particularly along the main ridge. As **4010 Wet heath** is largely confined to the lower slopes of the site (Fig. 3), it is not heavily impacted by walking. The intensity of this impact has been assessed as low and the influence as negative. The area affected has been estimated at less than 1% and the trend has been assessed as disimproving.

#### Off-road motorised driving (G01.03.02)

- 3.23 The Galtee Mountains cSAC Conservation Plan recorded a significant increase in the number of motorised vehicles accessing the site, including quad bikes, scrambler bikes and four wheel drives. As there are no purpose-built tracks on the site, this impact is causing poaching and

erosion as well as noise pollution. The most heavily impacted areas are the main ridge and the area around Lough Muskry. As **4010 Wet heath** is largely confined to the lower slopes of the site (Fig. 3), it is not as heavily impacted by motorised vehicles.

- 3.24 The Conservation Plan stated that motorised vehicles, other than those used by the emergency services, state bodies or by local landowners for ordinary agricultural purposes, would not be permitted on heath habitats within the site. Signs stating this were to be erected at access points to the site, if necessary (NPWS, 2005). The South Tipperary County Heritage Plan also proposed that the use of quads and motorbikes in the county's mountains be regulated through the enforcement of a bye-law by Tipperary County Council (South Tipperary Heritage Forum, 2004). However, no signage pertaining to such a bye-law was observed during the present survey. Signs of ongoing quad biking and resultant damage were noted within **4010 Wet heath** during vegetation mapping. The area affected has been estimated at less than 1% and the trend has been assessed as disimproving.

#### Invasive non-native species (I01)

- 3.25 *Campylopus introflexus* is a non-native pioneer moss species of bare peat which can become abundant after disturbance such as peat cutting, burning or drainage (Atherton *et al.*, 2010). Carpets of the moss have been found to have a significant depressive effect on germination of *Calluna vulgaris* seeds and therefore this species can impact on re-establishment of heather (Equiha & Usher, 1993; Bernth, 1998). Klinck (2010) defined it as a mild or temporary invasive species as it does not have long-term effects on biodiversity.
- 3.26 *Campylopus introflexus* was recorded within two **4010 Wet heath** monitoring stops. The degraded peat vegetation community DP1 *Campylopus introflexus* – *Polytrichum* spp. was recorded within eight polygons dominated by **4010 Wet heath** during vegetation mapping. However, it was not recorded as forming extensive carpets; therefore this impact was assessed as being of neutral influence.
- 3.27 The Galtee Mountains cSAC Conservation Plan makes reference to the invasive non-native species *Rhododendron ponticum* being present within forestry blocks adjacent to the site (NPWS, 2005). This has infested substantial areas of the Glengarra Forest on the lower southern slopes. Whilst this species was not recorded within the site, it is viewed as a threat to nearby areas of **4010 Wet heath** and is scored as a negative impact in Table 12.

#### Burning down (J01.01)

- 3.28 Unauthorised burning is regularly conducted within the site to encourage better grazing for livestock. Most of the burning occurs on the southern side of the site. According to the Conservation Plan (NPWS, 2005) it is often carried outside the permitted period of September to February inclusive and is usually unsupervised, such that large areas are burned each time a fire is started. Burning is often conducted on a short-term rotation (i.e. approximately every 3 years), with some areas being burned in successive years. Due to its extensive coverage, severity and frequency, burning has a very detrimental effect on the vegetation of heath habitats within this site. It reduces both floral species diversity and the ericoid component of

the vegetation. Burning also contributes to peat erosion and may encourage the spread of bracken (*Pteridium aquilinum*), a problematic native species.

- 3.29 The Conservation Plan identified the control of burning as a primary strategy in achieving Favourable conservation status for the Annex I habitats found on-site. Burning was to be monitored by regular inspection of the site by NPWS staff. Burning areas of heath vegetation over 5 ha, or burning any area more often than once every 15 years, was listed as a notifiable action i.e. an action which could cause damage to the site and for which prior approval is required.
- 3.30 Extensive, severe and frequent burning is an ongoing issue within the Galtee Mountains cSAC and was noted within **4010 Wet heath** at multiple locations during the present survey. However, based on the results of vegetation mapping, approximately only 3% of **4010 Wet heath** on the site is estimated to have been affected by burning within the last few years. Whilst burning can be an important management tool for heathland, burning at this site is currently regarded as a negative impact and threat due to its unregulated nature and the aim of this burning being to promote grass species rather than heathland. Its intensity has been assessed as high.

#### Collapse of terrain, landslide (L05)

- 3.31 Some minor areas of localised slippage were recorded from above Borheen Lough
- 

- 3.32 The overall impacts score for **4010 Wet heath** has been calculated as -9.50. This is significantly below the nominal Favourable Reference Value of zero. The combined future trend for area and structure and functions is however deemed to be improving due to the indications that the condition of this habitat is gradually improving due to the CFP reductions in stock numbers (see paragraph 3.7). The future prospects for this habitat were therefore assessed as Unfavourable – Inadequate.

#### **4030 Dry heath**

##### *Area*

- 3.33 Changes in the area of **4030 Dry heath** were recorded for the period 1995 to 2011 through a combination of observations in the field and analysis of aerial photographs. Available satellite coverage of the area was poor resolution and could not be used. These data are restricted to obvious changes in habitat; subtle changes from one habitat type to another cannot be reliably identified by this process. The losses were minor, less than 1 ha in total (Table 13), but still outweighed gains in habitat due to revegetation of localised slippage. The impacts and trends are discussed later under future prospects. The overall change in habitat area was a loss of less than 1% per year resulting in a status of Unfavourable – Inadequate.



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 Structure and functions

- 3.34 A total of 25 monitoring stops were recorded in **4030 Dry heath** in the Galtee Mountains cSAC. In the assessment of structure and functions, six monitoring stops failed one criterion or more. Following a review of the ecological condition of those stops, expert judgement determined that one should pass because the failure was marginal. This reduced the number of stops that failed to five, resulting in an overall failure rate of 20.0%. The structure and functions of **4030 Dry heath** were therefore assessed as Unfavourable – Inadequate.

Table 13: Impacts causing obvious losses in area of 4030 Dry heath, 1995-2011.

Impact code	Impact	Area (ha)	Area (ha)	Area (ha)	Area (ha)
		1995-2000	2000-2005	2005-2011	1995-2011
D01.01	Paths, tracks, cycling tracks	0.00	<0.01	0.00	<0.01
E01.03	Dispersed habitation	0.06	0.00	0.00	0.06
J01.01	Burning down	0.00	0.44	0.00	0.44
L05	Collapse of terrain, landslide	0.06	0.09	0.00	0.15
All impacts		0.12	0.53	0.00	0.65
% of habitat		0.01	0.02	0.00	0.03
% loss per year		<0.01	<0.01	0.00	<0.01

- 3.35 The vegetation composition of **4030 Dry heath** was poor in some cases, with failures being recorded under four criteria (Table 14). The number of bryophyte and non-crustose lichen species, excluding *Campylopus* spp. and *Polytrichum* spp., was inadequate at two stops (8.0%). The cover of positive indicator species was inadequate at one stop (4.0%). This indicates a paucity of dwarf shrubs at that stop, as the positive indicator species for this habitat are all dwarf shrubs. The cover of the non-native moss *Campylopus introflexus* was greater than or equal to 1% at two stops (8.0%), both in the relevé and local vicinity. As mentioned above, expert judgement determined that one of these stops should pass because the failure was marginal.
- 3.36 The vegetation structure of **4030 Dry heath** was poor in some cases. Burning in sensitive areas was recorded at 15.8% of the monitoring stops where this criterion was applicable. Browsing of dwarf shrubs by sheep was also recorded at most stops, but was only excessive at one (4.0%). The full range of *Calluna vulgaris* growth phases was not adequately represented at 9.5% of the stops where this criterion was applicable. While carefully controlled burning and light grazing are important management measures in maintaining certain dry heath communities (Averis *et al.*, 2004), burning in sensitive areas and excessive grazing can have significant negative impacts on conservation value. At the two stops that failed due to inadequate representation of the full range of *C. vulgaris* growth phases, one exhibited burning in sensitive areas and the other exhibited excessive browsing of *C. vulgaris* by sheep. The poor structural diversity of *C. vulgaris* recorded here may be related to excessive burning and browsing.

3.37 The physical structure of **4030 Dry heath** was good, with no failures being recorded under any of the relevant criteria. Although some disturbed bare ground was recorded, its cover was not deemed excessive at any of the monitoring stops.

Table 14: Monitoring criteria and failure rates for 4030 Dry heath ( $n = 25$ ).

Criteria	Scale of assessment	Number of assessments	Number of failures	Failure rate (%)	
<b>Vegetation composition</b>					
1	Number of bryophyte or non-crustose lichen species present, excluding <i>Campylopus</i> spp. and <i>Polytrichum</i> spp. $\geq 3$	Relevé	25	2	8.0
2	Number of positive indicator species present $\geq 2$	Relevé	25	0	0.0
3a	DH5 (Calcareous heaths): cover of positive indicator species 50-75%	Relevé	0	n/a	n/a
3b	Siliceous heaths: cover of positive indicator species $\geq 50\%$	Relevé	25	1	4.0
4	Proportion of dwarf shrub cover composed of <i>Myrica gale</i> , <i>Salix repens</i> , <i>Ulex gallii</i> collectively $< 50\%$	Relevé	25	0	0
5	Cover of the following weedy negative indicator species: <i>Cirsium arvense</i> , <i>C. vulgare</i> , <i>Ranunculus repens</i> , large <i>Rumex</i> species (except <i>R. acetosa</i> ), <i>Senecio jacobea</i> , <i>Urtica dioica</i> collectively $< 1\%$	Relevé	25	0	0
6	Cover of non-native species $< 1\%$	Relevé	25	2	8.0
7	Cover of non-native species $< 1\%$	Local vicinity	25	2	8.0
8	Cover of scattered native trees and scrub $< 20\%$	Local vicinity	25	0	0
9	Cover of <i>Pteridium aquilinum</i> $< 10\%$	Local vicinity	25	0	0
10	Cover of <i>Juncus effusus</i> $< 10\%$	Local vicinity	25	0	0
<b>Vegetation structure</b>					
11	Senescent proportion of <i>Calluna vulgaris</i> cover $< 50\%$	Relevé	25	0	0
12	Last complete growing season's shoots of ericoids and <i>Empetrum nigrum</i> showing signs of <u>browsing</u> collectively $< 33\%$	Relevé	25	1	4.0
13	No signs of <u>burning</u> inside boundaries of sensitive areas*	Local vicinity	19	3	15.8
14	Outside boundaries of sensitive areas, all growth phases of <i>Calluna vulgaris</i> should occur throughout, with $\geq 10\%$ of cover in mature phase	Local vicinity	21	2	9.5
<b>Physical structure</b>					
15	Cover of <u>disturbed</u> bare ground $< 10\%$	Relevé	25	0	0
16	Cover of <u>disturbed</u> bare ground $< 10\%$	Local vicinity	25	0	0

\*Sensitive areas

(a) Areas where soils are thin and less than 5 cm deep.

(b) Hill slopes greater than 1 in 2 ( $26^\circ$ ), 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 1991). 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 m<sup>2</sup> 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, hags and erosion gullies, and within 5 – 10 m of the edge of watercourses.

3.38 Burning and, to a lesser extent, grazing by sheep appear to be the most significant impacts on the conservation status of **4030 Dry heath** in the Galtee Mountains cSAC, with negative effects apparent in the composition and structure of the vegetation. The level of grazing by sheep has declined in recent years due to the CFP reductions in stock numbers and accordingly the levels of browsing and physical disturbance are relatively low at present. However, burning in sensitive areas is an ongoing impact.

*Future prospects*

3.39 The impacts recorded for **4030 Dry heath** are presented in Table 15. Eight impacts were recorded for this habitat.

Non-intensive grazing by cattle (A04.02.01)

3.40 As stated in paragraph 3.15, cattle were observed grazing on the slopes above Cullenagh during the present survey and signs of damage were apparent here. The area of **4030 Dry heath** affected was estimated to be 1%.

Table 15: Assessment of impacts for 4030 Dry heath. Under trend, Dis = Disimproving, Imp = Improving, Ins = Insufficient data.

Impact code	Impact	Intensity	Influence	Habitat area	Source	Score	Trend
A04.02.01	Non-intensive cattle grazing	Medium	Negative	1%	Inside	-1.00	Ins
A04.02.02	Non-intensive sheep grazing	Low	Positive	100%	Inside	1.50	Imp
D01.01	Paths, tracks, cycling tracks	High	Negative	<1%	Inside	-0.75	Ins
E01.03	Dispersed habitation	High	Negative	<1%	Inside	-0.75	Ins
G01.02	Walking, horseriding and non-motorized vehicles	Low	Negative	<1%	Inside	-0.25	Dis
I01	Invasive non-native species	Low	Negative	5%	Outside	-0.50	Ins
J01.01	Burning down	High	Negative	12%	Inside	-1.50	Ins
L05	Collapse of terrain, landslide	High	Negative	<1%	Inside	-0.75	Ins
<b>Overall score</b>						<b>-4.00</b>	

Non-intensive grazing by sheep (A04.02.02)

3.41 As discussed in paragraphs 3.16 and 3.17, the main land use within the Galtee Mountains cSAC is year-round sheep grazing. The assessment of structure and functions recorded excessive grazing within only 4.0% of **4030 Dry heath** monitoring stops. The intensity of this impact has therefore been assessed as low overall and its influence has tentatively been assessed as positive.

Paths, tracks, cycling tracks (D01.01)

3.42 There have been some apparent minor losses of **4030 Dry heath** habitat due to the cutting of farm tracks near Coolgarranroe.

Dispersed habitation (E01.03)

3.43 There have been some apparent minor losses of **4030 Dry heath** habitat due to the construction of a house in the Knockmoyle area in the north of the site.

Walking, horseriding and non-motorized vehicles (G01.02)

3.44 Recreational hill walking is a common activity within the Galtee Mountains cSAC (see paragraph 3.21). As **4030 Dry heath** is largely confined to the slopes of the site (Fig. 3), it is not heavily impacted. The intensity of this negative impact has been assessed as low, the area affected has been estimated at less than 1% and the trend has been assessed as disimproving.

Invasive non-native species (I01)

3.45 As stated in paragraph 3.25, *Campylopus introflexus* is a non-native moss species that is a mild invasive of bare peat, and can impact on heather re-establishment. It was recorded within seven **4030 Dry heath** monitoring stops during the assessment of structure and functions and the degraded peat vegetation community DP1 *Campylopus introflexus* – *Polytrichum* spp. was recorded within 42 polygons dominated by **4030 Dry heath** during vegetation mapping. However, it was not recorded as forming extensive carpets; therefore this impact was assessed as being of neutral influence.

3.46 The Galtee Mountains cSAC Conservation Plan makes reference to the invasive non-native species *Rhododendron ponticum* being present within forestry blocks adjacent to the site (NPWS, 2005). This has infested substantial areas of the Glengarra Forest on the lower southern slopes. Whilst this species was not recorded within the site, it is viewed as a threat to nearby areas of **4030 Dry heath**.

Burning down (J01.01)

3.47 Unauthorised burning is regularly conducted within the site to encourage better grazing for livestock (see paragraph 3.28). Extensive, severe and frequent burning is an ongoing issue within **4030 Dry heath** and was noted at multiple locations during the present survey. Its intensity has been assessed as high and its influence as negative. Based on the results of vegetation mapping, approximately 3% of **4030 Dry heath** on the site is estimated to have been affected by burning within the last few years.

Collapse of terrain, landslide (L05)

3.48 There has been some minor loss of habitat due to localised slippage.

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3.49 The overall impacts score for **4030 Dry heath** has been calculated as -4.00. This is significantly below the nominal Favourable Reference Value of zero. The combined future trend for area and structure and functions is however deemed to be improving due to the indications that the condition of this habitat is gradually improving due to the CFP reductions in stock numbers

(see paragraph 3.7), although uncontrolled burning remains a significant issue. The future prospects for this habitat were therefore assessed as Unfavourable – Inadequate.

#### 4060 Alpine and Boreal heath

##### Area

3.50 Changes in the area of **4060 Alpine and Boreal heath** were recorded for the period 1995 to 2011 through a combination of observations in the field and analysis of aerial photographs. Available satellite coverage of the area was poor resolution and could not be used. There was no evidence of any change in habitat area although this procedure only identifies obvious changes in habitat; less obvious changes from one habitat type to another cannot be reliably identified by this process. As the area of this habitat appears to be stable the area status was assessed as Favourable.

##### Structure and functions

3.51 Four monitoring stops were recorded within **4060 Alpine and Boreal heath** in the Galtee Mountains cSAC. In the assessment of structure and functions, one stop failed three criteria. Following a review of the ecological condition of the stops that failed one criterion or more, expert judgement determined that no changes should be made, resulting in an overall failure rate of 25.0%. The structure and functions of **4060 Alpine and Boreal heath** were therefore assessed as Unfavourable – Inadequate.

Table 16: Monitoring criteria and failure rates for 4060 Alpine and Boreal heath ( $n = 4$ ).

Criteria	Scale of assessment	Number of assessments	Number of failures	Failure rate (%)
<b>Vegetation composition</b>				
1	Number of bryophyte or non-crustose lichen species present $\geq 3$	Relevé	4	0
2	Cover of positive indicator species $\geq 66\%$	Relevé	4	0
3	Cover of dwarf shrubs $\geq 10\%$	Relevé	4	1
4	Cover of the following negative indicator species: <i>Agrostis capillaris</i> , <i>A. vinealis</i> , <i>Anthoxanthum odoratum</i> , <i>Deschampsia flexuosa</i> , <i>Festuca ovina</i> , <i>F. vivipara</i> , <i>Galium saxatile</i> , <i>Potentilla erecta</i> and <i>Poa</i> spp. (except <i>Poa alpina</i> ) collectively $< 10\%$	Relevé	4	1
5	Cover of non-native species $< 1\%$	Relevé	4	0
<b>Vegetation structure</b>				
6	Live leaves of <i>Carex bigelowii</i> , <i>Deschampsia flexuosa</i> , <i>Festuca ovina</i> , <i>F. vivipara</i> showing signs of <u>grazing</u> collectively $< 10\%$	Relevé	2	0
7	Last complete growing season's shoots of ericoids and <i>Empetrum nigrum</i> showing signs of <u>browsing</u> collectively $< 33\%$	Relevé	4	1
8	No signs of <u>burning</u> inside feature	Local vicinity	4	0
<b>Physical structure</b>				
9	Cover of <u>disturbed</u> bare ground $< 10\%$	Relevé	4	0
10	Cover of <u>disturbed</u> bare ground $< 10\%$	Local vicinity	4	0

- 3.52 One **4060 Alpine and Boreal heath** monitoring stop (25.0%) exhibited poor vegetation composition (Table 16). Criterion 3 stipulates that the cover of dwarf shrub species within a monitoring stop should be at least 10%; the cover recorded at the stop in question was 8%. This failure may be related to the excessive browsing of dwarf shrubs that was also recorded at this stop. Criterion 4 stipulates that the total cover of negative indicator species within a monitoring stop should be less than 10%; the total cover of *Agrostis capillaris*, *Deschampsia flexuosa*, *Festuca vivipara* and *Galium saxatile* recorded at the stop in question was 11.1%. In relation to vegetation composition, the Galtee Mountains cSAC Conservation Plan described the **4060 Alpine and Boreal heath** on the site as being species poor and almost devoid of alpine species (NPWS, 2005).
- 3.53 One **4060 Alpine and Boreal heath** monitoring stop (25.0%) exhibited poor vegetation structure. Criterion 7 stipulates that the proportion of dwarf shrub shoots showing signs of browsing should be less than 33%. The proportion recorded at the stop in question was 50%. The browsing recorded is likely to be due to sheep.
- 3.54 The physical structure of **4060 Alpine and Boreal heath** was good, with no failures being recorded under the relevant criteria.

