

Lisnageeragh Bog (SAC 000296), Co. Galway

Executive Summary

This survey, carried out in October 2012, aimed to assess the conservation status of habitats listed on Annex I of the European Habitats Directive (92/43EEC) on the high bog at Lisnageeragh Bog. Vegetation was described and mapped based on raised bog ecotope vegetation community complexes (Kelly and Schouten, 2002). The following Annex I habitats occur: Active Raised Bog, Degraded Raised Bog and Depressions on peat substrates of the Rhynchosporion.

Active Raised Bog covers 29.61 ha (10.09%) of the high bog area. High quality Active Raised Bog consists of central ecotope and active flush featuring *Sphagnum* lawns, hummocks and hollows. *Sphagnum* cover reaches 100% in certain locations. Sub-central ecotope is abundant and *Sphagnum* cover can be up to 75% in the best quality examples of this ecotope.

Degraded Raised Bog covers 239.91 ha (89.01%) of the high bog area. It is drier than Active Raised Bog and supports a lower density of *Sphagnum* mosses. It has a less developed micro-topography while permanent pools and *Sphagnum* lawns are generally absent. The habitat also includes some inactive flushes, most of them dominated by *Molinia caerulea*.

Depressions on peat substrates of the Rhynchosporion are found in both Active and Degraded Raised Bog, but tend to be best developed and most stable in the wettest areas of Active Raised Bog. On this site it was most frequent in the sub-central community complex 6/35. *Rhynchospora fusca* was recorded from three sub-central pools.

Restoration works took place at the site between 2004-12 in the form of drain blocking. Three major drains running across the centre of the high bog and three minor drains in the east of the high bog were blocked. The total length of blocked drains is 3.736km and the three major drains are now largely non-functional.

Restoration works also took place at the site in 2005-2007 under Coillte's LIFE-funded raised bog restoration project. These works included felling two plantations: one on the south-east of the high bog and another plantation on the north-west cutover, as well as blocking of drains with peat

dams. These restoration works have led to rising of water levels and re-colonisation of bog vegetation.

The current conservation objective for Lisnageeragh Bog is to restore the area of Active Raised Bog to the area present when the Habitats Directive came into force in 1994. In the case of Active Raised Bog, the objective also includes the restoration of all of the sub-marginal ecotope present at the time as this represents the area of Degraded Raised Bog most technically feasible to restore. The Area objective for Active Raised Bog is 109.93ha. The objective in relation to Structure and Functions (S&Fs) is that at least half of the Active Raised Bog area should be made up of the central ecotope and active flush (i.e. the wetter vegetation communities). These values have been set as Favourable Reference Values or FRVs until more site specific values can be set based on hydrological and topographical studies. The objective for Degraded Raised Bog is for the sub-marginal area to be restored to active peat forming communities as stated above and that no loss or degradation of any kind occurs. Although FRVs could not be established for the Rhynchosporion depressions, the objectives are to increase its extent and improve its quality to values associated with a favourable conservation status of Active Raised Bog. Therefore, the habitat's objectives are indirectly associated with Active Raised Bog objectives.

There has been an increase in the area of Active Raised Bog (13.18ha) at Lisnageeragh in the 2004 to 2012 period. This has mostly taken place in the centre of the high bog and is a result of rewetting associated with drain blocking.

Some new peat forming areas have been described at the site, some of which are the result of a more comprehensive field mapping. However, several are due to an increase in habitat quality as a result of rewetting associated with drain blocking.

There was an area in the south-eastern section of the bog where the quality of the ARB appears to have declined and this is likely to be due to the impact of the adjacent forestry in this area.

Peat cutting, drainage and afforestation are the most threatening current activities at the site. 0.50ha of high bog have been lost in the 2004-2010 period due to peat cutting. 7.57km of drains remain functional and 3.2km reduced functional. No fire events have affected the bog in the reporting period.

Active Raised Bog has been given an overall **Unfavourable Bad- Declining** conservation status assessment. Habitat Area has increased and quality (S&Fs) improved in the reporting period. However, current Area value and S&Fs are below favourable reference values. Future Prospects are considered **Unfavourable Bad- Declining**; despite the positive impact of restoration works

(drain blocking) as negatively impacting activities (peat cutting and drainage) continue to threaten the habitat.

Degraded Raised Bog has been given an overall **Unfavourable Bad-Declining** conservation assessment and **Rhynchosporion depressions** have been given an **Unfavourable Bad-Declining** conservation status assessment.

The **overall raised bog** at Lisnageeragh SAC has been given an **Unfavourable Bad- Declining** assessment.

A series of **recommendations** have been also given, these include: cessation of peat cutting; blocking of remaining high bog reduced-functional and functional drains, as well as cutover drains; assessment of the actual impact of forestry adjacent to the high bog; further hydrological and topographical studies to ascertain more accurate FRVs; and further botanical monitoring surveys.

Site identification

SAC Site Code	000296	6" Sheet:	GY 6/718/19
Grid Reference:	M 662 630	1:50,000 Sheet:	39
High Bog area (ha):	269.52ha		
Dates of Visit:	24 to 27/10/12		
Townlands:	Lisnageeragh, Frass, Curraghmulmurry and Clooncon East.		

Site location

Lisnageeragh Bog is located approximately 2.5km east of Glennamaddy, Co. Galway.

The site may be accessed from a number of bog roads, which lead eastwards from the road between Glennamaddy and Ballymoe.

Kelly *et al.* (1995) grouped Lisnageeragh Bog with the raised bogs of East Galway. It lies approximately 3km to the south of Killsallagh Bog (SAC 285), 3km to the north of Lough Lurgeen Bog (SAC 301), 1km to the west of Keeloges Bog (NHA 281) and 5km to the north-west of Clooncullaun Bog (NHA 245) and Camderry Bog (SAC 2347).

Description of the survey

The survey was carried out in October 2012 and involved a vegetation survey of the high bog at Lisnageeragh Bog and the recording of impacting activities affecting high bog vegetation. A similar survey was carried out in 2004 by Fernandez *et al.* (2005). High bog vegetation was described and mapped, based on raised bog ecotope vegetation community complexes developed by Kelly and Schouten (2002). Detailed notes were taken on each community complex and any flushed areas that were present. These included: species lists; estimation of % cover of dominant species; percentage *Sphagnum* cover; evidence of damage (due to burning, peat cutting or drainage); micro-topography; ground firmness; and presence of *Cladonia* species. A list of photographic records is given in Appendix II. The survey aimed to assess the conservation status of Habitats Directive (Council Directive 92/43/EEC) Annex I habitats on the high bog.

The entire high bog of Lisnageeragh Bog was re-surveyed. Sections mapped as sub-marginal, sub-central and central ecotope in 2004 were surveyed in more detail. These are the areas where changes were likely to have occurred. Quadrats, which describe the micro-topographical features and indicator species, recorded in the 2004 project (Fernandez *et al.* 2005) were re-surveyed (see Appendix III). The size of quadrats was 4m x 4m for Active Raised Bog.

A GeoExplorer handheld GPS minicomputer (Trimble GeoXT) was used in the field to record quadrats, ecotope boundaries, location of vegetation complexes and other points of interest. The GPS positions of these features were logged and stored on Terrasync software (Trimble). Additional comments were stored as text fields in the device. Post processing of data was carried out, based on the Active GPS Network from Ordnance Survey Ireland, to obtain sub-metre accuracy of the data.

A digital vector format ecotope vegetation map was produced based on the spatial data collected during the survey using ArcGIS 9.3 and 2010 aerial photography. The Irish National Grid was used as the co-ordinate reference system. Vegetation complex and ecotope maps are given in Appendix IV.

Description of the high bog

Lisnageeragh Bog is a large western or intermediate raised bog (Cross, 1990) geomorphically classified as a ridge basin (Kelly *et al.*, 1995). The bog is elongated in a N/S direction and slopes down to Ballinastack turlough in the north. In the south and south-west blanket type peat overlies parts of three drumlins that trend NW/SE while thicker *Sphagnum* peat occurs in parts of the east and south of the bog where peat overlies depressions or lower ground between drumlin ridges (Kelly *et al.*, 1995).

Ecological Information

Raised Bog Annex I (Habitats Directive (92/43/EEC)) habitats

The following Raised Bog EU Annex I habitats, are found in Lisnageeragh Bog:

- Active Raised Bog (EU code 7110),
- Degraded Raised Bog (EU code 7120) and
- Depressions on peat substrates of the Rhynchosporion (EU code 7150).

Active Raised Bog (7110)

The current area of Active Raised Bog (ARB) at Lisnageeragh Bog is 29.61ha (10.09% of the high bog), which is an increase of 16.57 ha since 1994.

ARB includes central and sub-central ecotopes and active flush.

Central ecotope was found at five locations (C1 to C5) (see Appendix IV, Map 1). Only one community complex was recorded. Complex 35 consisted of high and low hummocks, lawns and pools. Inter-connecting pools were 26 to 33% and *Sphagnum* cover ranged from 76 to 90%. *Calluna vulgaris* was abundant throughout but *Eriophorum vaginatum* was only locally abundant; *Sphagnum capillifolium* was dominant in the hummock layer with occasional *S. austinii*. Pools were dominated by *S. cuspidatum* with frequent *Menyanthes trifoliata* and *Drosera anglica* and occasional *S. denticulatum*. Lawns were dominated by *S. papillosum* and *S. magellanicum*. Additional species that were frequent at low cover throughout include *Racomitrium lanuginosum*, *Campylopus atrovirens*, *Cladonia portentosa* and *Pleurozia purpurea*.

Sub-central ecotope was found at sixteen locations (Sc1 to Sc4, Sc7 to Sc8, and Sc10 to Sc19) (see Appendix IV, Map 1). Five community complex types were recorded. The most frequent complex was 6/35. This comprised high and low hummocks, pools, lawns and flats. Inter-connecting pools were 11 to 25% and *Sphagnum* cover ranged from 51 to 75%. *Calluna vulgaris* and *Narthecium ossifragum* were abundant throughout with locally abundant *Eriophorum vaginatum*; *Sphagnum capillifolium* was dominant in the hummock layer with locally frequent *S. austinii* and *S. fuscum* and occasional *S. tenellum* and *S. subnitens*. Pools were dominated by *S. cuspidatum* with frequent *Menyanthes trifoliata* and *Drosera anglica* and occasional *S. denticulatum*. Lawns were dominated by *S. papillosum* with a low cover of *S. magellanicum*. Additional species that were frequent at low cover throughout include *Rhynchospora alba*, *Racomitrium lanuginosum*, *Campylopus atrovirens*, *Cladonia portentosa* and *Pleurozia purpurea*. *R. fusca* was recorded in at least two locations within this complex (E166198/ N262700 and E165967/ N262281). All other community complexes were present in only a few areas. These include community complex 9/7/10, which had a low cover of shallow pools (5 to 10%) but high cover of *Sphagnum* (51 to 75% and locally higher) in high and low hummocks. *Calluna vulgaris*, *Eriophorum vaginatum* were dominant with occasional flats of *Narthecium ossifragum*; *Sphagnum capillifolium* dominated in hummocks with occasional *S. austinii*. Lawns were dominated by *S. magellanicum* and *S. papillosum*. The community complex 9/7 + P was also present in a few locations. Species composition and abundance was similar to 9/7/10 (dominated by *Calluna vulgaris*, *Eriophorum vaginatum* and *Sphagnum capillifolium*) but pool cover was higher with inter-connecting pools 11 to 25% and abundant *S. cuspidatum*. *Cladonia portentosa*

was locally abundant. The remaining community complexes occurred in only one location each: 10/9A (dominated by *Calluna vulgaris*, *Eriophorum vaginatum*, *Sphagnum magellanicum* and frequent *E. angustifolium*) and 6 + P (*Calluna vulgaris*, *Sphagnum capillifolium*, *S. papillosum* dominant with pools with *S. cuspidatum*).

There was one active peat forming flush at Lisnageeragh Bog (Z). This was dominated by *Molinia caerulea* and *Calluna vulgaris* with abundant *Sphagnum* (35 to 50% cover). The main *Sphagnum* species present were *S. capillifolium*, *S. cuspidatum* and *S. magellanicum*. Additional species included occasional *Carex panicea*, *Eriophorum angustifolium*, *Drosera anglica*, *Trichophorum germanicum* and *S. papillosum*.

Degraded Raised Bog (7120)

The current area of Degraded Raised Bog at Lisnageeragh Bog is 239.91ha (89.01% of the high bog).

Degraded Raised Bog includes the sub-marginal, marginal and face bank ecotope, as well as inactive flushes. Although some areas of Degraded Raised Bog have a relatively well-developed Raised Bog flora, they are affected by water loss to varying degrees, and are usually devoid of permanent pools.