*Future prospects*

- 3.55 The impacts recorded for **4060 Alpine and Boreal heath** are presented in Table 17. Only two impacts were recorded for this habitat.

Table 17: Assessment of impacts for 4060 Alpine and Boreal heath. Under trend, Dis = Disimproving, Imp = Improving.

Impact code	Impact	Intensity	Influence	Habitat area	Trend	Source	Score
A04.02.02	Non-intensive sheep grazing	Medium	Negative	100%	Imp	Inside	-3.0
G01.02	Walking, horseriding and non-motorized vehicles	Low	Negative	5%	Dis	Inside	-0.5
	<b>Overall score</b>						<b>-3.5</b>

Non-intensive grazing by sheep (A04.02.02)

- 3.56 Sheep grazing remains the dominant land use in the Galtee Mountains cSAC (see paragraphs 3.16 and 3.17). The assessment of structure and functions recorded excessive grazing within 25.0% of **4060 Alpine and Boreal heath** monitoring stops. As grazing is not required to maintain this habitat, the intensity was assessed as medium overall and its influence as negative.

Walking, horseriding and non-motorized vehicles (G01.02)

- 3.57 Recreational hill walking is a common activity within the Galtee Mountains cSAC (see paragraph 3.21). Damage is caused by walking on popular routes, with localised poaching and peat erosion occurring, and is concentrated along the main ridge, where several areas of **4060 Alpine and Boreal heath** occur (Fig. 3). The intensity of this impact has been assessed as low

and the influence as negative. The area affected has been estimated to be 5% and the trend has been assessed as disimproving.

- 3.58 The overall impacts score for **4060 Alpine and Boreal heaths** has been calculated as -3.50. This is below the nominal Favourable Reference Value of zero. The combined future trend for area and structure and functions is however deemed to be improving due to the indications that the condition of this habitat is gradually improving due to the CFP reductions in stock numbers (see paragraph 3.7). The future prospects for this habitat were therefore assessed as Favourable.

### **\*7130/7130 Blanket bog**

#### *Area*

- 3.59 Changes in the area of **\*7130/7130 Blanket bog** were recorded for the period 1995 to 2011 through a combination of observations in the field and analysis of aerial photographs. Available satellite coverage of the area was poor resolution and could not be used. These data are restricted to obvious changes in habitat (Table 18); less obvious changes from one habitat type to another cannot be reliably identified by this process. Erosion has unquestionably resulted in loss of habitat, but due to the gradual and diffuse nature of this impact it was impractical to measure the area lost. Even when including the loss due to erosion it is estimated that the overall change in habitat area was a loss of less than 1% per year resulting in a status of Unfavourable – Inadequate. These impacts and trends are discussed later under future prospects.

Table 18: Impacts causing obvious losses in area of \*7130/7130 Blanket bog, 1995-2011.

n.m. indicates not measured.

Impact code	Impact	Area (ha)	Area (ha)	Area (ha)	Area (ha)
		1995-2000	2000-2005	2005-2011	1995-2011
A05.02	Stock feeding	0.00	<0.01	0.00	<0.01
D01.01	Paths, tracks, cycling tracks	0.00	<0.01	0.00	<0.01
K01.01	Erosion	n.m.	n.m.	n.m.	n.m.
L05	Collapse of terrain, landslide	0.19	0.00	0.00	0.19
All impacts		0.19	<0.01	0.00	0.19
% of habitat		0.02	<0.01	0.00	0.02
% loss per year		<0.01	<0.01	0.00	<0.01

#### *Structure and functions*

- 3.60 A total of 15 monitoring stops were recorded within **\*7130/7130 Blanket bog** in the Galtee Mountains cSAC. All were located within **\*7130 Active blanket bog** rather than **7130 Inactive blanket bog**. In the assessment of structure and functions, ten stops failed one criterion or more. Following a review of the ecological condition of those stops, expert judgement

determined that three should pass because the failure was marginal, resulting in an overall failure rate of 46.7%. The structure and functions of \*7130/7130 Blanket bog were therefore assessed as Unfavourable – Bad. Vegetation mapping indicated that the proportion of inactive and eroding bog within the total area of bog was 2.6%. These findings provide further support for the Unfavourable – Bad assessment result.

Table 19: Monitoring criteria and failure rates for \*7130/7130 Blanket bog ( $n = 15$ ).

Criteria	Scale of assessment	Number of assessments	Number of failures	Failure rate (%)	
<b>Vegetation composition</b>					
1	Number of positive indicator species present $\geq 7$	Relevé	15	6	40.0
2	Cover of bryophyte or lichen species, excluding <i>Sphagnum fallax</i> $\geq 10\%$	Relevé	15	1	6.7
3	Cover of <u>each</u> of the following species: <i>Calluna vulgaris</i> , <i>Eleocharis multicaulis</i> , <i>Eriophorum vaginatum</i> , <i>Molinia caerulea</i> , <i>Schoenus nigricans</i> , <i>Trichophorum germanicum</i> individually $< 75\%$	Relevé	15	1	6.7
4	Cover of the following negative indicator species: <i>Agrostis capillaris</i> , <i>Holcus lanatus</i> , <i>Phragmites australis</i> , <i>Pteridium aquilinum</i> , <i>Ranunculus repens</i> collectively $< 1\%$	Relevé	15	1	6.7
5	Cover of non-native species $< 1\%$	Relevé	15	0	0
6	Cover of non-native species $< 1\%$	Local vicinity	15	0	0
7	Cover of scattered native trees and scrub $< 10\%$	Local vicinity	15	0	0
<b>Vegetation structure</b>					
8	Crushed, broken and/or pulled up <i>Sphagnum</i> species $< 10\%$ of <i>Sphagnum</i> cover	Relevé	14	0	0
9	Last complete growing season's shoots of ericoids, <i>Empetrum nigrum</i> and <i>Myrica gale</i> showing signs of <u>browsing</u> collectively $< 33\%$	Relevé	14	0	0
10	No signs of <u>burning</u> into the moss, liverwort or lichen layer or exposure of peat surface due to burning	Local vicinity	15	0	0
11	No signs of <u>burning</u> inside boundaries of sensitive areas*	Local vicinity	15	0	0
<b>Physical structure</b>					
12	Cover of <u>disturbed</u> bare ground $< 10\%$	Relevé	15	0	0
13	Cover of <u>disturbed</u> bare ground $< 10\%$	Local vicinity	15	0	0
14	Area showing signs of <u>drainage</u> resulting from heavy trampling or tracking or ditches or peat cutting $< 10\%$	Local vicinity	15	1	6.7
15	Cover of <u>erosion</u> gullies and eroded areas within the greater bog mosaic $< 5\%$	Local vicinity	15	5	33.3

\*Sensitive areas

(a) Slopes greater than 1 in 3 ( $18^\circ$ ), and all the sides of gullies.

(b) Ground with abundant and/or an almost continuous carpet of *Sphagnum*, other mosses, liverworts and/or lichens.

(c) Patterned areas i.e. with pools, wet hollows, hags and erosion gullies.

(d) Areas within 5-10 m of watercourses.

(e) Areas above 400 m in altitude.

(f) Areas within 50 m of functioning drains.



- 3.61 The vegetation composition of **\*7130/7130 Blanket bog** was poor in some cases. The number of positive indicators was insufficient at 40.0% of monitoring stops (Table 19). One monitoring stop (6.7%) failed due to excessive cover of *Trichophorum germanicum*. One monitoring stop (6.7%) failed due to insufficient cover of bryophyte and lichen species, and another due to excessive cover of *Agrostis capillaris*, which is a negative indicator species for this habitat. These two stops also failed the erosion criterion, which suggests that peat erosion is exerting a negative impact on the vegetation composition.
- 3.62 The vegetation structure of **\*7130/7130 Blanket bog** was good, with no failures being recorded under the relevant criteria. However, the physical structure of this habitat has been significantly impacted by peat erosion, with 33.3% of monitoring stops failing due to high coverage of erosion gullies and eroded areas within the local vicinity. One stop (6.7%) failed due to excessive drainage, caused by man-made drainage channels. Due to the CFP recommendations, the number of sheep on this site has declined in recent years. This is reflected in the current low levels of browsing of dwarf shrubs, with no monitoring stops failing due to excessive browsing.

*Future prospects*

- 3.63 The impacts recorded for **\*7130/7130 Blanket bog** are presented in Table 20. Ten impacts were recorded for this habitat.

Non-intensive grazing by sheep (A04.02.02)

- 3.64 Sheep grazing remains the dominant land use in the Galtee Mountains cSAC (see paragraphs 3.16 and 3.17). Although no excessive grazing was recorded within **\*7130/7130 Blanket bog** monitoring stops during the assessment of structure and functions, some examples of overgrazed **\*7130/7130 Blanket bog** were noted during vegetation mapping. The intensity of this impact has been assessed as low overall but its influence as negative, due to the sensitivity of bogs to grazing animals.

Table 20: Assessment of impacts for **\*7130/7130 Blanket bog**. Under trend, Dis = Disimproving, Imp = Improving, Ins = Insufficient data.

Impact code	Impact	Intensity	Influence	Habitat area	Trend	Source	Score
A04.02.02	Non-intensive sheep grazing	Low	Negative	100%	Imp	Inside	-1.50
A05.02	Stock feeding	High	Negative	<1%	Ins	Inside	-0.75
D01.01	Paths, tracks, cycling tracks	High	Negative	<1%	Ins	Inside	-0.75
G01.02	Walking, horseriding and non-motorized vehicles	Medium	Negative	<1%	Dis	Inside	-0.50
G01.03.02	Off-road motorised driving	High	Negative	5%	Dis	Inside	-1.50
I01	Invasive non-native species	Low	Neutral	0.01%	Ins	Inside	-0.00
J01.01	Burning down	High	Negative	1%	Ins	Inside	-1.50
J02.07	Water abstractions from groundwater	High	Negative	6.7%	None	Inside	-1.50
K01.01	Erosion	High	Negative	5%	Ins	Inside	-1.50
L05	Collapse of terrain, landslide	High	Negative	<1%	Ins	Inside	-0.75
<b>Overall score</b>							<b>-10.25</b>

Stock feeding (A05.02)

3.65 There have been some apparent minor losses of **\*7130/7130 Blanket bog** habitat near Coolgarranroe.

Paths, tracks, cycling tracks (D01.01)

3.66 There have been some apparent minor losses of **\*7130/7130 Blanket bog** habitat due to the cutting of farm tracks near Coolgarranroe.

Walking, horseriding and non-motorized vehicles (G01.02)

3.67 Recreational hill walking is a common activity within the Galtee Mountains cSAC (see paragraph 3.21). Damage is caused by walking on popular routes, with localised poaching and peat erosion occurring, and is concentrated along the main ridge where much of the **\*7130/7130 Blanket bog** within the site occurs (Fig. 3). The intensity of this impact has been assessed as medium due to the sensitivity of bog habitat. The area affected has been estimated at less than 1% and the trend has been assessed as disimproving.



Plate 1: **\*7130/7130 Blanket bog** on the ridge between Greenane and Farbreaga, showing serious damage due to quad biking (Photo: BEC Consultants).

Off-road motorised driving (G01.03.02)

3.68 As discussed in paragraphs 3.23 and 3.24, the Galtee Mountains cSAC Conservation Plan (NPWS, 2005) recorded a significant increase in the number of motorised vehicles accessing the site, including quad bikes, scrambler bikes and four wheel drives. As there are no purpose-built tracks on the site, this impact is causing poaching and erosion (Plate 1) as well as noise pollution. The most heavily impacted areas are the main ridge and the area around Lough

Muskry, which are dominated by **\*7130/7130 Blanket bog** (Fig. 3). The intensity of this impact was assessed as high and the influence as negative. The area affected has been estimated to be 5% and the trend has been assessed as disimproving.

#### Invasive non-native species (I01)

3.69 As stated in paragraph 3.25, *Campylopus introflexus* is a non-native moss species that is a mild invasive of bare peat, and can impact on heather re-establishment. It was recorded in one **\*7130/7130 Blanket bog** monitoring stop during the assessment of structure and functions and the degraded peat vegetation community DP1 *Campylopus introflexus* – *Polytrichum* spp. was recorded within 14 polygons dominated by **\*7130/7130 Blanket bog** during vegetation mapping. However, it was not recorded as forming extensive carpets; therefore this impact was assessed as being of neutral influence.

#### Burning down (J01.01)

3.70 Unauthorised burning is regularly conducted within the site to encourage better grazing for livestock (see paragraph 3.28). Extensive, severe and frequent burning is an ongoing issue within the Galtee Mountains cSAC. Although burning was not recorded within any of the **\*7130/7130 Blanket bog** monitoring stops during the assessment of structure and functions, it was noted within **\*7130/7130 Blanket bog** at multiple locations during vegetation mapping. Its intensity has been assessed as high and its influence as negative. Based on the results of vegetation mapping, approximately 1% of **\*7130/7130 Blanket bog** on the site is estimated to have been affected by burning within the last few years.

#### Water abstractions from groundwater (J02.07)

3.71 Drainage has been recorded under this impact category. Water is being drained from **\*7130/7130 Blanket bog** and diverted away by means of ditches. The intended purpose is not water abstraction but reclamation of the land. Although the impact category does not accurately describe the impact in question it is the most appropriate option available on the list recommended by the EU for Habitats Directive Article 17 assessments (Ssymank, 2009).

3.72 Old drainage channels are evident in **\*7130/7130 Blanket bog** between Lyracappul and Knockaterriff Beg, on the south-eastern spur of Carrignabinnia and below Galtymore. They are regularly spaced at intervals of about 10-15 m and run across the slope. These channels were probably originally dug to mark out turbary boundaries (NPWS, 2005) and facilitate turf cutting. The channels drain the surrounding peat and active erosion is evident along their length. No recently dug drains were observed; drainage is listed as a notifiable action, i.e. an action which could cause damage to the site and for which prior approval is required. The intensity of this impact has been assessed as high and its influence as negative. Based on the results of the structure and functions assessment, the area affected has been estimated to be 6.7%.

#### Erosion (K01.01)

3.73 According to the Galtee Mountains cSAC Conservation Plan (NPWS, 2005), **\*7130 Active blanket bog** was once present on most of the cols within the mountain range. Much of this remains but some areas have suffered from severe erosion (Plate 2), with the loss of all or most

of the peat, and with only scree, bedrock or thin peaty soils remaining. **\*7130 Active blanket bog** was considered by the Conservation Plan to be of average or reduced conservation value, mainly due to their eroded nature and continued vulnerability. This impact has been partially discussed under non-intensive grazing by sheep (A04.02.02), walking (G01.02), off-road motorised driving (G01.03.02), burning (J01.01) and drainage (J02.07).

- 3.74 This survey found that erosion of blanket peat is a major issue for this habitat. Much of the **\*7130/7130 Blanket bog** recorded within the site is **PB2 Upland blanket bog** on deep peat, located on high ridges and saddles (Fig. 3). These areas are very exposed with very high levels of rainfall and are consequently particularly prone to erosion. Peat hagsgs were observed in many parts of the site, particularly at Slievecushnabinnia and along the ridge to the west of Greenane and active erosion channels are evident in many of the remaining areas of blanket bog. The assessment of structure and functions recorded high levels of erosion in 33.3% of **\*7130 Active blanket bog** monitoring stops. Contributing factors include former peat cutting, drainage channels, occasional burning, trampling and grazing by livestock.
- 3.75 Due to the CFP recommendations, the number of sheep on this site has declined in recent years. However, once exposed by removal of the vegetation, areas of bare peat may continue to erode due to severe climatic conditions regardless of manipulation of grazing levels. Therefore unless restoration measures are undertaken in badly eroded areas of **\*7130/7130 Blanket bog** erosion is likely to continue. It was assessed that there is insufficient data to determine the trend for this impact. Approximately 5% of the area of **\*7130/7130 Blanket bog** is estimated to be under threat from erosion; this is the proportion of the habitat occurring in polygons with at least 5% **PB5 Eroding blanket bog**.



Plate 2: PB5 Eroding blanket bog at the summit of Slievecushnabinnia, with signs of trampling by sheep and quad biking visible in the foreground. The peak in the background is Galtymore (Photo: BEC Consultants).

### Collapse of terrain, landslide (L05)

3.76 A bogslide was noted within one polygon which was dominated by **\*7130 Active blanket bog**. The area affected was estimated to be less than 1%.

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3.77 The overall impacts score for **\*7130/7130 Blanket bog** has been calculated as -10.25. This is significantly below the nominal Favourable Reference Value of zero. Whilst there are signs that the CFP reductions in stock numbers has resulted in localised decreased damage levels within this habitat (see paragraph 3.7), it is not thought this will result in a significant change in the conservation status of the habitat overall within the next twelve years due to continued erosion in the absence of restoration measures. The combined future trend for area and structure and functions was therefore assessed as no change. The future prospects for this habitat were therefore assessed as Unfavourable – Bad.

### **7230 Alkaline fens**

#### *Area*

3.78 Changes in the area of **7230 Alkaline fens** were recorded for the period 1995 to 2011 through a combination of observations in the field and analysis of aerial photographs. Available satellite coverage of the area was poor resolution and could not be used. There was no evidence of any change in habitat area although this procedure only identifies obvious changes in habitat; less obvious changes from one habitat type to another cannot be reliably identified by this process. As the area of this habitat appears to be stable the area status was assessed as Favourable.

#### *Structure and functions*

3.79 Two monitoring stops were recorded within **7230 Alkaline fens** in the Galtee Mountains cSAC. In the assessment of structure and functions, one stop failed one criterion relating to vegetation composition (Table 21). Criterion 4 stipulates that the total cover of negative indicator species should cover less than 1% of the monitoring stop; the stop in question contained 1% *Holcus lanatus*. Following a review of the ecological condition of that stop, expert judgement determined that it should pass because the failure was marginal, resulting in an overall failure rate of 0%. The structure and functions of **7230 Alkaline fens** were therefore assessed as Favourable.

3.80 The small sample size for this habitat reflects its rarity within the Galtee Mountains cSAC, where only 0.5 ha of **7230 Alkaline fens** were recorded, comprising 0.008% of the site. The sample size is therefore likely to be adequate.

#### *Future prospects*

### Non-intensive sheep grazing (A04.02.02)

3.81 The only impact recorded for this habitat was sheep grazing. During the assessment of structure and functions, disturbed bare ground was recorded both within and in the local vicinity of one of the monitoring stops, although the coverage was not sufficiently high to cause

the stop to fail. This disturbance is likely to be due to trampling by sheep. Due to the low intensity of this impact it was assessed as insignificant and its influence assessed as neutral (Table 22).

Table 21: Monitoring criteria and failure rates for 7230 Alkaline fens ( $n = 2$ )

Criteria	Scale of assessment	Number of assessments	Number of failures	Failure rate (%)
<b>Vegetation composition</b>				
1 At least one brown moss species present	Relevé	2	0	0
2a RFLU1a/RFLU2: number of positive vascular indicator species present $\geq 2$	Relevé	2	0	0
2b RFLU4/RFEN1a: number of positive vascular indicator species present $\geq 3$	Relevé	0	n/a	n/a
3a RFLU1a/RFLU2: vegetation cover of brown mosses and vascular indicator species $\geq 20\%$		2	0	0
3b RFLU4/RFEN1a: vegetation cover of brown mosses and vascular indicator species $\geq 75\%$	Relevé	0	n/a	n/a
4 Total cover of the following species: <i>Anthoxanthum odoratum</i> , <i>Epilobium hirsutum</i> , <i>Holcus lanatus</i> , <i>Ranunculus repens</i> $< 1\%$	Relevé	2	1	50.0
5 Cover of non-native species $< 1\%$	Relevé	2	0	0
6 Cover of scattered native trees and scrub $< 10\%$	Local vicinity	2	0	0
7 Total cover of <i>Juncus effusus</i> and <i>Phragmites australis</i> $< 10\%$	Local vicinity	2	0	0
<b>Vegetation structure</b>				
8 At least 50% of the live leaves/flowering shoots are more than 5 cm above ground surface	Relevé	2	0	0
<b>Physical structure</b>				
9 Cover of <u>disturbed</u> bare ground $< 10\%$	Relevé	2	0	0
10 Cover of <u>disturbed</u> bare ground $< 10\%$	Local vicinity	2	0	0
11 Area showing signs of <u>drainage</u> resulting from ditches or heavy trampling or tracking $< 10\%$	Local vicinity	2	0	0
12 Where tufa is present, <u>disturbed</u> proportion of vegetation cover $< 1\%$	Local vicinity	0	n/a	n/a

Table 22: Assessment of impacts for 7230 Alkaline fens. Under trend, Ins = Insufficient data.

Impact code	Impact	Intensity	Influence	Habitat area	Source	Score	Trend
A04.02.02	Non-intensive sheep grazing	Low	Neutral	100%	Inside	0	Ins
<b>Overall score</b>						<b>0</b>	

3.82 The overall impacts score for **7230 Alkaline fens** was calculated as zero which is equal to the nominal Favourable Reference Value. The combined future trend for area and structure and functions was deemed to be no change. The future prospects for this habitat were therefore assessed as Favourable.

**8110 Siliceous scree***Area*

3.83 Changes in the area of **8110 Siliceous scree** were recorded for the period 1995 to 2011 through a combination of observations in the field and analysis of aerial photographs. Available satellite coverage of the area was poor resolution and could not be used. There was no evidence of any change in habitat area although this procedure only identifies obvious changes in habitat; less obvious changes from one habitat type to another cannot be reliably identified by this process. As the area of this habitat appears to be stable the area status was assessed as Favourable.

*Structure and functions*

3.84 Three monitoring stops were recorded within **8110 Siliceous scree** in the Galtee Mountains cSAC. In the assessment of structure and functions, one stop failed one criterion. Following a review of the ecological condition of that stop, expert judgement determined that no changes should be made, resulting in an overall failure rate of 33.3% (Table 23).

Table 23: Monitoring criteria and failure rates for 8110 Siliceous scree ( $n = 3$ )

Criteria	Scale of assessment	Number of assessments	Number of failures	Failure rate (%)
<b>Vegetation composition</b>				
1 Cover of bryophyte or non-crustose lichen species $\geq 5\%$	Relevé	3	0	0
2 Proportion of vegetation composed of following negative indicator species: <i>Cirsium arvense</i> , <i>C. vulgare</i> , <i>Rubus fruticosus</i> agg., large <i>Rumex</i> species (except <i>R. acetosa</i> ), <i>Senecio jacobaea</i> , <i>Urtica dioica</i> collectively $< 1\%$	Relevé	3	0	0
3 Proportion of vegetation composed of non-native species $< 1\%$	Relevé	3	0	0
4 Block scree: number of positive indicator species for 8220 present $\geq 1$	Local vicinity	2	0	0
5 Cover of grass species and dwarf shrubs collectively $< 20\%$	Local vicinity	3	0	0
6 Cover of <i>Pteridium aquilinum</i> , native trees and scrub collectively $< 25\%$	Local vicinity	3	0	0
<b>Vegetation structure</b>				
7 Live leaves of forbs and shoots of dwarf shrubs showing signs of <u>grazing</u> or <u>browsing</u> collectively $< 50\%$	Relevé	3	1	33.3%
<b>Physical structure</b>				
8 Ground cover of <u>disturbed</u> by human & animal paths, scree running, vehicles $< 10\%$	Relevé	3	0	0
9 Ground cover of <u>disturbed</u> by human & animal paths, scree running, vehicles $< 10\%$	Local vicinity	3	0	0

3.85 The small sample size for this habitat reflects its relatively restricted distribution within the Galtee Mountains cSAC, where 54.8 ha of **8110 Siliceous scree** was recorded, comprising 0.9% of the site. Although the overall failure rate for **8110 Siliceous scree** was 33.3%, expert

judgement would suggest that the structure and functions of this habitat should be assessed as Unfavourable – Inadequate rather than Unfavourable – Bad.

- 3.86 The vegetation composition of **8110 Siliceous scree** was good with no failures being recorded under the relevant criteria. Indeed, the Galtee Mountains cSAC Conservation Management Plan (NPWS, 2005) noted that **8110 Siliceous scree** in the vicinity of the corries and lakes supported numerous alpine species.
- 3.87 One **8110 Siliceous scree** monitoring stop (33.3%) exhibited a single failure relating to vegetation structure. Criterion 7 stipulates that the proportion of live leaves of forbs and shoots of dwarf shrubs showing signs of grazing or browsing should be collectively less than 50%. The result for this criterion at the stop in question was 80%, probably as a result of sheep grazing, so the stop exceeded the threshold by quite a wide margin and failed the criterion. The other two **8110 Siliceous scree** monitoring stops also exhibited signs of grazing at a lower intensity and passed the criterion.
- 3.88 The physical structure of **8110 Siliceous scree** was good with no failures being recorded under the relevant criteria.

#### *Future prospects*

##### Non-intensive sheep grazing (A04.02.02)

- 3.89 The only impact recorded for this habitat was sheep grazing (Table 24). During the assessment of structure and functions, grazing was recorded at all three of the monitoring stops recorded, with one of these showing signs of excessive grazing. This grazing is likely to be due to sheep. Year-round sheep grazing is the dominant land use within the site and the majority of the cSAC is unfenced, so livestock can access most areas.

Table 24: Assessment of future prospects for 8110 Siliceous scree. Under trend, Ins = Insufficient data.

Impact code	Impact	Intensity	Influence	Habitat area	Source	Score	Trend
A04.02.02	Non-intensive sheep grazing	Low	Negative	100%	Inside	-0.5	Ins
<b>Overall score</b>						<b>-0.5</b>	

- 3.90 The overall impacts score for **8110 Siliceous scree** was calculated as -0.50 which is just below the nominal Favourable Reference Value. The combined future trend for area and structure and functions was deemed to be improving due to the CFP reductions in stock numbers (see paragraph 3.7). The future prospects for this habitat were therefore assessed as Favourable.

#### **8210 Calcareous rocky slopes**

##### *Area*

- 3.91 Changes in the area of **8210 Calcareous rocky slopes** were examined for the period 1995 to 2011 through a combination of observations in the field and analysis of aerial photographs and



satellite imagery. There was no evidence of any change in habitat area although this procedure only identifies obvious changes in habitat; less obvious changes from one habitat type to another cannot be reliably identified by this process. As the area of this habitat appears to be stable the area status was assessed as Favourable.

*Structure and functions*

- 3.92 Three monitoring stops were recorded within **8210 Calcareous rocky slopes** in the Galtee Mountains cSAC. In the assessment of structure and functions, two stops failed one criterion or more. Following a review of the ecological condition of these stops, expert judgement determined that one should pass as the failure was marginal, resulting in an overall failure rate of 33.3%. The structure and functions of **8210 Calcareous rocky slopes** were therefore assessed as Unfavourable – Bad.
- 3.93 The small sample size for this habitat reflects its rarity within the Galtee Mountains cSAC, where only 2.8 ha of **8210 Calcareous rocky slopes** were recorded, comprising 0.04% of the site. The sample size is therefore likely to be adequate.
- 3.94 The vegetation composition of **8210 Calcareous rocky slopes** was poor in most cases (Table 25), with two monitoring stops failing due to an inadequate number of positive indicator species. One of these monitoring stops also failed due to excessive cover of the invasive non-native *Epilobium brunnescens*.
- 3.95 The vegetation structure of **8210 Calcareous rocky slopes** was good, with no failures being recorded under the relevant criterion.

Table 25: Monitoring criteria and failure rates for 8210 Calcareous rocky slopes (n = 3).

Criteria	Scale of assessment	Number of assessments	Number of failures	Failure rate (%)
<b>Vegetation composition</b>				
1	Number of indicative fern or <i>Saxifraga</i> species present ≥ 1	Local vicinity	3	0
2	Number of positive indicator species present ≥ 3	Local vicinity	3	66.6%
3	Proportion of vegetation composed of non-native species < 1%	Local vicinity	3	33.3%
4	Cover of <i>Pteridium aquilinum</i> , native trees and scrub collectively < 25%	Local vicinity	3	0
<b>Vegetation structure</b>				
5	Live leaves of forbs and shoots of dwarf shrubs showing signs of <u>grazing</u> or <u>browsing</u> collectively < 50%	Local vicinity	2	0

*Future Prospects*

Invasive non-native species (I01)

- 3.96 One impact was recorded for this habitat. *Epilobium brunnescens* has been present in the Galtee Mountains since at least the early 1970s, when it was recorded “in a few places” by Fahy &

Goodwillie (1974). During the present survey, *E. brunnescens* was recorded at two **8210 Calcareous rocky slopes** monitoring stops, giving it a frequency of 66.6% within this habitat at this site with cover scores of 0.3% and 5%. Webb *et al.* (1996) described it as a species of stony places, especially in the mountains, which is localised but spreading in Ireland. This is consistent with the findings of this survey.

- 3.97 The intensity of this impact is assessed as low, since this species does not tend to transform the nature of the habitats in which it becomes established but, nonetheless, its influence has been assessed as negative (Table 26). The area affected has been estimated to be 1.8%, based on the average cover of *E. brunnescens* within **8210 Calcareous rocky slopes** relevés. The trend has been assessed as disimproving, as there is evidence that the species is spreading and it would appear that no management strategies are in place to counteract this. The Galtee Mountains cSAC Conservation Plan (NPWS, 2005) stated that the **8210 Calcareous rocky slopes** within the site were considered to be of excellent conservation value, as they form a good representative community, contain a rich alpine flora and are in natural or near-natural condition. However, the Conservation Plan did not take the presence of non-native species into account.
- 3.98 *Epilobium brunnescens* has become established within both **8210 Calcareous rocky slopes** and **8220 Siliceous rocky slopes** in the Galtee Mountains cSAC. The species presents a threat to the conservation status of rocky slope habitats and should be monitored.

Table 26: Assessment of future prospects for 8210 Calcareous rocky slopes. Under trend, Dis = Disimproving.

Impact code	Impact	Intensity	Influence	Habitat area	Source	Score	Trend
I01	Invasive non-native species	Low	Negative	1.8%	Inside	-0.50	Dis
	<b>Overall score</b>					<b>-0.50</b>	

- 3.99 The overall impacts score for **8210 Calcareous rocky slopes** was calculated as -0.50 which is just below the nominal Favourable Reference Value of zero. The combined future trend for area and structure and functions was deemed overall to be no change despite the predicted trend for spread of *Epilobium brunnescens*. The future prospects for this habitat were therefore assessed as Unfavourable – Inadequate.

## 8220 Siliceous rocky slopes

### Area

- 3.100 Changes in the area of **8220 Siliceous rocky slopes** were examined for the period 1995 to 2011 through a combination of observations in the field and analysis of aerial photographs and satellite imagery. There was no evidence of any change in habitat area although this procedure only identifies obvious changes in habitat; less obvious changes from one habitat type to

another cannot be reliably identified by this process. As the area of this habitat appears to be stable the area status was assessed as Favourable.

*Structure and functions*

3.101 Three monitoring stops were recorded within **8220 Siliceous rocky slopes** in the Galtee Mountains cSAC. In the assessment of structure and functions, no monitoring stops failed any of the criteria (Table 27), resulting in an overall failure rate of 0.0%. The structure and functions of **8220 Siliceous rocky slopes** were assessed as Favourable.

Table 27: Monitoring criteria and failure rates for 8220 Siliceous rocky slopes (n = 3)

Criteria	Scale of assessment	Number of assessments	Number of failures	Failure rate (%)
<b>Vegetation composition</b>				
1 Number of positive indicator species present $\geq 1$	Local vicinity	3	0	0
2 Proportion of vegetation composed of non-native species < 1%	Local vicinity	3	0	0
3 Cover of <i>Pteridium aquilinum</i> , native trees and scrub collectively < 25%	Local vicinity	3	0	0
<b>Vegetation structure</b>				
4 Live leaves of forbs and shoots of dwarf shrubs showing signs of <u>grazing</u> or <u>browsing</u> collectively < 50%	Local vicinity	3	0	0

3.102 The small sample size for this habitat reflects its relative rarity within the Galtee Mountains cSAC, where only 6.1 ha of **8220 Siliceous rocky slopes** were recorded, comprising 0.1% of the site. The sample size is therefore likely to be adequate.

*Future Prospects*

Invasive, non-native plant species (I01)

3.103 This was the only impact recorded for this habitat. As with **8210 Calcareous rocky slopes** the non-native species recorded was *Epilobium brunnescens* (see paragraph 3.96). *E. brunnescens* was recorded at two of the three **8220 Siliceous rocky slopes** monitoring stops. The area affected has been estimated to be 0.1%, based on the average cover of *E. brunnescens* within these relevés. The trend has been assessed as increasing, as the species is spreading and it would appear that no management strategies are in place to counteract this (Table 28). The Galtee Mountains cSAC Conservation Plan (NPWS, 2005) considered this habitat to be of excellent conservation value but did not take this species into account in their assessment.

Table 28: Assessment of impacts for 8220 Siliceous rocky slopes. Under trend, Dis = Disimproving.

Impact code	Impact	Intensity	Influence	Habitat area	Source	Score	Trend
I01	Invasive non-native species	Low	Negative	0.1%	Inside	-0.25	Dis
<b>Overall score</b>						<b>-0.25</b>	

3.104 The overall impacts score for **8220 Siliceous rocky slopes** was calculated as -0.25 which is just below the nominal Favourable Reference Value of zero. The combined future trend for area and structure and functions was deemed overall to be no change despite the predicted trend for spread of *Epilobium brunnescens*. The future prospects for this habitat were therefore assessed as Unfavourable – Inadequate.

### Summary of conservation assessment

3.105 The summary results for the conservation assessment of Annex I habitats in the Galtee Mountains cSAC are presented in Table 29. Of the eight habitats assessed, one habitat was assessed as Favourable, four as Unfavourable – Inadequate, and three as Unfavourable – Bad.

3.106 Generally, habitats performed well in the area assessments with no major losses of habitat being readily apparent. Peatland habitats tended to perform poorly in the assessments of structure and functions, while rocky habitats perform better. This may be due in part to the stability of the substrate and accessibility for grazing animals. Habitats tended to perform better under future prospects than under structure and functions as it is predicted that habitats will gradually recover from previous high stocking levels.

Table 29: Summary of conservation status assessments for Annex I habitats in the Galtee Mountains cSAC

Annex I code	Habitat	Area	Structure and functions	Future prospects	Overall assessment
4010	Wet heath	Unfavourable - Inadequate	Unfavourable - Bad	Unfavourable - Inadequate	Unfavourable - Bad
4030	Dry heath	Unfavourable - Inadequate	Unfavourable - Inadequate	Unfavourable - Inadequate	Unfavourable - Inadequate
4060	Alpine and Boreal heath	Favourable	Unfavourable - Inadequate	Favourable	Unfavourable - Inadequate
*7130/7130	Blanket bog	Unfavourable - Inadequate	Unfavourable - Bad	Unfavourable - Bad	Unfavourable - Bad
7230	Alkaline fens	Favourable	Favourable	Favourable	Favourable
8110	Siliceous scree	Favourable	Unfavourable - Inadequate	Favourable	Unfavourable - Inadequate
8210	Calcareous rocky slopes	Favourable	Unfavourable - Bad	Unfavourable - Inadequate	Unfavourable - Bad
8220	Siliceous rocky slopes	Favourable	Favourable	Unfavourable - Inadequate	Unfavourable - Inadequate

## 4. DISCUSSION

### Natura 2000 Standard Data Form

- 4.1 Seven Annex I habitats were recorded in the cSAC that are currently not listed for the site on the Natura 2000 Standard Data Form, habitats 3130, 3160, 3260, 6430, 7230 and 8110. All of the corrie lakes on the north side of the range are **3130 Upland oligotrophic lakes**. Habitat **4010 Wet heath** is common throughout the site and covers 11.3% of the area whilst **8110 Siliceous scree** is frequent on the upper slope of Slievecushnabinnia. Habitats **3160 Dystrophic lakes** and **3260 Floating river vegetation** are present only as small localised examples, as are brown moss flush communities ascribable to **7230 Alkaline fens**. The upland ledge aspects of **6430 Hydrophilous tall herb communities** were recorded from several corrie walls.
- 4.2 Habitat **\*6230 Species-rich *Nardus* grassland** is listed on the Standard Data Form for this site and management objectives for this habitat are included in the site's Conservation Plan (NPWS, 2005). Maps in the conservation plan indicate small areas of this habitat in the townlands of Ballynamuddagh and Ballygeana in the western end of the site and on the lower western slopes of Cush. No examples of this habitat however were recorded during the present survey. This may be due to a change in the quality of the habitat. As noted in section 3, a population of *Pseudorchis albida* had been recorded in this habitat in 1991, but these plants were not refound during a survey in 2006 at which time the habitat was noted as being unsuitable for the species due to a rank sward (J. Conaghan, pers. comm.). The apparent absence of this habitat may also be due to a change in its interpretation. The *Interpretation manual of European habitats* (European Commission, 2007) states that species-rich sites should be interpreted as sites which are remarkable for a high number of species. Data recorded in 1991 as part of an Area of Scientific Interest survey noted a maximum of only 11 vascular species in a 1 m x 1 m plot. This is significantly lower than examples of this habitat recorded at other sites by the NSUH, where it typically occurs on thin, stony soils with some enrichment from basic flushing.
- 4.3 The Natura 2000 Standard Data Form for this site should be reviewed and updated in light of the data presented in this report in terms of the habitats listed, areas and ratings. It is obligatory that all Annex I habitats within an SAC are listed on this form even if they are subsequently ranked as having a non-significant presence.