The sub-marginal ecotope featured the most developed micro-topography within Degraded Raised Bog. Three community complexes and variants were recorded within the sub-marginal ecotope: 9/7, 9/7/6 and 6/3 + TP. 9/7 was generally found adjacent to areas of sub-central ecotope and was the wettest of the sub-marginal complexes. Pools were absent and *Sphagnum* cover was 34-50% in low hummocks. In the other two sub-marginal community complexes the *Sphagnum* cover was 11-25% with occasional algal or tear pools. These pools occasionally supported *Sphagnum cuspidatum* but *Sphagnum* cover was usually less than 4%. Micro-topography usually consisted of low hummocks, hollows and *Narthecium ossifragum* flats in places. *Calluna vulgaris*, *Erica tetralix*, *Eriophorum vaginatum*, *Narthecium ossifragum* and *Carex panicea* were the most common species within this ecotope. The *Sphagnum* hummocks consisted of *S. capillifolium* and *S. papillosum* with occasional *S. magellanicum* and *S. tenellum*. *Cladonia portentosa* was frequent throughout. *R. fusca* was recorded in three locations in sub-marginal complexes 9/7/3 (variant of 9/7/6) (E 165817 / N 262259) and 6/3 + TP (E 165658 / N 263469 and E 165923 / N 263277).

Marginal ecotope is slightly drier than sub-marginal ecotope and mainly occurred as a band near the margins of the high bog. The micro-topography consisted of *Calluna vulgaris* hummocks, low *Sphagnum* hummocks, flats and occasional hollows and tear pools. The *Sphagnum* cover was lower

than in the sub-marginal ecotope (5-10%) and the vegetation was characterised by a higher cover of *Carex panicea*, *Narthecium ossifragum*, *Trichophorum germanicum*, and *Calluna vulgaris*.

Face bank ecotope is characterised by firm ground, tall *Calluna vulgaris*, poor *Sphagnum* cover and a flat micro-topography. This ecotope covered small areas around the edge of the high bog, usually adjacent to areas of past or current peat exploitation.

The high bog also features several inactive flushes (V, W1, X, X1, Y, Z and Z1). These were dominated by *Molinia caerulea* with *Calluna vulgaris* and occasional *Potentilla erecta*, *Erica tetralix*, *Myrica gale*, *Cladonia portentosa* and *Polytrichum strictum*. *Sphagnum* cover was absent or less than 4% with occasional *Sphagnum cuspidatum*, *S. papillosum*, *S. capillifolium* and *S. subnitens*.

Depressions on peat substrates of the Rhynchosporion (7150)

Rhynchosporion vegetation is frequent but of low overall cover on Lisnageeragh Bog. It was found in both Active and Degraded Raised Bog, but was most frequent in the sub-central community complex 6/35. In these areas, the Rhynchosporion vegetation occurred within *Sphagnum* hollows and along *Sphagnum* pool edges and in lawns. Typical plant species included *Rhynchospora alba* (usually less than 4% cover at this site), *Sphagnum cuspidatum*, *S. papillosum*, *S. magellanicum*, *S. papillosum*, *Drosera anglica* and *Eriophorum angustifolium*. *Rhynchospora fusca* was recorded from at least three pools within sub-central complex 6/35 (E 166198 / N 262700 and E 165967 / N 262281) and three pools within sub-marginal complexes 9/7/3 (E 165817 / N 262259) and 6/3 + TP (E 165658 / N 263469 and E 165923 / N 263277).

Detailed vegetation description of the high bog

A detailed description of high bog vegetation recorded during the 2012 survey of Lisnageeragh Bog is given in Appendix I. Vegetation is divided into a number of community complexes, which are listed and described based on the dominant species. These community complexes are grouped into ecotope types. The distribution of the ecotopes is shown on the ecotope map (Appendix IV, Map 1). The community complexes are shown on the community complex map (Appendix IV, Map 2) and the quadrat details are given in Appendix III and their location in Appendix IV (Map 1).

Impacting activities

Table 6.1 below provides a list of activities impacting high bog vegetation at Lisnageeragh Bog, according to their occurrence on the high bog or adjacent to the high bog; area or length affected, and whether they influence negatively (i.e. drainage, peat extraction) or positively (i.e. restoration works):

Table 6.1 Impacting activities

Code	Activity	Ranking	Influence	Area (ha) /Length(km)	Location	Habitat affected
C01.03	Peat extraction	H	-1	0.50ha of high bog cut away	Inside High Bog: 13 different locations along southern and eastern high bog sections	7120
C01.03	Peat extraction	L	-1	0.50ha of high bog cut away	""	7110/7150
J02.07	Drainage	M	-1	10.804km ¹	Inside High Bog	7110/7120/7150
J02.07	Drainage	L	-1	n/av	Outside High Bog	7110/7120/7150
I01	Invasive alien species	L	-1	<0.1ha ³	Inside High Bog	7110/7120/7150
B01.02	Artificial planting on open ground (non-native trees)	L	-1	14.5ha	Outside High Bog	7110/7120/7150
4.2	Restoring/Improving the hydrological regime	H	+1	4.526km ²	Inside High Bog	7110/7120/7150
B02.02	Forestry clearance	M	+1	6.76 ha	Inside High Bog	7110/7120/7150
B02.02	Forestry clearance	M	+1	18.7 ha	Outside High Bog	7110/7120/7150

HB: High Bog; Ranking: H: High importance/impact; M: Medium importance/impact; L: Low importance/impact.

¹ This figure only includes functional and reduced-functional drains.

² This figure includes blocked drains on high bog.

³ This figure is estimated and represents the extent of invasive species across entire high bog

n/a: not applicable, n/av: not available

Peat cutting

This activity has taken place at 13 locations at the site in the 2004-2010 period. This has reduced the area of high bog by 0.50ha. Rate of cutting at most of these plots is relatively low with the only exception being some plots along the southern western edge of the high bog.

The loss of high bog from peat cutting is calculated using GIS techniques on aerial photography from 2004/05 and 2010. Information from the NPWS indicates that 15 plots were cut on Lisnageeragh in 2010/2011; three plots were cut in 2012 and two in 2013. Thus, the area of high bog lost on Lisnageeragh during the reporting period is in excess of 0.50ha, but since there is no aerial photography available post 2010, the area lost from 2010 to 2012 cannot be estimated.