### Additional recommendations

- 4.4 The timeframe of the Conservation Plan (2005-2010) has now expired and an updated plan is required which should utilise the information provided in this report, and should assess the success of implementation of management objectives from the previous plan. The impacts highlighted in this report need to be addressed if progress is to be made towards attaining Favourable status for Annex I habitats. The three major impacts are livestock grazing, burning and peat erosion.
- 4.5 Levels of livestock grazing are being addressed through the CFP. Whilst the CFP reductions in stock numbers appears to have resulted in some improvement to Annex I habitats, these

- habitats are not currently attaining Favourable status. Continued monitoring is required to establish what would be sustainable levels of livestock for this site bearing in mind that there may be a considerable delay between changes in livestock levels and a response in the vegetation. The available data do not support an increase in stocking levels.
- 4.6 Burning is a major impact on heath habitats in some areas of the cSAC. Whilst burning can be an important tool in heathland management, uncontrolled and too frequent burning can damage the long-term viability of heaths. Regulation of burning at a site level is required to ensure that it complies with a maximum area of 5 ha and maximum frequency for any area of once every 15 years.
- 4.7 Erosion of blanket peat is a major impact in **\*7130/7130 Blanket bog**. Whilst some areas of eroded peat may gradually revegetate as a result of the CFP reductions in stock numbers, in areas of more severe erosion active restoration measures are needed. These may include the damming of erosion gullies, stabilisation of bare peat with geotextiles or heather brash, the planting of *Eriophorum angustifolium*, and seeding of bare peat with *Sphagnum* propagules. The conservation of **\*7130 Active blanket bog** should be prioritised as befitting its status.
- 4.8 It would be desirable for future phases of monitoring to expand on the network of monitoring stops established by this survey. Placement of additional stops should take into account the spatial distribution of existing stops.
- 4.9 Monitoring criteria should be developed for habitat **6430 Hydrophilous tall herb communities**. Relevé data collected by this survey will allow this habitat to be, in part, retrospectively assessed.
- 4.10 In many areas the cSAC boundary follows no obvious feature on the ground such as a river, forest edge or fenceline. In these areas, expanses of Annex I habitat may continue for some distance outside the cSAC, for example at Bohernarnane and near Carrigphierish. Consideration should be given to reviewing the cSAC boundary in these locations and/or how these habitats are to be effectively managed when the land parcels straddle the current boundary.
- 4.11 Significant areas of the site (26.4%) are non-Annex I **GS3 Dry-humid acid grassland** that has largely developed from **4030 Dry heath** as a result of burning and heavy grazing. These occur mainly in the western and northern central parts of the site. Consideration should be given to increasing the area of **4030 Dry heath** within the site by encouraging it to recolonise these areas.

## REFERENCES

- Anon. (1998) A manual for the production of grazing impact assessments in upland and peatland habitats. Version 1.2. Dúchas, the Heritage Service and Department of Agriculture and Food, Dublin.
- Anon. (2011) Schedule of walks to December 2011. Galtee Walking Club, Tipperary. Online at: <http://www.galteewalkingclub.ie/schedule.html> Accessed: 18th November 2011.
- Atherton, I., Bosanquet, S. & Lawley, M. (eds) (2010) *Mosses and liverworts of Britain and Ireland: a field guide*. British Bryological Society.
- Averis, A.M., Averis, A.B.G., Birks, H.J.B., Horsfield, D., Thompson, D.B.A. & Yeo, M.J.M. (2004) *An illustrated guide to British upland vegetation*. Joint Nature Conservation Committee, Peterborough.
- Bernth, K.K. (1998) *Campylopus introflexus* (Hedw.) Brid. Thesis, Department of Bioscience, University of Århus, Århus.
- Curtis, T.G.F. & McGough, H.N. (1988) *The Irish Red Data Book 1: Vascular plants*. The Stationery Office, Dublin.
- Equiha, M. & Usher, M.B. (1993) Impact of carpets of the invasive moss *Campylopus introflexus* on *Calluna vulgaris* regeneration. *Journal of Ecology* **81** 359-365.
- European Commission (2007) Interpretation manual of European habitats EUR 27. European Commission, DG Environment, Nature and Biodiversity.
- Fahy, E. & Goodwillie, R. (1974) A preliminary report on Areas of Scientific Interest in Co. Tipperary S.R. Unpublished report to the National Institute for Physical Planning and Construction Research, Dublin.
- Fossitt, J.A. (2000) *A guide to habitats in Ireland*. The Heritage Council, Kilkenny.
- Goodwillie, R. (2005) SAC designation of part of Galtee Mountains, Co. Tipperary (000646). Report submitted to National Parks and Wildlife Service, Department of Environment, Heritage and Local, Government, Dublin.
- Hart, H.C. (1883) On the botany of the Galtee Mountains, Co. Tipperary. *Proceedings of the Royal Irish Academy* **3** 392-402.
- Klinck, J. (2010) The alien invasive moss *Campylopus introflexus* in the Danish coastal dune system: preferences, development, effects, control. M.Sc. thesis. Copenhagen University, Copenhagen.
- Lockhart, N., Hodgetts, N. & Holyoak, D. (2012) Rare and threatened bryophytes of Ireland. National Museums Northern Ireland, Holywood, Co. Down.
- Mooney, E., Goodwillie, R. & Douglas, C. (1991) Survey to locate mountain blanket bogs of scientific interest in Ireland. National Parks & Wildlife Service, Office of Public Works.
- NPWS (2005) National Parks and Wildlife Service Conservation Plan for 2005-2010. Galtee Mountains cSAC Site Code 646 Cos. Limerick & Tipperary. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

- NPWS (2008) *The status of EU protected habitats and species in Ireland*. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin.
- Perrin, P.M. (2012) Evaluation of Commonage Framework Plan data for use in the National Survey of Upland Habitats. Unpublished report submitted to National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Government, Dublin.
- Perrin, P.M., Barron, S.J., Roche, J.R. & O'Hanrahan, B. (2009) *Scoping study and pilot survey for a national survey of upland habitats and vegetation in Ireland*. Report submitted to the National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.
- Perrin, P.M., Barron, S.J., Roche, J.R. & O'Hanrahan, B. (2010) *Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland. Version 1.0*. Irish Wildlife Manuals, No. 48. National Parks and Wildlife Service, Department of Environment, Heritage and Local, Government, Dublin.
- Perrin, P.M., Barron, S.J., Roche, J.R. & O'Hanrahan, B. (2014). *Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland. Version 2.0*. Irish Wildlife Manuals, No. 79. National Parks and Wildlife Service. Department of Arts, Heritage and the Gaeltacht, Dublin.
- Praeger, R.L. (1934) *The botanist in Ireland*. Hodges, Figgis & Co., Dublin.
- Rodwell, J.S. (ed.) (1991). *British Plant Communities Volume 2: Mires and Heaths*. Cambridge University Press, Cambridge.
- Scannell, M.J.B. (1973) *Euphrasia frigida* Pugsl. on the Galtees. *Irish Naturalists' Journal* **19** 396.
- South Tipperary Heritage Forum (2004) *South Tipperary County Heritage Plan 2004-2008*. Tipperary County Council, Clonmel.
- Stelfox, A.W. (1944) Comments on H. C. Hart's "Botany of the Galtee Mountains, Co. Tipperary": *Proc. R.I. Acad.*, **3**, (2), No. 6. April, 1881. *Irish Naturalists' Journal* **5** 138-142.
- Stelfox, A.W. (1946) Further Notes on the Flora of the Galtee Mountains and the Glen of Aherlow. *Irish Naturalists' Journal* **9** 327-331.
- Ssymank, A. (2009) Report and suggestions for the use of references for pressures, threats and impacts, Sub-group for Work Package 1 (review Art 17 reporting). Expert Group on Reporting, European Commission, DG Environment.
- Synnott, D. Summer Meeting 1966 Clonmel, 21 August-2 September. In: Meetings of the BBS – 1966. British Bryological Society. Online at: <http://rbg-web2.rbge.org.uk/bbs/meetings/mtgs66.htm> Accessed 22nd February 2012.
- Webb, D.A. (1943) Some new county records. *Irish Naturalists' Journal* **8** 114-115.
- Webb, D.A., Parnell, J. & Doogue, D. (1996) *An Irish flora*. 7<sup>th</sup> edn. Dundalgan Press, Dundalk.



## APPENDIX 1: ANNEX I HABITATS

The following standard abbreviations are used throughout this report for Annex I habitats. With the exception of habitats 4060 and 7130, these follow the abbreviations used in NPWS (2008).

<b>Annex I code</b>	<b>Full name of Annex I habitat</b>	<b>Standard abbreviation</b>
3130	Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or of the <i>Isoëto-Nanojuncetea</i>	3130 Upland oligotrophic lakes
3160	Natural dystrophic lakes and ponds	3160 Dystrophic lakes
3260	Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation	3260 Floating river vegetation
4010	Northern Atlantic wet heaths with <i>Erica tetralix</i>	4010 Wet heath
4030	European dry heaths	4030 Dry heath
4060	Alpine and Boreal heaths	4060 Alpine and Boreal heath
6230	*Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)	*6230 Species-rich <i>Nardus</i> grasslands
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	6430 Hydrophilous tall herb communities
7130	Blanket bogs (* if active bog)	*7130 Active blanket bog or 7130 Inactive blanket bog or *7130/7130 Blanket bog
7230	Alkaline fens	7230 Alkaline fens
8110	Siliceous scree of the montane to snow levels ( <i>Androsacetalia alpinae</i> and <i>Galeopsetalia ladani</i> )	8110 Siliceous scree
8210	Calcareous rocky slopes with chasmophytic vegetation	8210 Calcareous rocky slopes
8220	Siliceous rocky slopes with chasmophytic vegetation	8220 Siliceous rocky slopes

## APPENDIX 2: PHOTOGRAPHS



Plate A1: *Cochlearia officinalis* agg. on the corrie wall surrounding Lough Diheen (Photo: John Conaghan).



Plate A2: *Thalictrum minus* on the corrie walls surrounding Lough Muskry (Photo: Philip Perrin).



Plate A3: 4060 Alpine and Boreal heath with *Calluna vulgaris*, *Racomitrium lanuginosum*, *Huperzia selago* and *Juncus squarrosus*, southeast of Farbreaga (Photo: Evelyn Joyce).



Plate A4: Previously burnt area of 4030 Dry heath with *Calluna vulgaris*, southeast of Knockeenatoung (Photo: Philip Perrin).



Plate A5: 4010 Wet heath with *Trichophorum germanicum*, *Eriophorum angustifolium* and *Calluna vulgaris* on the slopes south of Carrignabinnia (Photo: Jenni Roche).



Plate A6: 6430 Hydrophilous tall herb community with *Angelica sylvestris*, *Cochlearia officinalis* agg., *Festuca* spp., *Anthoxanthum odoratum*, *Luzula sylvatica* and *Saxifraga rosacea* on the corrie wall surrounding Lough Diheen (Photo: Rory Hodd).



Plate A7: 8110 Siliceous scree with *Racomitrium lanuginosum*, Lyracappul (Photo: Orla Daly).



Plate A8: 3130 Upland oligotrophic lake. Lough Diheen and associated moraine with a large expanse of GS3 Dry-humid acid grassland (Photo: John Conaghan).



Plate A9: \*7130 Active blanket bog with *Eriophorum vaginatum*, *Calluna vulgaris*, *Erica tetralix* and *Sphagnum* spp., east of Knockastakeen (Photo: Joanne Denyer).



Plate A10: FP2 Calcareous spring with *Palustriella commutata* and *Koeleria macrantha* in the corrie surrounding Lough Muskry (Photo: Joanne Denyer).



Plate A11: 8210 Calcareous rocky slopes with *Asplenium viride* in the corrie surrounding Lough Muskry (Photo: Rory Hodd).



Plate A12: 3130 Upland oligotrophic lake, Lough Curra and the surrounding corrie walls (Photo: Orla Daly).



Plate A13: The Galtees mountain range with Cush, Galtymbeg, Galtymore and Slievecushnabinnia depicted from left to right (Photo: Orla Daly).



Plate A14: View from Slievecushnabinnia across to Galtymore with erosion evident in \*7130 Active blanket bog (Photo: Philip Perrin).



Plate A15: Erosion of \*7130 Active blanket bog on the saddle west of Greenane (Photo: John Conaghan).



Plate A16: Old drainage channels cut into \*7130 Active blanket bog on the southeastern spur of Carrignabinnia (Photo: Orla Daly).

## APPENDIX 3: PLANT SPECIES LIST

All species recorded from relevés, waypoints and polygons during the NSUH survey are listed.

VASCULAR SPECIES	
Species name	Common name
<i>Agrostis canina</i>	Velvet Bent
<i>Agrostis capillaris</i>	Common Bent
<i>Agrostis stolonifera</i>	Creeping Bent
<i>Anagallis tenella</i>	Bog Pimpernel
<i>Angelica sylvestris</i>	Wild Angelica
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass
<i>Asplenium viride</i>	Green Spleenwort
<i>Betula pubescens</i>	Downy Birch
<i>Blechnum spicant</i>	Hard-fern
<i>Calluna vulgaris</i>	Heather
<i>Campanula rotundifolia</i>	Harebell
<i>Cardamine pratensis</i>	Cuckooflower
<i>Carex bigelowii</i>	Stiff Sedge
<i>Carex binervis</i>	Green-ribbed Sedge
<i>Carex echinata</i>	Star Sedge
<i>Carex flacca</i>	Glaucous Sedge
<i>Carex nigra</i>	Common Sedge
<i>Carex panicea</i>	Carnation Sedge
<i>Carex paniculata</i>	Greater Tussock-sedge
<i>Carex pilulifera</i>	Pill Sedge
<i>Carex pulicaris</i>	Flea Sedge
<i>Carex viridula</i> subsp. <i>oedocarpa</i>	a Yellow-sedge
<i>Cerastium fontanum</i>	Common Mouse-ear
<i>Chrysosplenium oppositifolium</i>	Opposite-leaved Golden-saxifrage
<i>Cirsium palustre</i>	Marsh Thistle
<i>Cochlearia officinalis</i> agg.	Common Scurvygrass
<i>Crataegus monogyna</i>	Hawthorn
<i>Crepis paludosa</i>	Marsh Hawk's-beard
<i>Cystopteris fragilis</i>	Brittle Bladder-fern
<i>Dactylorhiza</i> sp.	an Orchid
<i>Danthonia decumbens</i>	Heath-grass
<i>Deschampsia cespitosa</i>	Tufted Hair-grass



<b>VASCULAR SPECIES</b>	
<b>Species name</b>	<b>Common name</b>
<i>Deschampsia flexuosa</i>	Wavy Hair-grass
<i>Digitalis purpurea</i>	Foxglove
<i>Drosera rotundifolia</i>	Round-leaved Sundew
<i>Dryopteris dilatata</i>	Broad Buckler-fern
<i>Empetrum nigrum</i>	Crowberry
<i>Epilobium brunnescens</i>	New Zealand Willowherb
<i>Epilobium</i> sp.	a Willowherb
<i>Erica cinerea</i>	Bell Heather
<i>Erica tetralix</i>	Cross-leaved Heath
<i>Eriophorum angustifolium</i>	Common Cottongrass
<i>Eriophorum vaginatum</i>	Hare's-tail Cottongrass
<i>Euphrasia officinalis</i> agg.	Eyebrights
<i>Festuca ovina</i>	Sheep's-fescue
<i>Festuca rubra</i>	Red Fescue
<i>Festuca vivipara</i>	Viviparous Sheep's-fescue
<i>Fraxinus excelsior</i>	Ash
<i>Galium palustre</i>	Common Marsh-bedstraw
<i>Galium saxatile</i>	Heath Bedstraw
<i>Hieracium</i> sp.	a Hawkweed
<i>Holcus lanatus</i>	Yorkshire-fog
<i>Homalothecium sericeum</i>	Silky Wall Feather-moss
<i>Huperzia selago</i>	Fir Clubmoss
<i>Hymenophyllum wilsonii</i>	Wilson's Filmy-Fern
<i>Ilex aquifolium</i>	Holly
<i>Isolepis setacea</i>	Bristle Club-rush
<i>Juncus acutiflorus</i>	Sharp-flowered Rush
<i>Juncus articulatus</i>	Jointed Rush
<i>Juncus bulbosus</i>	Bulbous Rush
<i>Juncus effusus</i>	Soft-rush
<i>Juncus squarrosus</i>	Heath Rush
<i>Koeleria macrantha</i>	Crested Hair-grass
<i>Leontodon autumnalis</i>	Autumn Hawkbit
<i>Listera cordata</i>	Lesser Twayblade
<i>Luzula campestris</i>	Field Wood-rush
<i>Luzula multiflora</i>	Heath Wood-rush
<i>Luzula sylvatica</i>	Great Wood-rush

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**VASCULAR SPECIES**

<b>Species name</b>	<b>Common name</b>
<i>Lysimachia nemorum</i>	Yellow Pimpernel
<i>Molinia caerulea</i>	Purple Moor-grass
<i>Montia fontana</i>	Blinks
<i>Nardus stricta</i>	Mat-grass
<i>Narthecium ossifragum</i>	Bog Asphodel
<i>Oxalis acetosella</i>	Wood-sorrel
<i>Oxyria digyna</i>	Mountain Sorrel
<i>Pedicularis sylvatica</i>	Lousewort
<i>Picea sitchensis</i>	Sitka Spruce
<i>Pinus sylvestris</i>	Scots Pine
<i>Plantago lanceolata</i>	Ribwort Plantain
<i>Polygala serpyllifolia</i>	Heath Milkwort
<i>Polypodium interjectum</i>	Intermediate Polypody
<i>Polypodium vulgare</i>	Polypody
<i>Potentilla erecta</i>	Tormentil
<i>Prunus spinosa</i>	Blackthorn
<i>Pteridium aquilinum</i>	Bracken
<i>Quercus petraea</i>	Sessile Oak
<i>Ranunculus flammula</i>	Lesser Spearwort
<i>Ranunculus repens</i>	Creeping Buttercup
<i>Rubus fruticosus</i> agg.	Brambles
<i>Rumex acetosa</i>	Common Sorrel
<i>Rumex acetosella</i>	Sheep's Sorrel
<i>Sagina nodosa</i>	Knotted Pearlwort
<i>Sagina procumbens</i>	Procumbent Pearlwort
<i>Salix herbacea</i>	Dwarf Willow
<i>Saxifraga hypnoides</i>	Mossy Saxifrage
<i>Saxifraga rosacea</i>	Irish saxifrage
<i>Saxifraga spathularis</i>	St Patrick's-cabbage
<i>Saxifraga stellaris</i>	Starry Saxifrage
<i>Sedum rosea</i>	Roseroot
<i>Sorbus aucuparia</i>	Rowan
<i>Stellaria graminea</i>	Lesser Stitchwort
<i>Stellaria uliginosa</i>	Bog Stitchwort
<i>Succisa pratensis</i>	Devil's-bit Scabious
<i>Taraxacum officinale</i> agg.	Dandelions

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**VASCULAR SPECIES**

<b>Species name</b>	<b>Common name</b>
<i>Thalictrum minus</i>	Lesser Meadow-rue
<i>Trichophorum germanicum</i>	Deergrass
<i>Trifolium repens</i>	White Clover
<i>Ulex europaeus</i>	Gorse
<i>Ulex gallii</i>	Western Gorse
<i>Vaccinium myrtillus</i>	Bilberry
<i>Vaccinium vitis-idaea</i>	Cowberry
<i>Viola palustris</i>	Marsh Violet
<i>Viola riviniana</i>	Common Dog-violet