Although peat exploitation on most of the site is low or no longer active, the old face banks and multiple functional drains associated with cutting continue to impact on the high bog habitats in many areas. Water running off the high bog was noted within two drains on the high bog.

This activity is considered to have a high direct importance/impact on Degraded Raised Bog habitat on the high bog and a low indirect importance/ impact on Active Raised Bog and Rhynchosporion depression habitats. Old face banks and high bog and cutover drainage associated with past cutting continue to cause negative impacts on the high bog habitats. The continuation of these peat cutting will prevent the recovery of the high bog, and the recovery of ARB towards FRVs as further restoration works needed cannot be employed until such activities stop. It should also be borne in mind that peat cutting has already had a serious negative impact over a long period at this site, indicated by the fact that ARB covers only a very small area (29.61ha or 10.09% of the high bog) and is 73.06% below the FRV target.

Drainage

High bog drainage

Table 6.2 shows a slight decrease in functional drainage as a result of natural infilling of unblocked drains. The majority of drains in the high bog remain functional (7.567km). Significant water losses through the drains were noted within drains b2J (flowing west from the north-eastern section of the high bog) and bJ (flowing south-west from the south-western section of the high bog). Functional and reduced functional drains are still impacting on high bog habitats and will continue to do so until they are blocked and become completely in-filled and thus non-functional.

High bog drainage is considered to have medium importance/impact on high bog habitats.

Table 6.2 High bog drainage summary

Status	2004 (km) ¹	2012 (km)	Change (+/-)
NB: functional	7.640	7.567	(-) 0.073
NB: reduced functional	2.825	2.898	(+) 0.073
NB: non- functional	1.129	1.129	0.000
B: functional	0.000	0.000	0.000
B: reduced functional	0.339	0.339	0.000
B: non- functional	3.397	3.397	0.000

B: Blocked; NB: Not blocked n/a: not applicable

¹ High bog drainage has been revised (e.g. re-digitised in cases) and figures above may vary slightly from those given by Fernandez *et al.* (2005)

Table 6.3 below provides a more detail description of the drainage present on the high bog at Lisnageeragh including any change in their functionality in the 2004 – 2012 reporting period (see Map 3).

Table 6.3 High bog drainage detail

Drain Name	Length (km)	2004 status	2012 status	Change	Comment
b2A	0.440	NB: non-functional	NB: non- functional	No	
b2A	0.378	NB: reduced functional	NB: reduced functional	No	
b2B	0.366	NB: reduced functional	NB: reduced functional	No	
b2C	0.079	NB: functional	NB: functional	No	
b2D	0.121	NB: functional	NB: functional	No	
b2E	0.227	NB: functional	NB: functional	No	
b2F	0.240	NB: functional	NB: functional	No	Western section of drain
b2F	0.180	NB: non-functional	NB: non- functional	No	Eastern section of drain
b2G	0.186	NB: non-functional	NB: non- functional	No	
b2H	0.160	NB: non-functional	NB: non- functional	No	

Drain Name	Length (km)	2004 status	2012 status	Change	Comment
b2J	0.154	NB: functional	NB: functional	No	This section of drain was wrongly classified as reduced functional in 2004; water flowing recorded during visit.
b2J	0.062	NB: reduced functional	NB: reduced functional	No	Western section of drain
b2K	0.165	NB: functional	NB: functional	No	This section of drain was wrongly classified as reduced functional in 2004
b2K	0.100	NB: reduced functional	NB: reduced functional	No	Western section of drain
bA	0.865	B: non- functional	B: non- functional	No	
bA	0.246	NB: functional	NB: functional	No	Eastern section of drain
bB	1.820	B: non- functional	B: non- functional	No	Double drain
bB	0.383	NB: functional	NB: functional	No	Double drain; eastern section of drain
bC	0.510	B: non- functional	B: non- functional	No	Some sections of non-functional
bC	0.131	B: reduced functional	B: reduced functional	No	Middle section of drain
bC	0.131	NB: functional	NB: functional	No	Eastern section of drain
bC	0.155	NB: reduced functional	NB: reduced functional	No	Western section of drain
bD	1.929	NB: functional	NB: functional	No	Southern and middle-northern sections of drain
bD	1.451	NB: reduced functional	NB: reduced functional	No	Northern and middle of drain; some sections were wrongly classified as non-functional in 2004
bE	0.202	B: non- functional	B: non- functional	No	
bF	0.125	B: reduced functional	B: reduced functional	No	
bG	0.223	NB: reduced functional	NB: reduced functional	No	
bH	0.083	B: reduced functional	B: reduced functional	No	
bJ	0.555	NB: functional	NB: functional	No	Some sections reduced functional; water flowing recorded during visit.
bK	0.073	NB: functional	NB: reduced functional	Yes	

Drain Name	Length (km)	2004 status	2012 status	Change	Comment
bL1	0.077	NB: functional	NB: functional	No	
bL2	0.062	NB: functional	NB: functional	No	
bM	0.082	NB: functional	NB: functional	No	
bN	0.142	NB: functional	NB: functional	No	
bO	1.406	NB: functional	NB: functional	No	Western section of double drain already present in 2004 but not mapped
bP	0.090	NB: reduced functional	NB: reduced functional	No	
bR	0.029	NB: functional	NB: functional	No	This drain was wrongly classified as reduced functional in 2004
bS	0.205	NB: functional	NB: functional	No	This drain was wrongly classified as reduced functional in 2004
bT	0.257	NB: functional	NB: functional	No	
bU	0.129	NB: functional	NB: functional	No	
bV	0.082	NB: functional	NB: functional	No	
bW	0.163	NB: non-functional	NB: non-functional	No	
bX	0.105	NB: functional	NB: functional	No	Drain already present in 2004 but not mapped
bY	0.136	NB: functional	NB: functional	No	""
bZ	0.530	NB: functional	NB: functional	No	""
bZ1	0.041	NB: functional	NB: functional	No	""
bZ2	0.034	NB: functional	NB: functional	No	""

Bog margin drainage

The cutover areas were not surveyed for drains during 2012.

Drains associated with either currently active or no longer active peat cutting are present along the entire cutover. These drains continue to drain the high bog and impact on high bog habitats.

Drainage maintenance associated with agricultural improvements is evident on the 2010 aerial photograph along the eastern margin of high bog, (E 166908 / N 263466) (1.7km approx.) and the western margin of high bog (E 165452 / N 263821 (1km approx.), both within the SAC boundary.

Bog margin drainage is considered to have a low importance/impact on high bog habitats.

Fire history

Fernandez *et al.* (2005) mentioned that the bog has been extensively burnt in the past. No fire events have been reported on the high bog in the 2004-2012 reporting period.

Invasive species

One individual of *Picea sitchensis* was recorded in 2004 in flush X (Fernandez *et al.*; 2005). An individual of *Picea sitchensis* was also recorded from the western lobe of the bog in 2012 but did not appear to be spreading.

The non-native moss *Campylopus introflexus* was recorded occasionally from the high bog, mainly in the marginal ecotopes, but also recorded once from the central ecotope (C1). However, it was at low frequency throughout.

Invasive species are considered to have low importance/impact on high bog habitats.

Afforestation and forestry management

Fernandez *et al.* (2005) reported a number of forestry plantations (Sitka Spruce and Lodgepole Pine) on marginal land around the site. Within the SAC there are two plantations on cutover bog: ESE of the site in an area named Ballyhard (9ha approx.) and NW of the site in an area named Curraghmulmurry (2.9ha approx.). There is another plantation S of the high bog (5.5ha approx.). The plantations to the ESE and S are closer to the high bog than the plantation to the NW and are considered to have a higher impact on the high bog. There was a slight decline in area and a decline in habitat quality of Active Raised Bog in the south-eastern part of the high bog (former C2 and Sc10). As the high bog slopes south-east towards the forestry in this location it is considered that the forestry may be impacting on this area of the high bog.

Nevertheless, afforestation is considered to have low importance/impact on high bog habitats.

Other impacting activities

One of the newly mapped areas of sub-central ecotopes in the southern area of the site (**Sc18**) is likely to have formed as a result of subsidence associated with the track to the west of **Sc18**. This type of ARB associated with subsidence is considered secondary re-wetting ARB, this ARB habitat type can easily be lost if further subsidence continue and in addition subsidence in lower ground areas are generally associated with drying out processes on adjacent higher ground. Thus, the

formation of secondary re-wetting ARB habitat is not a sign of better conservation status for the habitat.

No other significant impacting activities were noted or recorded in 2012 impacting high bog habitats in the 2005-2012 reporting period.

Conservation activities

Restoration works (as reported in Fernandez *et al.*; 2005) have been undertaken in the form of drain blocking. Three major drains (bA, bB and bC) running across the centre of the high bog and three minor drains (bF, bG and bH) in the east of the high bog have been blocked. The total length of blocked drains is 3.736km and the three major drains are now largely non-functional.

The results of the 2012 survey showed that the drain blocking has led to an expansion and improvement of ARB habitat in the centre and eastern section of the high bog. Two new areas of central ecotope (C4 and C5) were recorded in the vicinity of drain bA. In addition, three areas of sub-central ecotope (Sc4, Sc7 and Sc8) increased in extent around the three major blocked drains (bA, bB and bC).

Lisnageeragh has also been part of the Coillte's LIFE-funded raised bog restoration project. The project consisted of the removal of conifer plantations on two separate areas: A mature plantation of Lodgepole Pine (*Pinus contorta*) planted on high bog, occurs at Ballyhard to the south-east of the SAC and a young plantation of Sitka Spruce (*Picea sitchensis*) occurs on cutover bog at Curraghmulmurry to the north-west of the SAC (Derwin, 2008).

At this site the main restoration measures undertaken in 2005-2007 was the clear-felling and removal of the mature conifer crop, fell to waste of young conifers, wind-rowing of the remaining brash and blocking of drains with peat dams. Brash was removed from the flood zone of the turlough. Follow-up work included the control of the natural regeneration of conifer seedlings

According to Derwin (2008) much of the site is now cleared of conifers and brash. The brash which remained after clear-felling was wind-rowed to allow bog vegetation to re-colonise exposed peat surface. After blocking of drains, water-levels rose on the high bog plantations and bog vegetation started to recolonise. None of the clear felled areas were surveyed in the most recent 2012 survey. The occurrence of Active Raised Bog on the high bog clear felled area to the south-east of the site is very unlikely as indicated by the 2010 aerial photographs. Nevertheless the surveying of the area in

future monitoring surveys is recommended and the positive impact on the high bog hydrology of both clear feelings is obvious as reported by Derwin already in 2008.

Both high bog and cutover drainage blocking and removal of conifer plantations are reported as positive management actions under Restoring/Improving the hydrological regime (4.2) within table 6.1.

Conservation status assessment

The assessment of the conservation status of Annex I Active and Degraded Raised Bog and Bog Woodland is based on the following (a more detailed description of conservation status assessment methods is given within the methods section of the project's Summary Report (Volume 1) :

AREA - comparison of current habitat area with favourable reference values and its change in the reporting period to assess trends.

STRUCTURE & FUNCTION - comparison of central ecotope and active flush area (i.e. the higher quality wetter vegetation communities) for Active Raised Bog, and marginal and face bank ecotope area (i.e. the lower quality and drier vegetation communities) for Degraded Raised Bog against favourable reference values to assess their status and changes in their area in the reporting period to assess their trend. Community complex descriptions were also taken into account to evaluate changes in ecotope quality together with an analysis of the indicators recorded in the quadrats.

FUTURE PROSPECTS - an assessment of the influence of current and future activities both negative and positive (e.g. restoration works) affecting these habitats. Future Prospects for Active and Degraded Raised Bog are assessed at status and trend level based on the prospects for the habitat to reach favourable reference values in a two reporting period (12 years).

Active Raised Bog (7110)

Area

There has been a large increase (13.18ha) in the area of ARB on the site (Table 8.1).

More comprehensive mapping in 2012 led to slight changes in some central and sub-section boundaries, as the mapping accuracy increased. This means that some sections increased (**Sc3**, **Sc11**) or decreased (**C1**, **C3**, **Sc1**, **Sc2**, **Sc12**) slightly in size, but have actually been stable during the reporting period 2004 to 2012.

In the south eastern part of the high bog there was a change in ARB ecotopes, although no overall loss of ARB was recorded. **C2** is no longer present and was mapped as **Sc10**. In addition, the former **Sc10** had decreased in size and was mapped as **Sc10** and a newly mapped area **Sc17**, with sub-marginal vegetation between the two areas. However, much of the change is likely to be due to re-interpretation of the vegetation and no overall loss has been recorded from this area. It is probable though that the change from central to sub-central ecotope represents an actual decrease in quality in this area due to impacts from the forestry plantations to the south and east of this part of the high bog. This area of the high bog slopes to the south and east towards the forestry plantations.