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**BRYOPHYTES**

<b>Species name</b>	<b>Common name</b>
<i>Amphidium mougeotii</i>	Mougeot's Yoke-moss
<i>Andreaea rothii</i> subsp. <i>falcata</i>	Hunt's Rock-moss
<i>Andreaea rupestris</i>	Rock-moss
<i>Aneura pinguis</i>	Greasewort
<i>Anoetangium aestivum</i>	Summer moss
<i>Aulacomnium palustre</i>	Bog Bead-moss
<i>Blindia acuta</i>	Sharp-leaved Blindia
<i>Brachythecium rivulare</i>	River Feather-moss
<i>Brachythecium rutabulum</i>	Rough-stalked Feather-moss
<i>Breutelia chrysocoma</i>	Golden-head Moss
<i>Bryoerythrophyllum recurvirostrum</i>	Red Beard-moss
<i>Bryum capillare</i>	Thread-moss
<i>Bryum pseudotriquetrum</i>	Marsh Bryum
<i>Calliergon giganteum</i>	Giant Spear-moss
<i>Calliergonella cuspidata</i>	Pointed Spear-moss
<i>Calypogeia fissa</i>	Common Pouchwort
<i>Calypogeia muelleriana</i>	Mueller's Pouchwort
<i>Campylium stellatum</i>	Yellow Starry Feather-moss
<i>Campylopus atrovirens</i>	Swan-neck Moss
<i>Campylopus flexuosus</i>	Rusty Swan-neck Moss
<i>Campylopus introflexus</i>	Heath Star-moss
<i>Campylopus pyriformis</i>	Dwarf Swan-neck Moss
<i>Cephalozia bicuspidata</i>	Two-horned Pincerwort
<i>Cephalozia catenulata</i>	Pincerwort

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**BRYOPHYTES**

<b>Species name</b>	<b>Common name</b>
<i>Cephaloziella</i> sp.	a Threadwort
<i>Ceratodon purpureus</i>	Redshank
<i>Chiloscyphus pallescens</i>	Pale Liverwort
<i>Chiloscyphus polyanthos</i>	St Winifred's Moss
<i>Conocephalum conicum</i>	Great Scented Liverwort
<i>Cratoneuron filicinum</i>	Fern-leaved Hook Moss
<i>Ctenidium molluscum</i>	Comb-moss
<i>Dichodontium pellucidum</i>	Transparent Fork-moss
<i>Dicranella palustris</i>	Marsh Forklet-moss
<i>Dicranum majus</i>	Greater Fork-moss
<i>Dicranum scoparium</i>	Broom Fork-moss
<i>Diplophyllum albicans</i>	White Earwort
<i>Ditrichum gracile</i>	Slender Ditrichum
<i>Drepanocladus cossonii</i>	Intermediate Hook-moss
<i>Drepanocladus revolvens</i>	Rust Hook-moss
<i>Eucladium verticillatum</i>	Whorled Tufa-moss
<i>Eurhynchium hians</i>	Swartz's Feather-moss
<i>Fissidens adianthoides</i>	Maidenhair Pocket-moss
<i>Fissidens osmundoides</i>	Purple-stalked Pocket-moss
<i>Fissidens taxifolius</i>	Pocket-moss
<i>Fontinalis antipyretica</i>	Greater Water-moss
<i>Frullania tamarisci</i>	Tamarisk Scalewort
<i>Frullania teneriffae</i>	Sea Scalewort
<i>Grimmia</i> sp.	a Grimmia
<i>Gymnocolea inflata</i>	Inflated Notchwort
<i>Herbertus aduncus</i> subsp. <i>hutchinsiae</i>	Juniper Prongwort
<i>Heterocladium heteropterum</i>	Wry-leaved Tamarisk-moss
<i>Hookeria lucens</i>	Shining Hookeria
<i>Hylocomium splendens</i>	Glittering Wood-moss
<i>Hyocomium armoricum</i>	Flagellate Feather-moss
<i>Hypnum jutlandicum</i>	Heath Plait-moss
<i>Isoetecium holtii</i>	Holt's Mouse-tail Moss
<i>Isoetecium myosuroides</i> var. <i>brachytheციoides</i>	Thicker Mouse-tail Moss
<i>Kindbergia praelonga</i>	Common Feather-moss
<i>Kurzia trichoclados</i>	Heath Fingerwort
<i>Leiocolea bantriensis</i>	Bantry Notchwort

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**BRYOPHYTES**

<b>Species name</b>	<b>Common name</b>
<i>Lejeunea patens</i>	Pearl Pouncewort
<i>Lophocolea bidentata</i>	Bifid Crestwort
<i>Lophocolea fragrans</i>	Fragrant Crestwort
<i>Lophozia excisa</i>	Capitate Notchwort
<i>Lophozia incisa</i>	Jagged Notchwort
<i>Lophozia ventricosa</i>	Tumid Notchwort
<i>Marsupella emarginata</i>	Notched Rustwort
<i>Marsupella</i> sp.	a Rustwort
<i>Metzgeria conjugata</i>	Rock Veilwort
<i>Metzgeria furcata</i>	Forked Veilwort
<i>Metzgeria leptoneura</i>	Hooked Veilwort
<i>Mnium hornum</i>	Swan's-neck Thyme-moss
<i>Mylia taylorii</i>	Taylor's Flapwort
<i>Nardia</i> sp.	a Flapwort
<i>Neckera crispa</i>	Crisped Neckera
<i>Odontoschisma denudatum</i>	Matchstick Flapwort
<i>Odontoschisma sphagni</i>	Bog-moss Flapwort
<i>Orthothecium intricatum</i>	Fine-leaved Leskea
<i>Palustriella commutata</i>	Curled Hook-moss
<i>Pellia endiviifolia</i>	Endive Pellia
<i>Pellia epiphylla</i>	Overleaf Pellia
<i>Philonotis fontana</i>	Fountain Apple-moss
<i>Plagiochila exigua</i>	Petty Featherwort
<i>Plagiochila porelloides</i>	Lesser Featherwort
<i>Plagiochila punctata</i>	Spotty Featherwort
<i>Plagiochila spinulosa</i>	Prickly Featherwort
<i>Plagiomnium undulatum</i>	Hart's-tongue Thyme-moss
<i>Plagiothecium succulentum</i>	Juicy Silk-moss
<i>Plagiothecium undulatum</i>	Waved Silk-moss
<i>Pleurozium schreberi</i>	Red-stemmed Feather-moss
<i>Pogonatum urnigerum</i>	Urn Haircap
<i>Pohlia nutans</i>	Nodding Thread-moss
<i>Pohlia wahlenbergii</i>	Thread-moss
<i>Polytrichum alpinum</i>	Alpine Haircap
<i>Polytrichum commune</i>	Common/Dense Haircap
<i>Polytrichum formosum</i>	Bank Haircap

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**BRYOPHYTES**

<b>Species name</b>	<b>Common name</b>
<i>Pseudotaxiphyllum elegans</i>	Elegant Silk-moss
<i>Racomitrium fasciculare</i>	Green Mountain Fringe-moss
<i>Racomitrium heterostichum</i>	Bristly Fringe-moss
<i>Racomitrium lanuginosum</i>	Woolly Fringe-moss
<i>Rhizomnium punctatum</i>	Dotted Thyme-moss
<i>Rhytidiadelphus loreus</i>	Little Shaggy-moss
<i>Rhytidiadelphus squarrosus</i>	Springy Turf-moss
<i>Rhytidiadelphus triquetrus</i>	Big Shaggy-moss
<i>Riccardia chamedryfolia</i>	Jagged Germanderwort
<i>Riccardia multifida</i>	Delicate Germanderwort
<i>Saccogyna viticulosa</i>	Straggling Pouchwort
<i>Scapania gracilis</i>	Western Earwort
<i>Scapania irrigua</i>	Heath Earwort
<i>Scapania nemorea</i>	Grove Earwort
<i>Scapania scandica</i>	Norwegian Earwort
<i>Scapania undulata</i>	Water Earwort
<i>Schistidium crassipilum</i>	Thickpoint Grimmia
<i>Scleropodium purum</i>	Neat Feather-moss
<i>Sphagnum capillifolium</i> subsp. <i>capillifolium</i>	Acute-leaved Bog-moss
<i>Sphagnum capillifolium</i> subsp. <i>rubellum</i>	Red Bog-moss
<i>Sphagnum compactum</i>	Compact Bog-moss
<i>Sphagnum cuspidatum</i>	Feathery Bog-moss
<i>Sphagnum denticulatum</i>	Cow-horn Bog-moss
<i>Sphagnum fallax</i>	Flat-topped Bog-moss
<i>Sphagnum inundatum</i>	Lesser Cow-horn Bog-moss
<i>Sphagnum palustre</i>	Blunt-leaved Bog-moss
<i>Sphagnum papillosum</i>	Papillose Bog-moss
<i>Sphagnum quinquefarium</i>	Five-ranked Bog-moss
<i>Sphagnum skyense</i>	Skye Bog-moss
<i>Sphagnum subnitens</i>	Lustrous Bog-moss
<i>Sphagnum tenellum</i>	Soft Bog-moss
<i>Thamnobryum alopecurum</i>	Fox-tail Feather-moss
<i>Thuidium tamariscinum</i>	Common Tamarisk-moss
<i>Tortella tortuosa</i>	Fizzled Crisp-moss
<i>Trichostomum crispulum</i>	Curly Crisp-moss
<i>Trichostomum tenuirostre</i>	Narrow-fruited Crisp-moss

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### BRYOPHYTES

<b>Species name</b>	<b>Common name</b>
<i>Tritomaria exsectiformis</i>	Large Cut Notchwort
<i>Tritomaria quinquedentata</i>	Lyon's Notchwort
<i>Weissia</i> sp.	a Beardless-moss

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### LICHENS

<b>Species name</b>	<b>Species name</b>
<i>Cladonia arbuscula</i>	<i>Cladonia furcata</i>
<i>Cladonia asahinae</i>	<i>Cladonia portentosa</i>
<i>Cladonia cervicornis</i>	<i>Cladonia squamosa</i>
<i>Cladonia ciliata</i>	<i>Cladonia subcervicornis</i>
<i>Cladonia coccifera</i>	<i>Cladonia uncialis</i>
<i>Cladonia floerkeana</i>	

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Figure 1. Survey area / boundary of Galtee Mountains cSAC (000646), Cos. Tipperary and Limerick

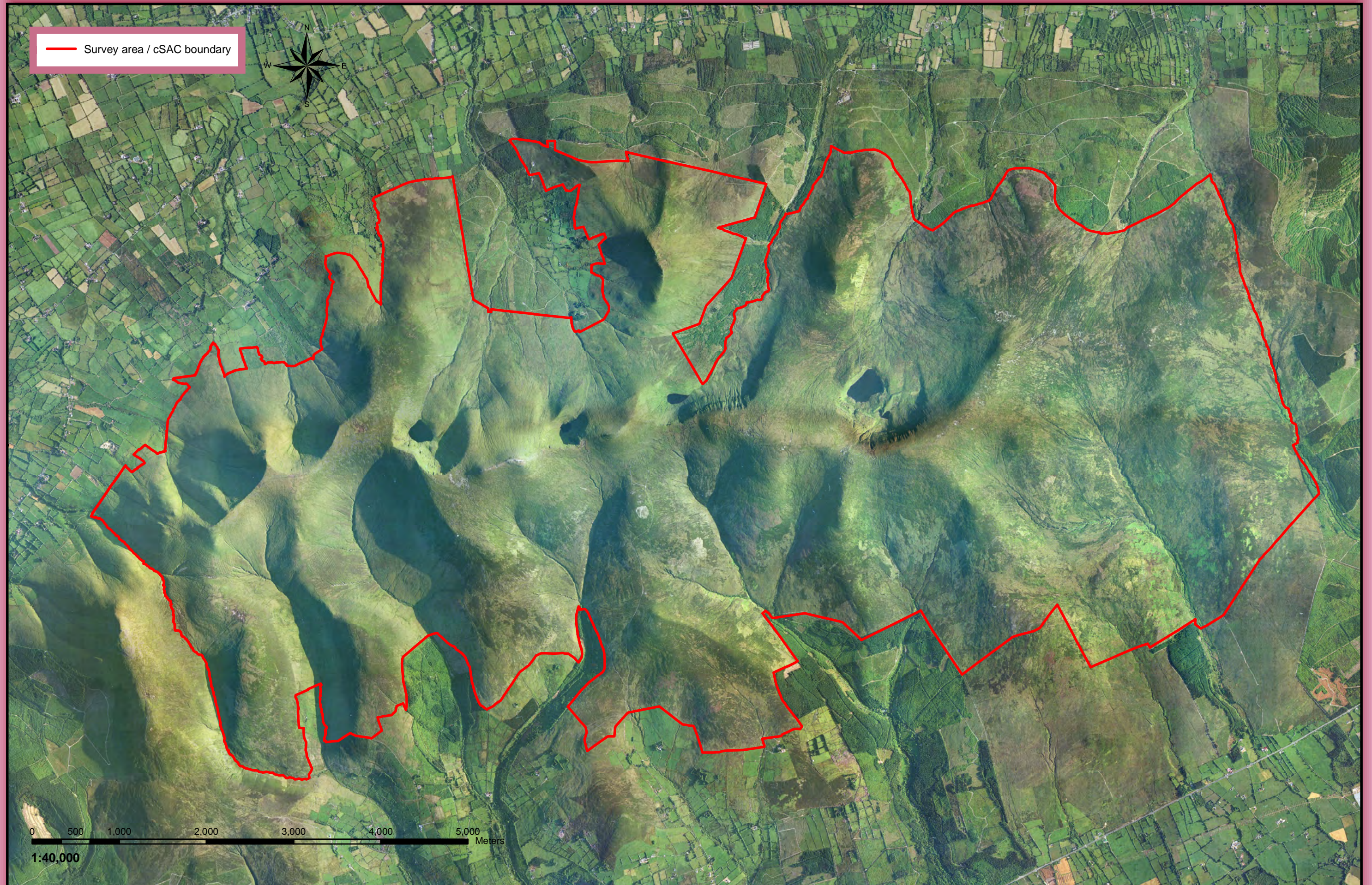




Figure 2. Primary Fossitt habitats within Galtee Mountains cSAC (000646), Cos. Tipperary and Limerick

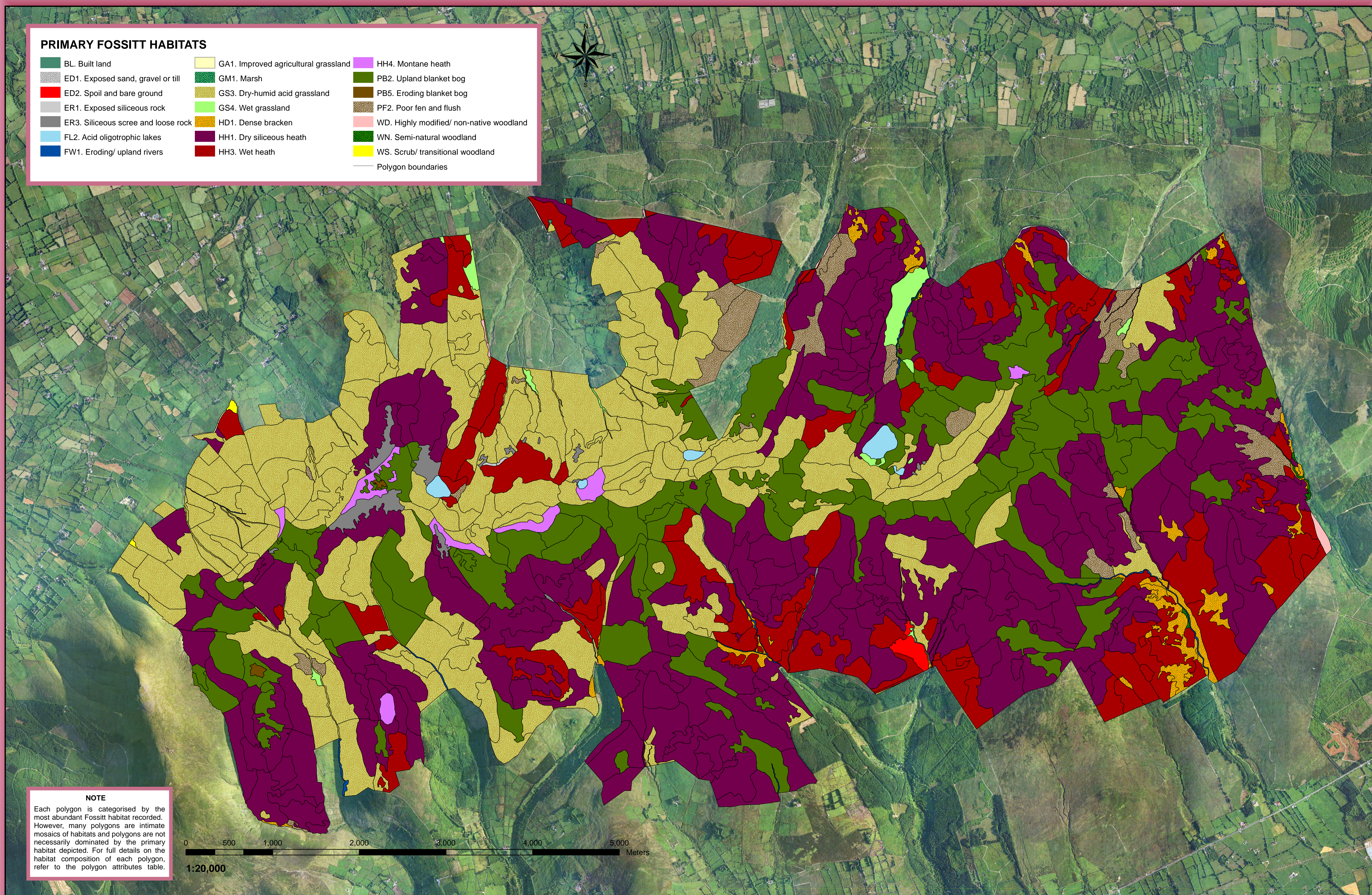


Figure 3. Primary Annex I habitats within Galtee Mountains cSAC (000646), Cos. Tipperary and Limerick