A large increase in ARB (approx. 13ha) was recorded in three sub-central sections in 2012 (**Sc4**, **Sc7** and **Sc8**) as a result of rewetting associated with drain blocking. **Sc4** increased to the south and now includes the areas formerly mapped as **Sc5** and **Sc6**, extending south across drain bB (approx. Increase 5ha). **Sc7** has increased to the west and now almost extends to **Sc4** in the north (approx. increase of 5ha). **Sc8** has increased to the north and south and now extends north across the drain bA towards drain bB and south to include the former **Sc9** (approx. increase of 3ha).

There were several new areas of ARB mapped in 2012 (**C4**, **C5** and **Sc18**). **C4** (approx. 0.5ha) and **C5** (approx. 0.1ha) are located within **Sc8**, which showed a large increase in area in 2012. The formation of these new central sections is a result of re-wetting associated with the blockage of drains bA and bB. **C4** is the larger of the two new central areas and it is likely that some central vegetation was present in 2004 and that part of the increase in area is due to more comprehensive survey in 2012. **Sc18** (approx. 0.1ha) is a small area of sub-central ecotope in the south western part of the high bog, east of drain bD. This is likely to have developed as a result of re-wetting from subsidence associated with the track to the west of **Sc18**. Although this represents an increase in the area of ARB on this site this is a sign of subsidence on the high bog in this area.

There were five newly mapped areas of sub-central ecotope (**Sc13**, **Sc14**, **Sc15**, **Sc16** and **Sc19**) (approx. 1ha in total) in 2012 that were in areas that were not previously subject to detailed mapping. It is therefore not possible to say whether these areas are newly formed areas of ARB or are the result of more comprehensive survey.

The active flush **Z** was slightly smaller in 2012 but this is due to more comprehensive mapping in 2012 and this flush is considered to have remained stable in area.

To summarise it is estimated that there has been an overall loss of ca. 0.1ha of central ecotope within the former **C2**; an increase of c. 13ha central and sub-central ecotope within **Sc4**, **Sc7** and **Sc8** and the newly formed **C4**, **C5** and **Sc18**; and an increase of ca. 1ha due to increased mapping accuracy

(Sc13, Sc14, Sc15, Sc16 and Sc19). The remaining sections were stable or showed slight changes due to increased mapping accuracy. The increases in ARB were generally as a result of re-wetting associated with drain blocking across the centre of the high bog. One area, Sc18, is likely to have formed as a result of re-wetting from subsidence associated with the track to the west of Sc18.

The favourable reference value (FRV) for Area is considered to be the sum of ARB (central, sub-central ecotopes and active flush) plus sub-marginal ecotope when the Habitats Directive came into force in 1994 (see table 8.4). Therefore, ARB Area FRV is 109.93ha (based on 1994/5 Kelly (1995) figures amended by Fernandez *et al.* (2005), see tables 8.1 and 8.3 below). This FRV is only approximate until further hydrological and topographical studies are carried out in order to assess the maximum potential capacity of the high bog to support ARB. The current habitat area value (29.61ha) is 73.06% below the FRV. A current Area value more than 15% below FRV falls into the **Unfavourable Bad** assessment category.

A long-term (1994/5-2012) trend shows an increase in the area of ARB at the site (16.57ha) (see table 8.1). A more recent and short-term trend analysis (8 years; 2004-2012) shows that much of this increase has been post 2004 with an increase of 13.18ha (101.07%) of ARB. Therefore, the Area of ARB is given an **Increasing** trend assessment.

The Area of Active Raised Bog at Lisnageeragh Bog is assessed as Unfavourable Bad-Increasing (see table 8.5).

Structure & Functions

The FRV for S&Fs is for at least half of the ARB area to be made up of central and active flush, i.e. the higher quality wetter vegetation communities. This value is 14.81ha (half of 29.61ha, the current area of ARB). The current value is 2.76ha, which is 81.36% below the FRV. Therefore S&Fs are given an **Unfavourable Bad** assessment.

Both the long term (1994/5-2012) and short term (8 years; 2004-2012) trends indicate an increase of the area of central ecotope and therefore the S&Fs are given an **Improving** trend.

Quadrats analysis (Qc1, Qsc1, Qsc2, Qsc3, Qsc4 and Qsm1) indicates the following:

Qc1: There was slight variation in the quadrat data compared to 2004: this quadrat was previously classified as community complex 15 but was recorded as 35 in 2012, this is due to re-interpretation of the data and not due to vegetation change; the ground was described as quaking in 2012, not soft as in 2004; interconnecting pools had higher cover (51 to 75%, compared with 34 to 50% in 2004) and there was an associated increase in the cover of *Sphagnum cuspidatum* and overall *Sphagnum*

cover; cover of *Sphagnum capillifolium* and *Calluna vulgaris* were increased; and, *Sphagnum magellanicum*, and *S. austinii* were absent in 2012. The area around the quadrat was examined and it was considered that these changes (in particular the increase in pool cover) were due to differences in quadrat positioning between 2004 and 2012 and not due to changes in the vegetation. The hummock indicator *Sphagnum austinii* was present in the adjacent vegetation.

Qsc1: There was moderate variation in the quadrat data compared to 2004: *Sphagnum* pools had moderate cover in 2004 (26 to 33%) but were absent in 2012. Associated with this was a decrease in the cover of the *Sphagnum cuspidatum* (4 to 10% in 2004, absent in 2012) and other species associated with pools and hollows in this habitat such as *Sphagnum papillosum*, *Carex panicea* and *Narthecium ossifragum*. There was an increase in hummocks (91 to 100%, compared with 51 to 75% in 2004) and hummock species such as *Calluna vulgaris* and *Sphagnum capillifolium*. There were hollows in the vicinity of the quadrat and it was considered that these changes (decrease in pool cover and increase in hummocks) were due to differences in quadrat positioning between 2004 and 2012 and not due to changes in the vegetation.