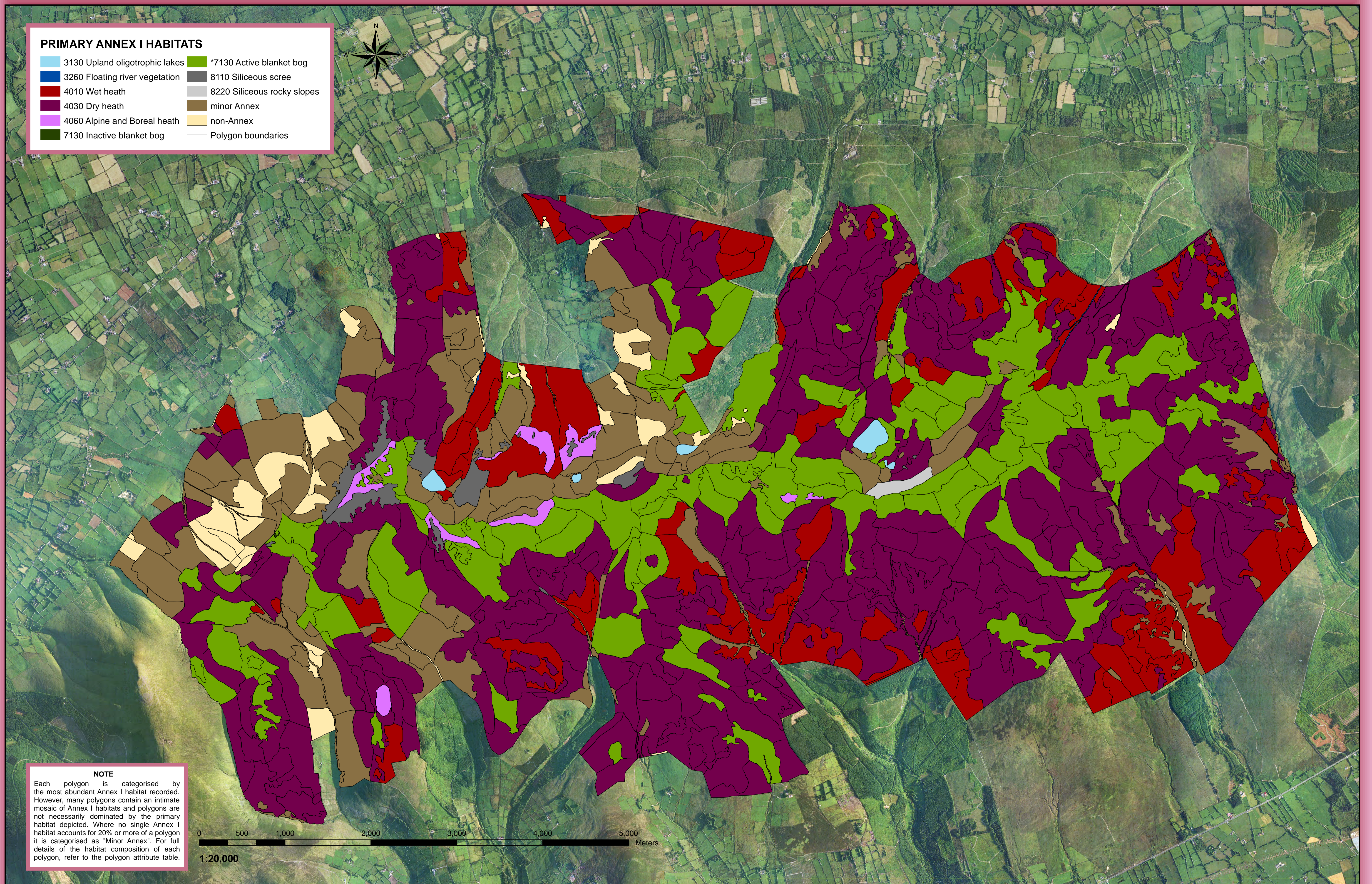


Figure 4a. Cover of 4010 WET HEATH within Galtee Mountains cSAC (000646), Cos. Tipperary and Limerick

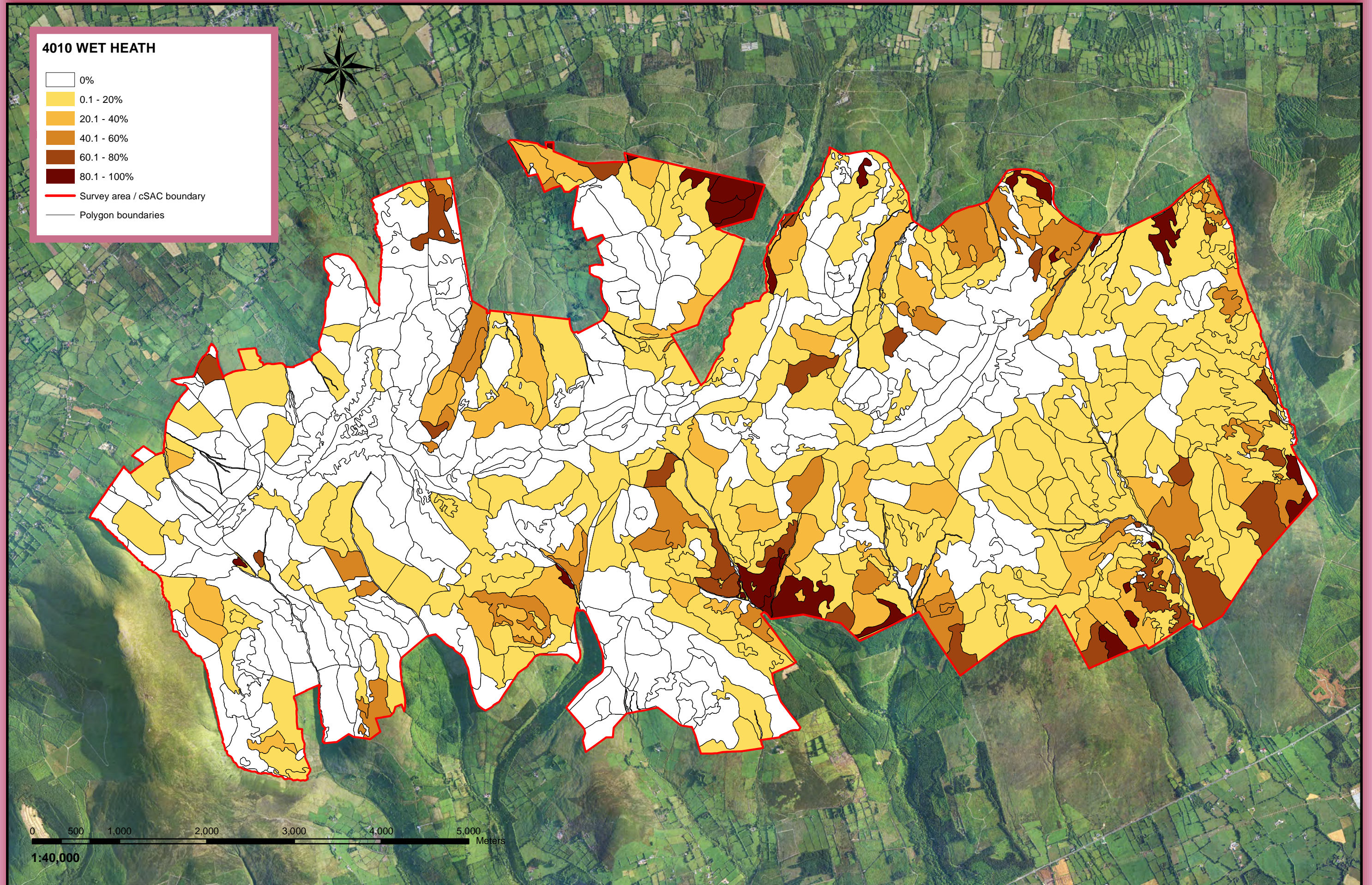


Figure 4b. Cover of 4030 DRY HEATH within Galtee Mountains cSAC (000646), Cos. Tipperary and Limerick

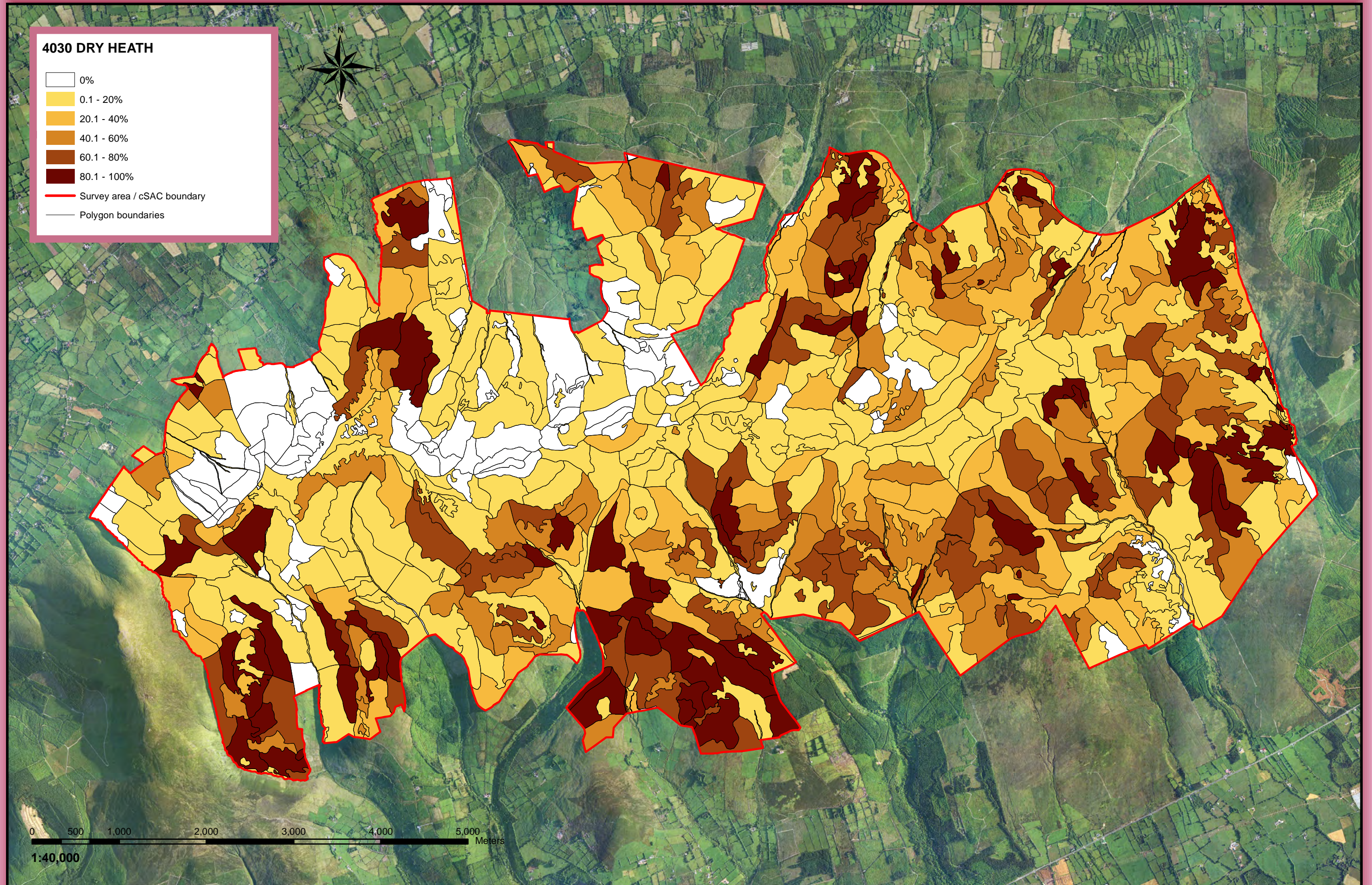


Figure 4c. Cover of 4060 ALPINE AND BOREAL HEATH within Galtee Mountains cSAC (000646), Cos. Tipperary and Limerick

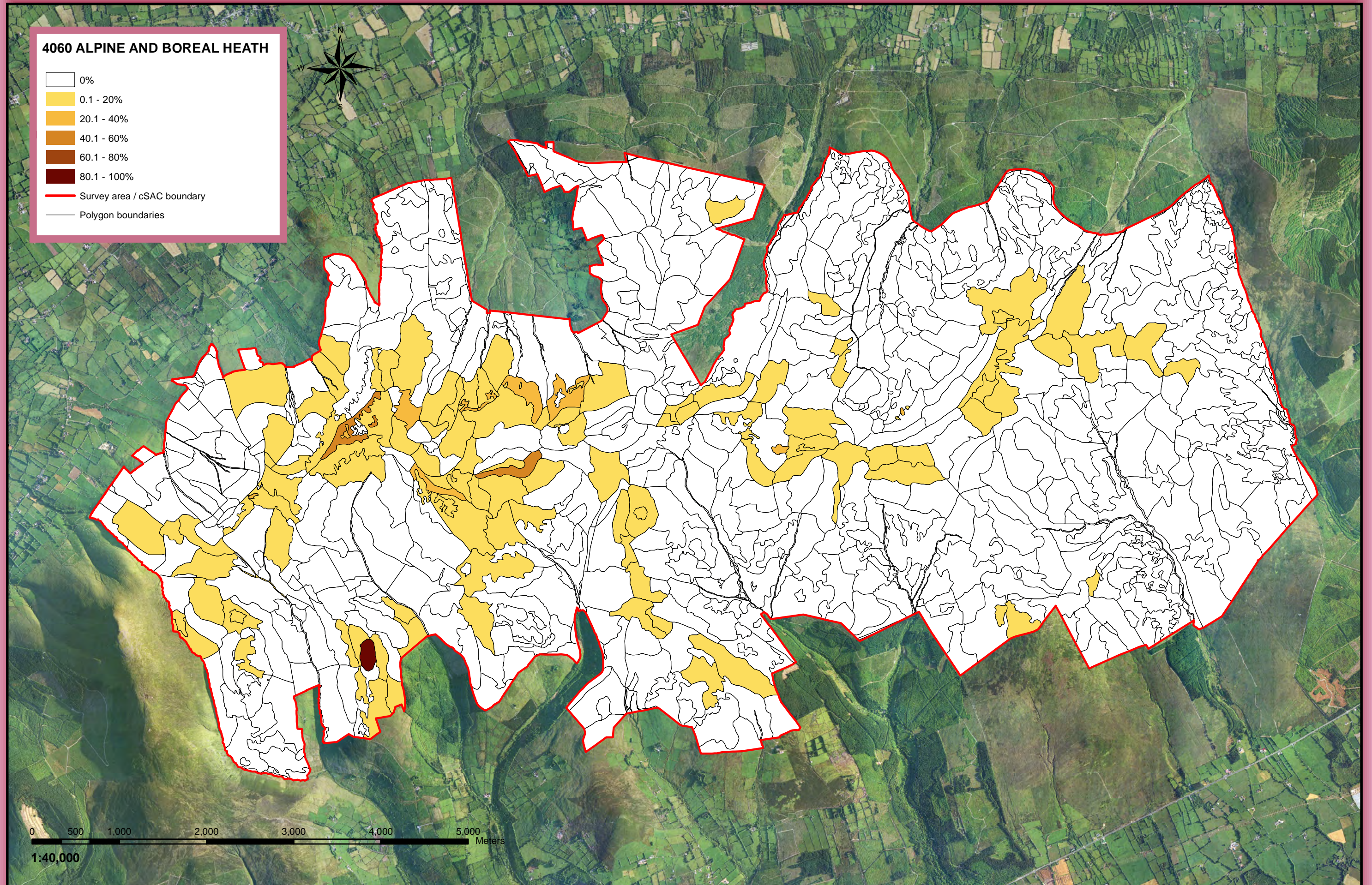


Figure 4d. Cover of 6430 HYDROPHILOUS TALL HERB COMMUNITIES within Galtee Mountains cSAC (000646), Cos. Tipperary and Limerick

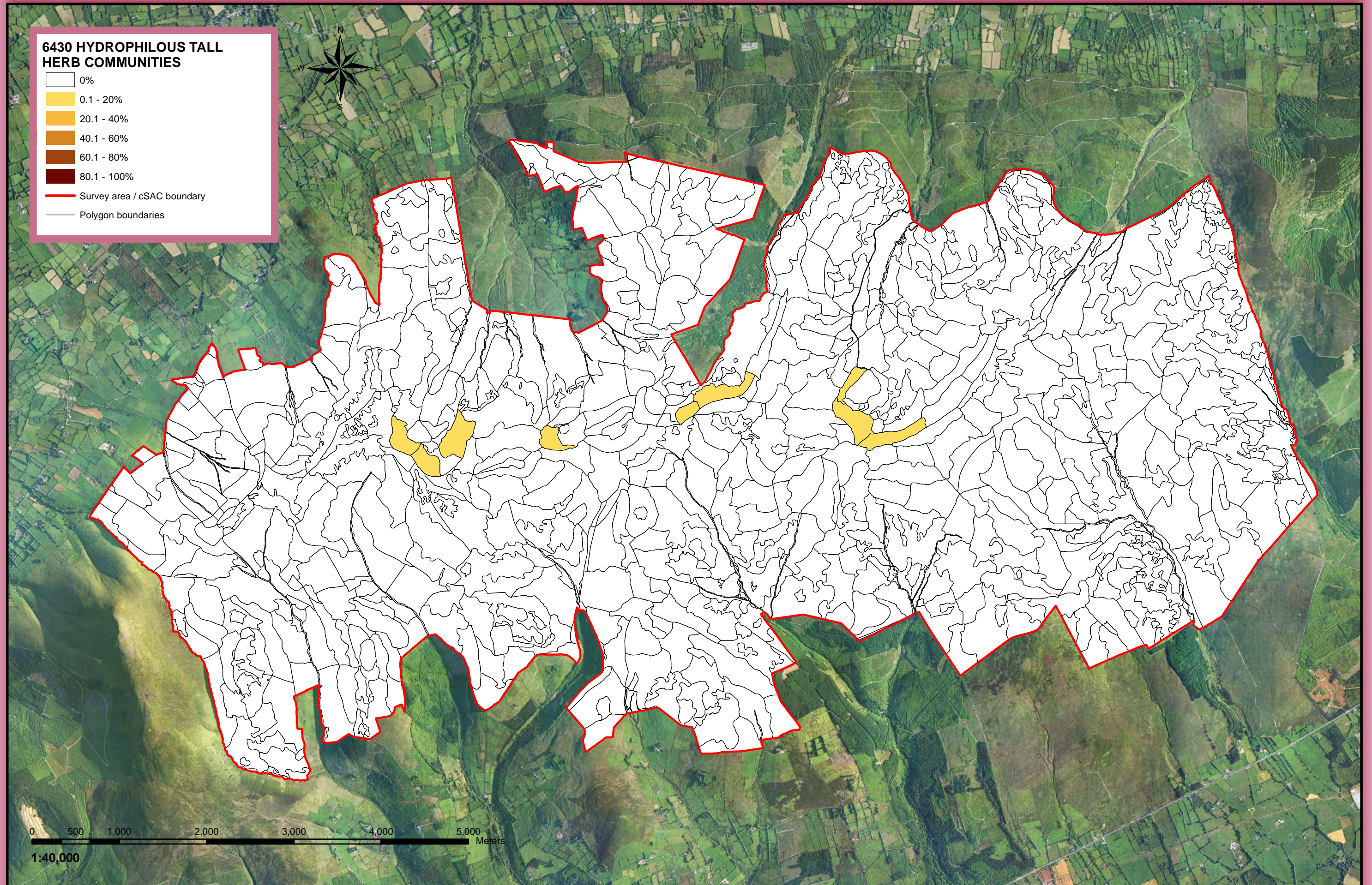


Figure 4e. Cover of \*7130 ACTIVE BLANKET BOG within Galtee Mountains cSAC (000646), Cos. Tipperary and Limerick