Qsc2: There was a large variation in the quadrat data compared to 2004, due to an increase in habitat quality: Although overall pool cover declined (11 to 25% in 2012, compared with 34 to 50% in 2004), there was an increase in *Sphagnum cuspidatum* cover and lower algal cover. The decrease in pool cover is considered to be due to differences in quadrat positioning between 2004 and 2012 and not due to changes in the vegetation. However, there was also a large increase in overall *Sphagnum* cover (51 to 75% in 2012, compared with 11 to 25% in 2004) which is likely to be a real change associated with re-wetting from drain blocking to the north of the quadrat. High and low *Sphagnum* hummocks increased with an increase in *S. magellanicum*, *S. subnitens*, *S. cuspidatum* and *S. capillifolium*. The hummock indicator *S. fuscum* increased in cover, but *S. austinii* was absent in 2012.

Qsc3: There was a large variation in the quadrat data compared to 2004, due to an increase in habitat quality: There was an increase in the cover of *Sphagnum* pools, lawns and hummocks and overall *Sphagnum* cover increased (51 to 75% in 2012, compared with 11 to 25% in 2004). Associated with this were a decrease in algal pools and *Narthecium ossifragum* and an increase in *S. cuspidatum*, *S. capillifolium* and *S. papillosum*. This is considered to be a real change associated with re-wetting from drain blocking to the north of the quadrat.

Qsc4: There was slight variation in the quadrat data compared to 2004: Overall *Sphagnum* cover increased (34 to 50% in 2012, compared with 11 to 25% in 2004). This was largely due to an increase in *Sphagnum* pools and *S. cuspidatum*. However, *S. capillifolium* and *S. papillosum* also increased

slightly and hummock cover was higher (with an associated increase in *Calluna vulgaris*). *Narthecium ossifragum* cover was lower in 2012. It was considered that these changes (the increase in *Sphagnum* and pool cover) were due to differences in quadrat positioning between 2004 and 2012 and not due to changes in the vegetation.

Qsm1: There was a large variation in the quadrat data compared to 2004, due to a decrease in habitat quality: this quadrat was previously classified as central community complex 35 but was recorded as sub-marginal community complex 6/3 + AP in 2012. The overall *Sphagnum* cover was only slightly different and it is likely that this quadrat was wrongly mapped as central ecotope in 2004 and should have been mapped as sub-central ecotope. *Sphagnum* pools, hummocks and hollows were absent in 2012 and there was a reduction in the cover of *S. cuspidatum*, *S. capillifolium* and *S. papillosum*. *Narthecium ossifragum* showed a large increase (26 to 33% in 2012, compared with 4 to 10% in 2004) and *Carex panicea* was frequent. The area around the quadrat was examined and it was considered that these changes (decrease in *Sphagnum* and pool cover and increase in *N. ossifragum* and *C. panicea*) were actual changes in the vegetation. The habitat quality in this area has declined although there is little overall change in the area of ARB and this may be due to the forestry located to the south and east of this area.

Typical good quality indicators and typical plant species are still found in central, sub-central and active flush throughout the entire bog.

The Structure & Functions of Active Raised Bog at Lisnageeragh Bog are assessed as Unfavourable Bad-Improving (see table 8.5).

Future Prospects

Overall there has been a large increase in ARB Area and improvement in quality (S&Fs). There was a potential slight decline in the habitat quality within the ARB in the south-eastern area (former C2 and Sc10) due to forestry impacts; however further research would be needed to confirm this trend and thus this change could be the result of vegetation interpretation and more comprehensive surveying in 2012. However, in the central areas of the high bog the condition of ARB has improved due to re-wetting associated with drain blocking. To the north, where there has not been any drain blocking, the ARB condition is stable. To increase ARB in these areas will require blocking of functional and reduced functional drains on the high bog.

Nevertheless, impacting activities such as high bog and peripheral drainage along with peat cutting continue to threaten Active Raised Bog. Peat cutting at the site is characterised by high face banks located close to Active Raised Bog areas (e.g. Sc8 (C4) to the southeast that captures water from the

surrounding high bog and Sc11 to the south), which has significant high risk of subsidence if the activity continues and thus of seriously impacting on Active Raised Bog and compromising the recovery of Degraded Raised Bog to active peat forming.

Habitat **Area** is currently 73.06% below FRV (see table 8.4) and a Decreasing trend is expected in the following two reporting periods (12 years) as a result of negative influence of current impacting activities and despite positive effects of restoration works. Habitat Area is expected to remain more than 25% below FRV. Thus, habitat’s **Area Future Prospects** are assessed as **Unfavourable Bad-Decreasing**. Habitat’s **S&Fs** are currently 81.36% below FRV (see table 8.4). Similarly to Area Future Prospects are given a declining trend and thus the habitat’s **S&Fs** are expected to remain more than 25% below FRV in the following two reporting periods. **S&Fs Future Prospects** are assessed as **Unfavourable Bad-Declining**.

The overall habitat’s Future Prospects are Unfavourable Bad-Declining (see table 8.5). Blocking of remaining reduced-functional and functional drains both on the high bog and cutover and cessation of peat cutting is necessary. The actual impact of adjacent forestry on the high bog should be assessed. Ongoing management of regenerating conifers and other measures to consolidate the benefits from forestry clearance are also required (and are currently part of the Coillte LIFE project).

Cutover areas will also play a role in the restoration of ARB on this site, as the extent of previous cutting of the high bog margin may make it difficult to regenerate previous ARB values on the high bog alone. There is potential for restoration of three cutover areas: to the NE of the high bog (E 166300 / N 263987), as flowing water was noted within drain b2L; to the E of the high bog, adjacent to flush Z, (E 166602 / N 263427), as water flowing within the flush towards this cutover was noted in 2012; and the cutover to the W of the high bog, due to the amount of cutover land within different high bog lobes.

The overall conservation status of Active Raised Bog at Lisnageeragh Bog is assessed as Unfavourable Bad-Declining (see table 8.5).

Table 8.1 Changes in Active Raised Bog area

Active Ecotopes	1994 ¹	2004	2004 (amended)	2012	Change (2004-2012)	
	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	%
Central	4.18	0.90	1.07	1.42	(+)0.35	(+)32.71
Sub-central	7.35	15.85	14.02	26.85	(+)12.83	(+)91.51

Active flush	1.51	1.51	1.34	1.34	0.00	0.00
Total	13.04	18.26	16.43	29.61	(+)13.18	(+)80.22

¹These are the figures calculated from the vegetation map drawn by Kelly *et al.*, (1995) that was geo-referenced, digitised and in some cases adjusted as part of Fernandez *et al.* (2005) project.