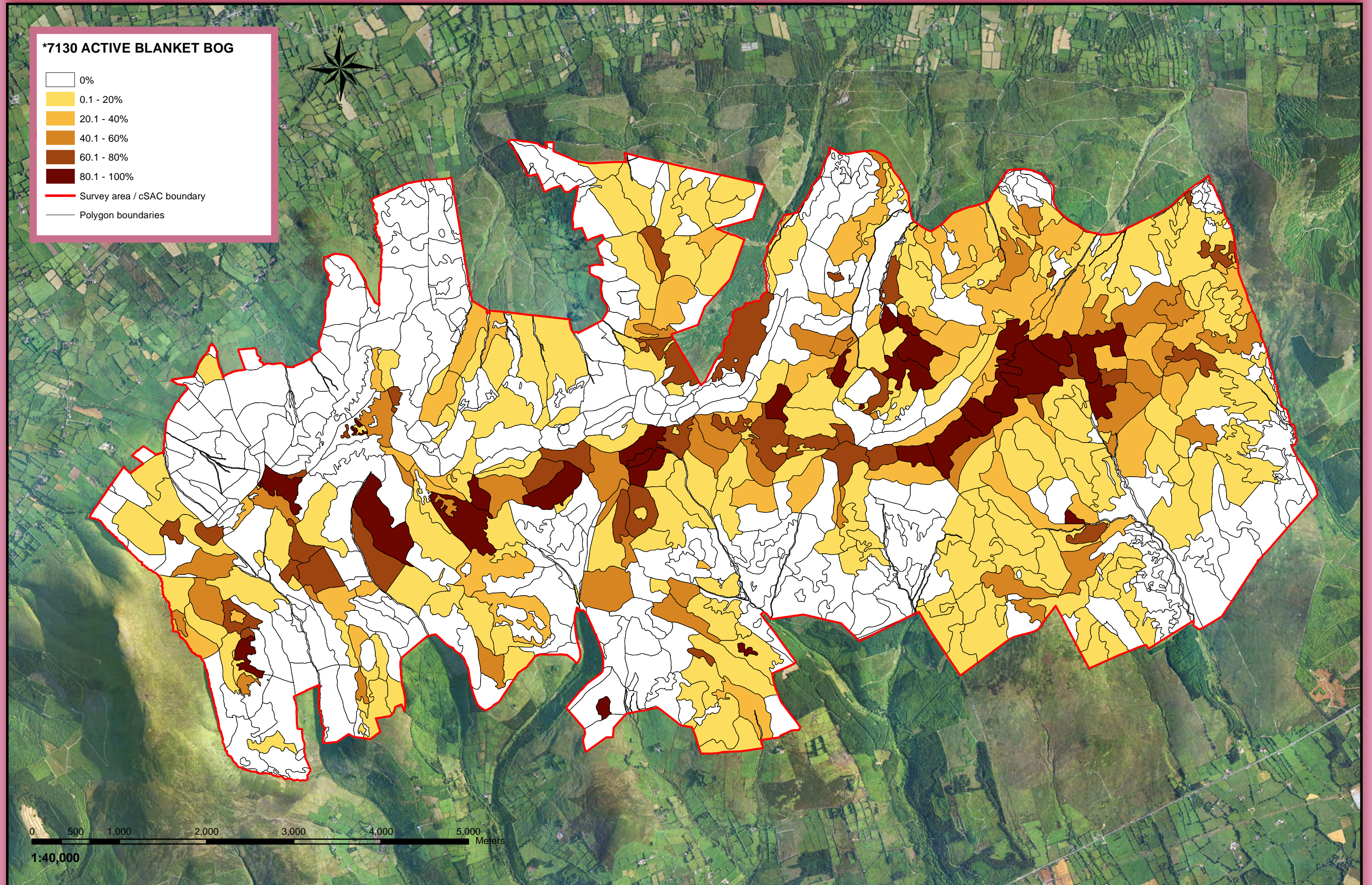


Figure 4f. Cover of 7130 INACTIVE BLANKET BOG within Galtee Mountains cSAC (000646), Cos. Tipperary and Limerick

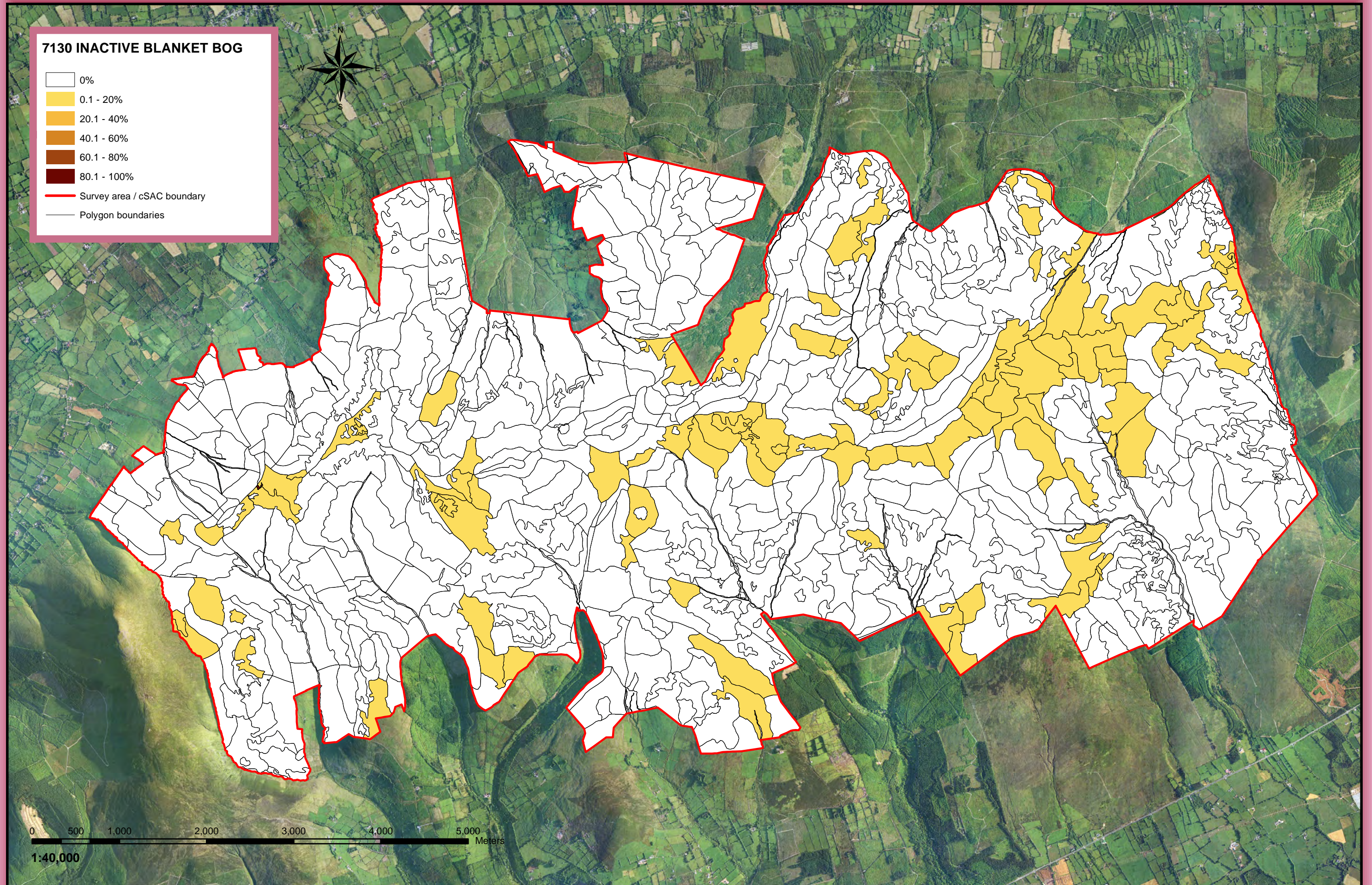




Figure 4g. Cover of 7230 ALKALINE FENS within Galtee Mountains cSAC (000646), Cos. Tipperary and Limerick

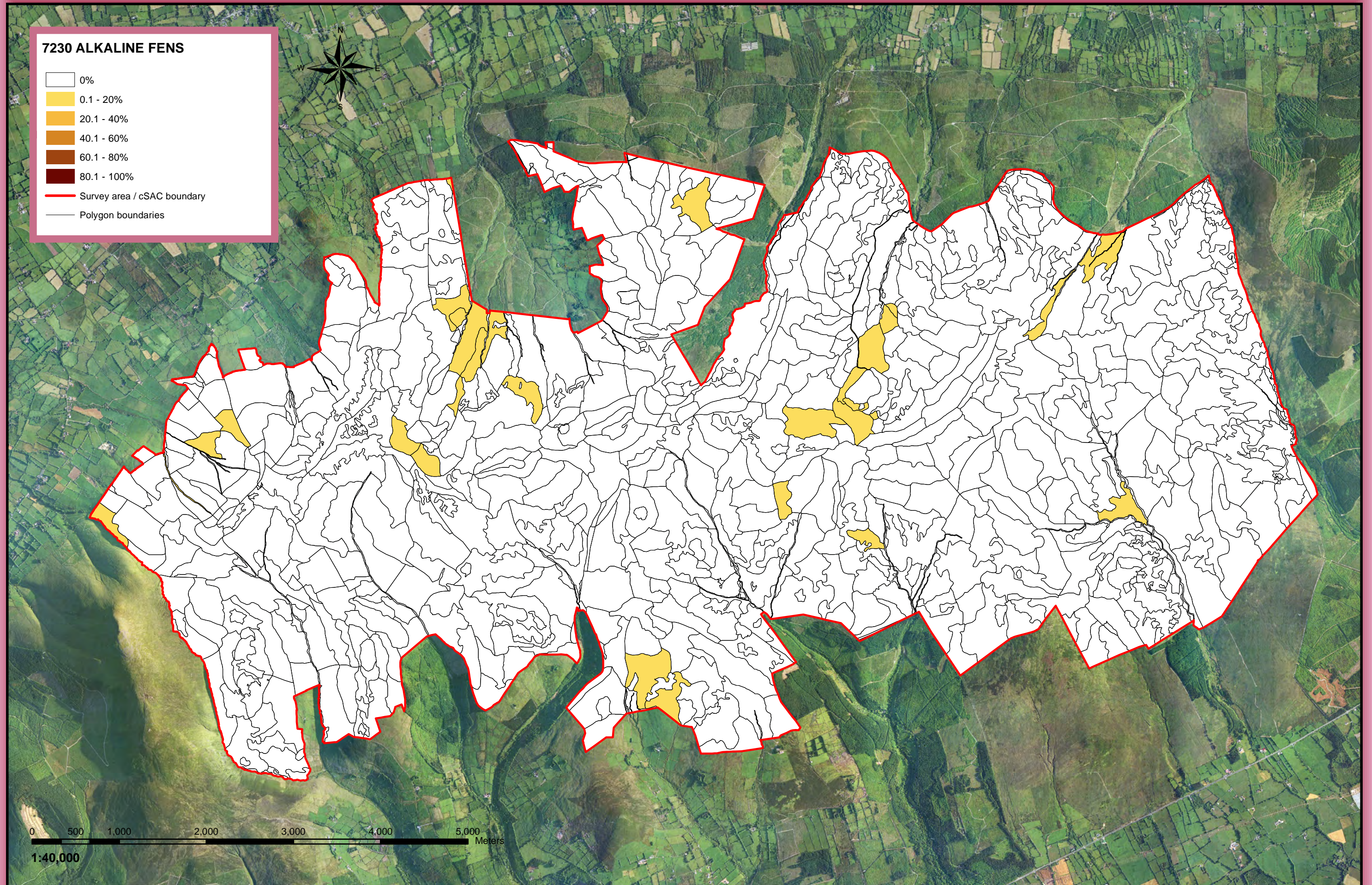


Figure 4h. Cover of 8110 SILICEOUS SCREE within Galtee Mountains cSAC (000646), Cos. Tipperary and Limerick

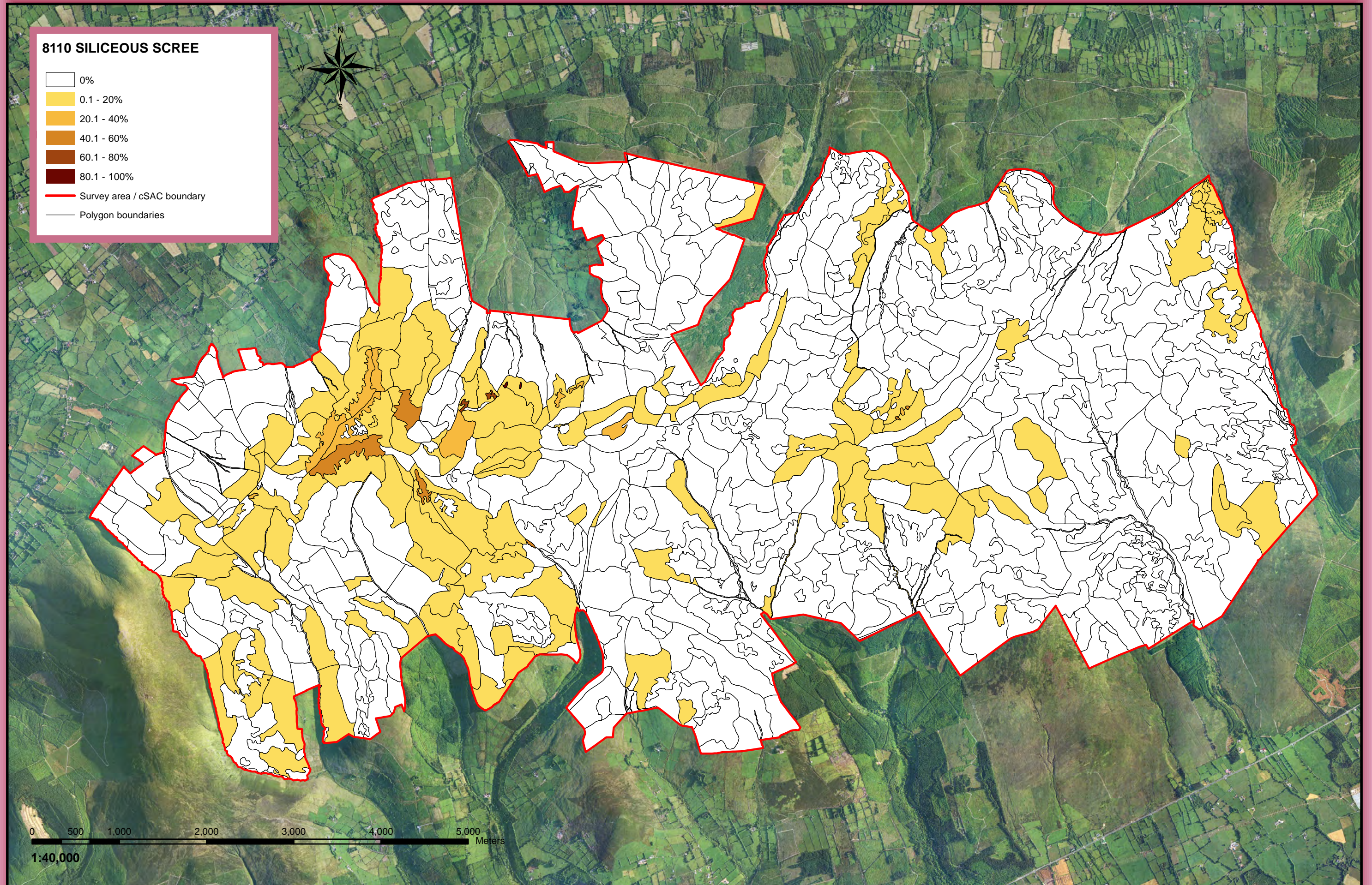


Figure 4i. Cover of 8210 CALCAREOUS ROCKY SLOPES within Galtee Mountains cSAC (000646), Cos. Tipperary and Limerick

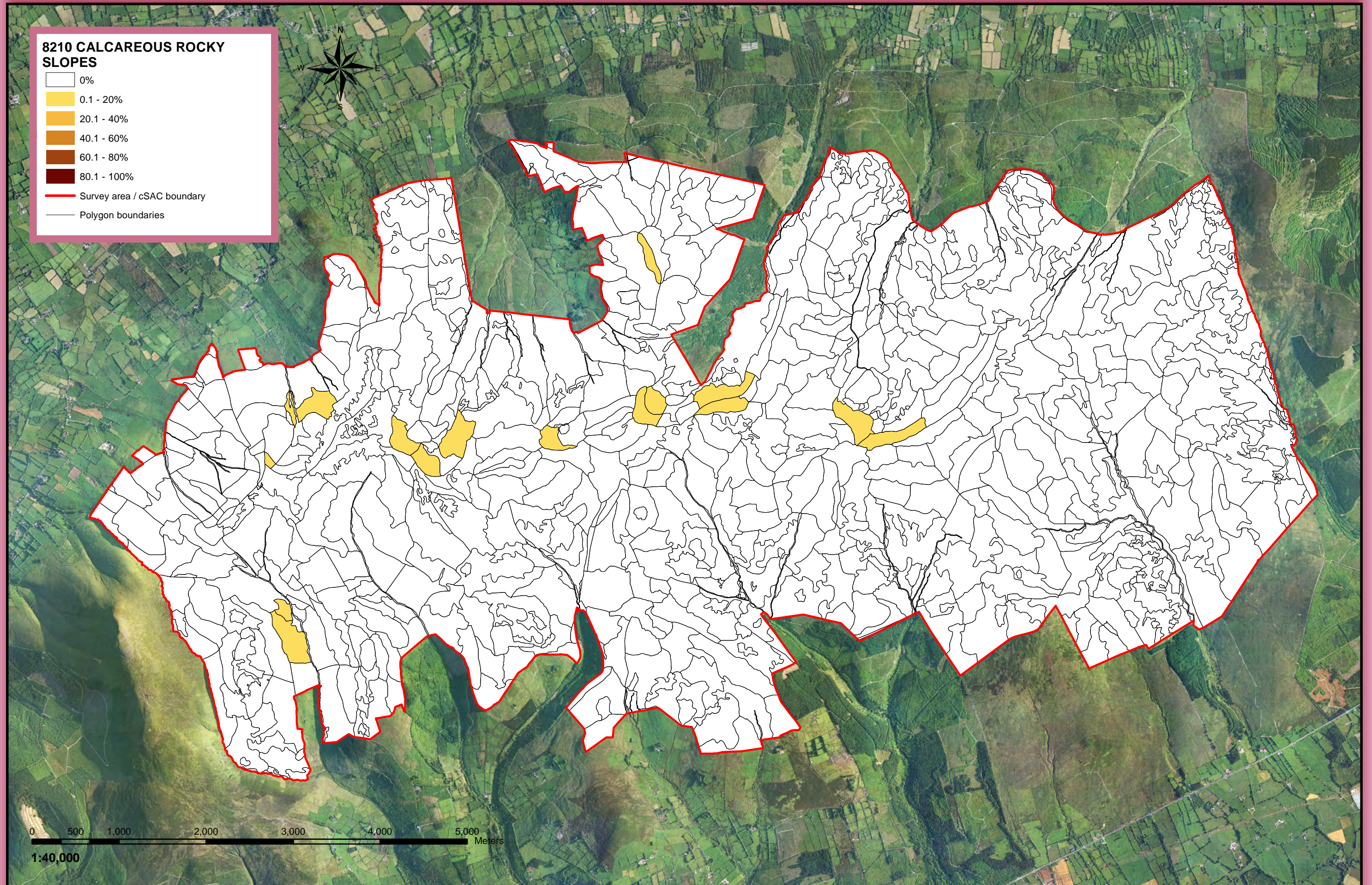


Figure 4j. Cover of 8220 SILICEOUS ROCKY SLOPES within Galtee Mountains cSAC (000646), Cos. Tipperary and Limerick

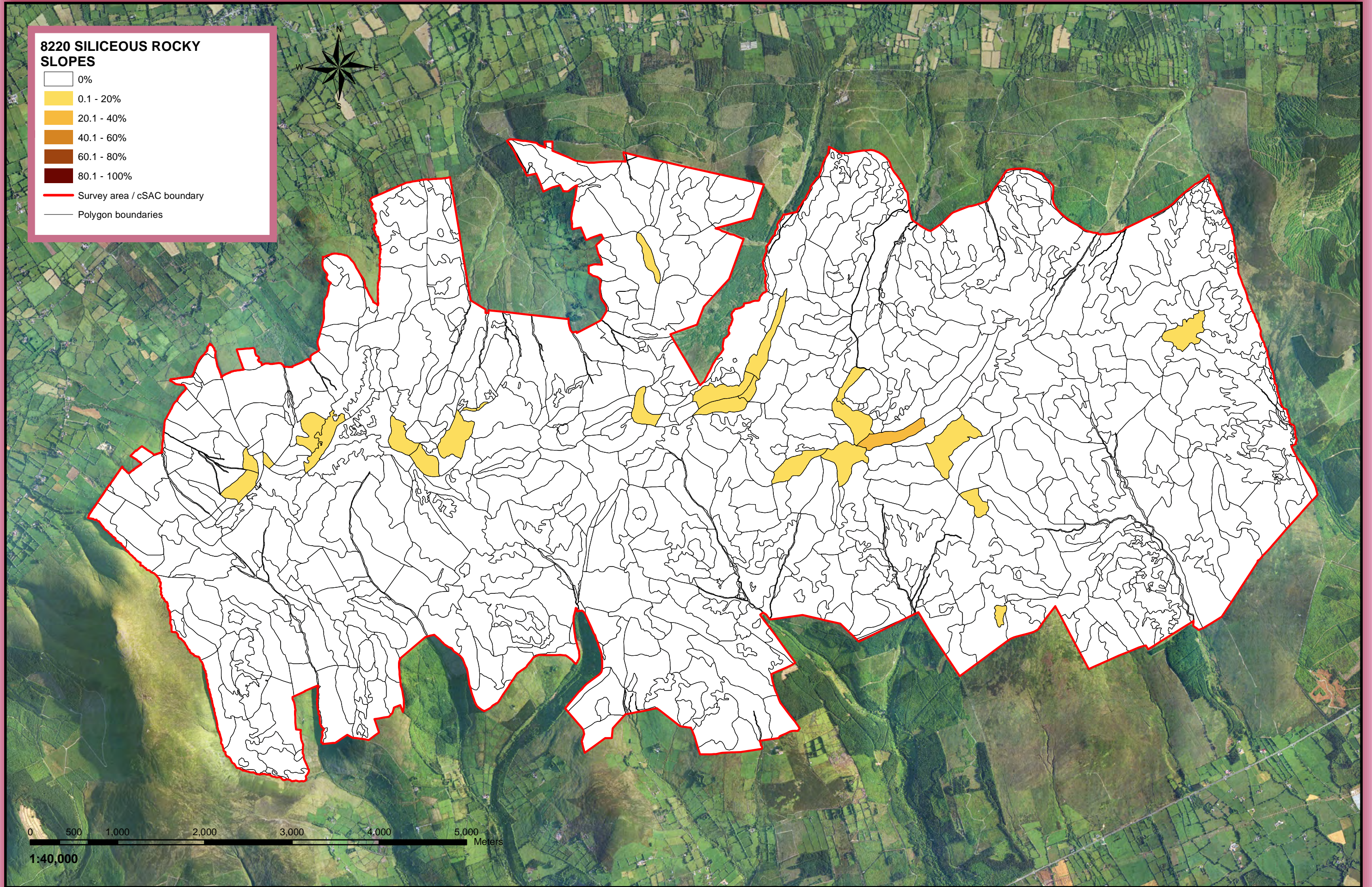


Figure 5a. Location of rare and notable vascular plant records within and surrounding Galtee Mountains cSAC (000646), Cos. Tipperary and Limerick

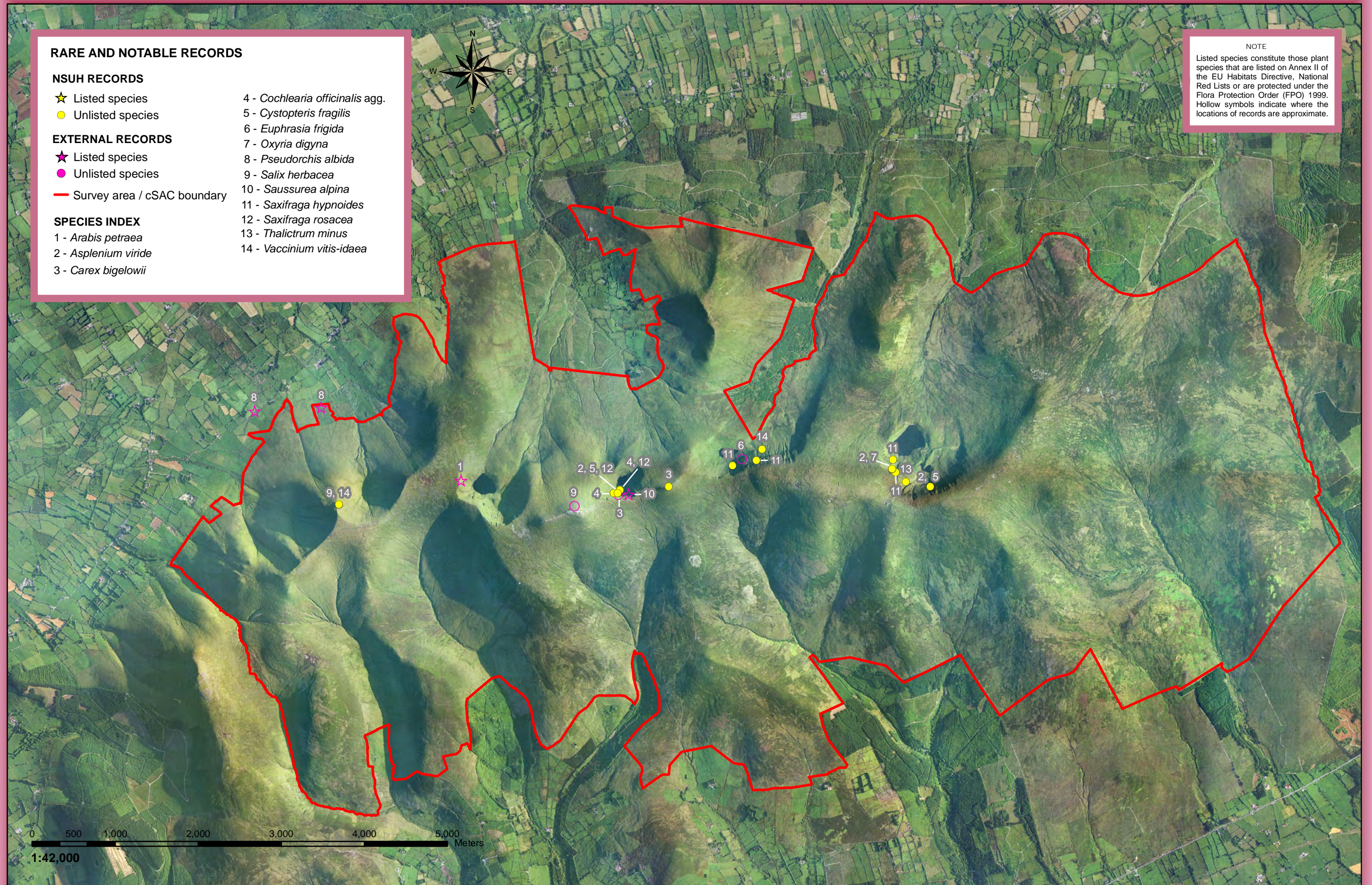


Figure 5b. Location of rare and notable bryophyte records within and surrounding Galtee Mountains cSAC (000646), Cos. Tipperary and Limerick

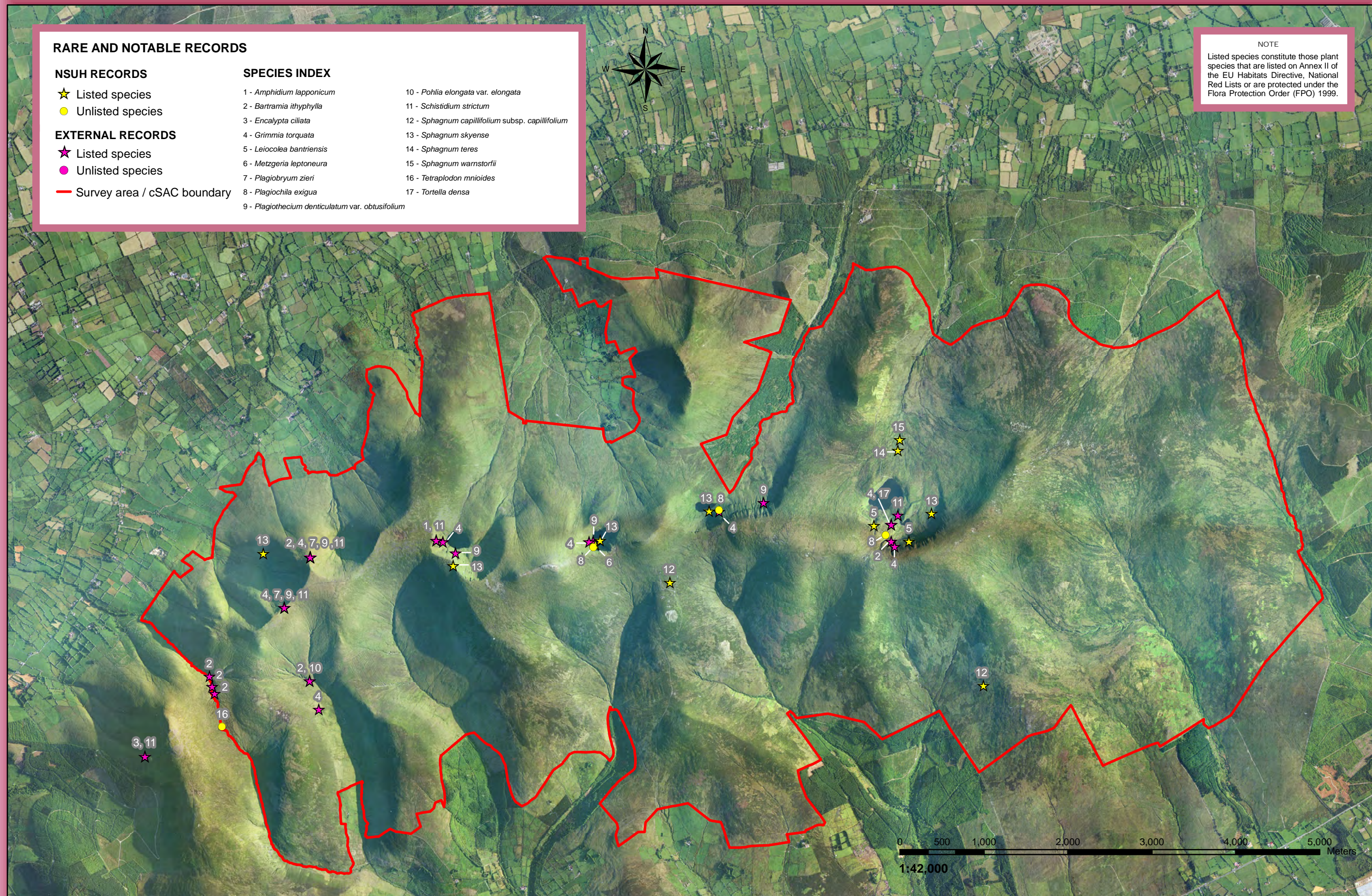


Figure 6. Location and results of conservation assessment monitoring stops and other relevés within Galtee Mountains cSAC (000646), Cos. Tipperary and Limerick

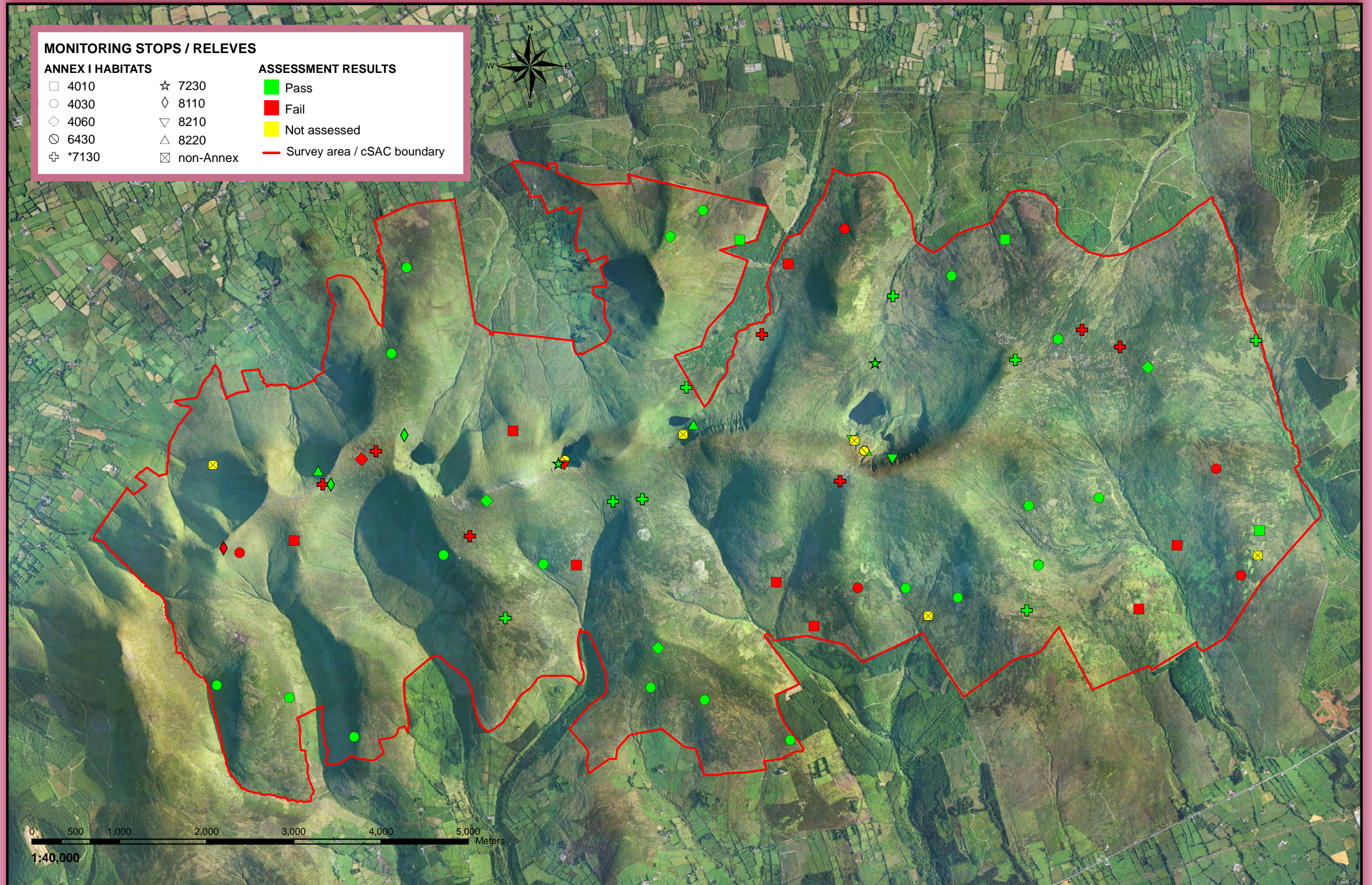


Figure 7a. Commonage Framework Plan damage assessment (2000-2004) within and surrounding Galtee Mountains cSAC (000646), Cos. Tipperary and Limerick

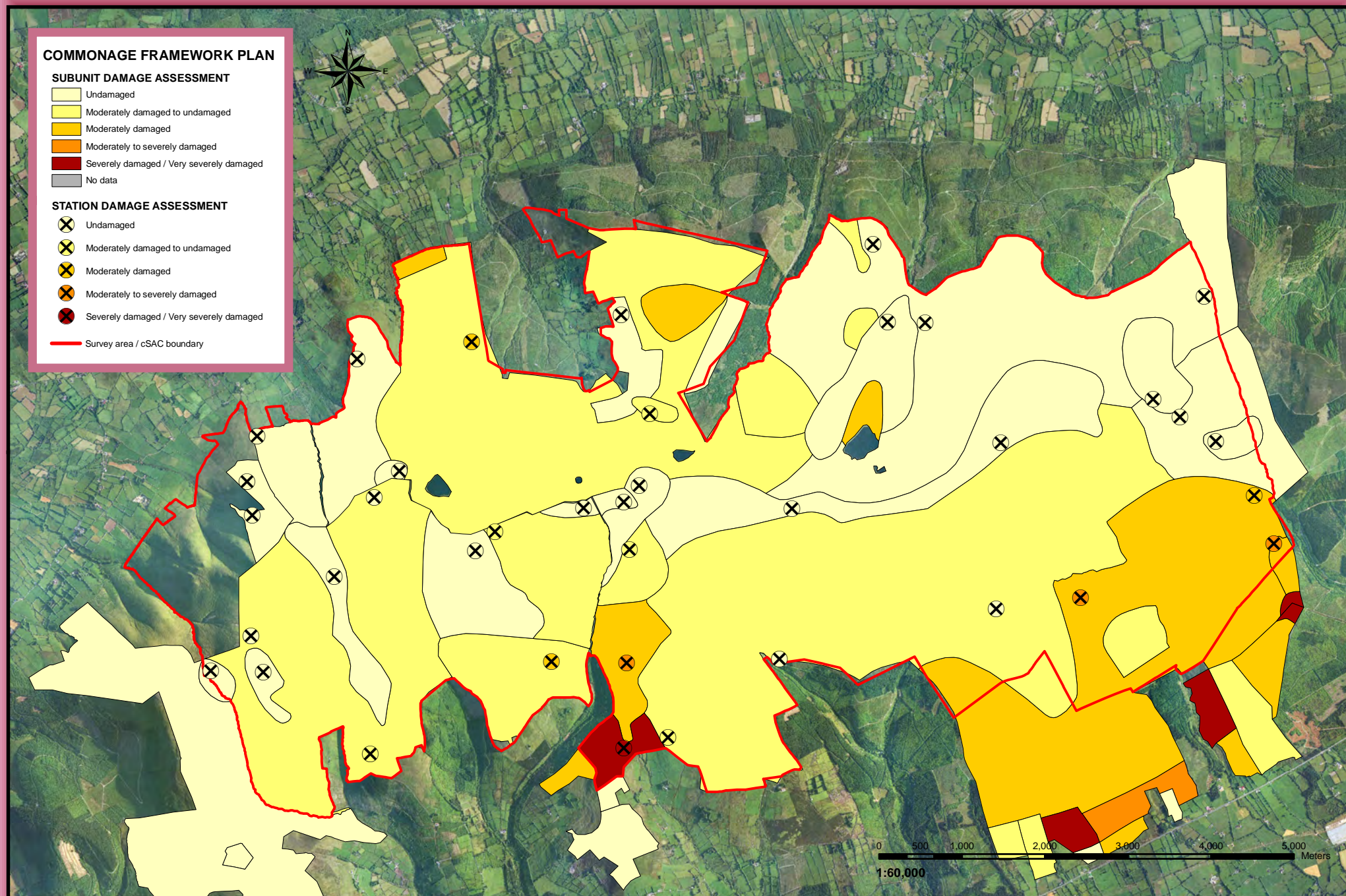


Figure 7b. Commonage Framework Plan damage assessment (2008) within and surrounding Galtee Mountains cSAC (000646), Cos. Tipperary and Limerick