Note: Table 8.1 includes 2004 figures and 2004 amended figures. The latter shows the ecotope area believed to be present in 2004 after surveying improvements in 2012. The comparison between 2004 (amended) and 2012 illustrates the actual changes in ecotope area in the 2004-2012 period. Any change in ecotope area between the 2004 and the 2004 (amended) values is due to improvement in mapping accuracy and/or the result of a more comprehensive survey in 2012 (see table 8.2 for further detail).

Table 8.2 Assessment of changes in individual Active Raised Bog areas

Area	Quadrats	Trend	Comment	Quadrats analysis
C1	Qc1	Stable	Slight changes in boundary (slightly smaller). This change is the result of more comprehensive surveying in 2012, which resulted in more accurate mapping.	Previously classified as community complex 15, but classified as 35 in 2012. Increase in pool cover and associated increase in overall <i>Sphagnum</i> cover. Changes due to re-interpretation of vegetation and quadrat location.
C2	Qsm1	Stable (possibly declining)	Former C2 is now mapped as Sc10. Some sections now mapped as sub-marginal ecotope. ARB habitat declining in quality, but the central ecotope area should have been mapped as sub-central in 2004.	Qsm1 was previously named Qc2. Decrease in <i>Sphagnum</i> and pool cover and increase in <i>N. ossifragum</i> and <i>C. panicea</i> due to decline in habitat quality.
C3	None	Stable	Slight changes in boundary (slightly smaller). This change is the result of more comprehensive surveying in 2012, which resulted in more accurate mapping.	
C4	None	Newly developed	This central ecotope area has recently developed as a result of rewetting associated with drainage blocking within Sc8. However some sections are likely to be already present in 2004 and thus are the result of a more comprehensive surveying in 2012.	
C5	None	Newly developed	This central ecotope area has recently developed as a result of rewetting associated with drainage blocking within Sc8.	

Area	Quadrats	Trend	Comment	Quadrats analysis
Sc1	Qsc1	Stable	Slight changes in boundary (slightly smaller). This change is the result of more comprehensive surveying in 2012, which resulted in more accurate mapping.	Slight variation in quadrat data compared to 2004 such as absence of interconnecting pools and <i>Sphagnum cuspidatum</i> and increase in hummock species and overall <i>Sphagnum</i> cover. This is due to difference in quadrat location.
Sc2	None	Stable	Slight changes in boundary (slightly smaller). This change is the result of more comprehensive surveying in 2012, which resulted in more accurate mapping.	
Sc3	None	Stable	Slight changes in boundary (slightly larger). This change is the result of more comprehensive surveying in 2012, which resulted in more accurate mapping.	
Sc4	Qsc4	Increasing	Southern section of this sub-central ecotope area expanding as a result of rewetting associated with drainage blocking. Now also includes former Sc5 and Sc6.	Increase in Sphagnum and pool cover and associated species. This is due to difference in quadrat location and not actual vegetation changes.
Sc5	None	No longer present	This former sub-central section is now part of Sc4 which have expanded as a result of rewetting associated with drainage blocking	
Sc6	None	No longer present	This former sub-central section is now part of Sc4 which have expanded as a result of rewetting associated with drainage blocking	
Sc7	Qsc3	Increasing	Western section of this sub-central ecotope area expanding as a result of rewetting associated with drainage blocking.	Increase in cover of <i>Sphagnum</i> pools, lawns and hummocks and decrease in algal pools and <i>Narthecium ossifragum</i> . Increase in habitat quality resulting from re-wetting due to drain blocking to the north of the quadrat.
Sc8	Qsc2	Increasing	Southern and northern sections of this sub-central ecotope area expanding as a result of rewetting associated with drainage blocking. Now also includes former Sc9.	Decrease in pool cover and increase in hummocks and hummock species such as <i>Calluna vulgaris</i> and <i>Sphagnum capillifolium</i> . Increase in habitat quality resulting from re-wetting due to drain blocking to the north of the quadrat.
Sc9	None	No longer present	This former sub-central section is now part of Sc8 which have expanded as a result of rewetting associated with drainage blocking	
Sc10	None	Possibly declining	Former Sc10 now consists of two separate Sub-central ecotope areas (Sc10 and Sc17). Slight smaller in extent. Area may be declining in quality but could also be the result of re-interpretation of vegetation.	

Area	Quadrats	Trend	Comment	Quadrats analysis
Sc11	None	Stable	Slight changes in boundary (slightly larger). This change is the result of more comprehensive surveying in 2012, which resulted in more accurate mapping. However also the result of re-interpretation of vegetation.	
Sc12	None	Stable	Slight changes in boundary (slightly smaller). This change is the result of more comprehensive surveying in 2012, which resulted in more accurate mapping.	
Sc13	None	Unknown	This specific area was not surveyed in 2004. This is likely to be the result of more comprehensive surveying in 2011, which resulted in more accurate mapping.	
Sc14	None	Unknown	This specific area was not surveyed in 2004. This is likely to be the result of more comprehensive surveying in 2011, which resulted in more accurate mapping.	
Sc15	None	Unknown	This specific area was not surveyed in 2004. This is likely to be the result of more comprehensive surveying in 2011, which resulted in more accurate mapping.	
Sc16	None	Unknown	This specific area was not surveyed in 2004. This is likely to be the result of more comprehensive surveying in 2011, which resulted in more accurate mapping.	
Sc17	None	Stable (possibly declining)	Former Sc10 now consists of two separate Sub-central ecotope areas (Sc10 and Sc17). Slight smaller in extent. Area may be declining in quality but could also be the result of re-interpretation of vegetation.	
Sc18	None	Newly developed	This sub-central ecotope area is likely to have developed associated with further subsidence on the high bog.	
Sc19	None	Unknown	This very small sub-central ecotope area was not surveyed in 2004. This is likely to be the result of more comprehensive surveying in 2011, which resulted in more accurate mapping.	
Z	None	Stable	Slight changes in boundary (slightly smaller). This change is the result of more comprehensive surveying in 2012, which resulted in more accurate mapping.	

Degraded Raised Bog (7120)

Area

The Degraded Raised Bog FRV for Area is 159.59ha at Lisnageeragh Bog. This value corresponds with the difference between the current high bog area (269.52ha) and the Active Raised Bog FRV (109.93ha) for area. Degraded Raised Bog is a particular habitat type, for which a FRV smaller than the current value, may be desirable in many sites. However any decrease in habitat area would only be considered positive, when it is the result of restoration to Active Raised Bog. Current habitat area is 50.33% bigger than FRV and therefore the habitat Area is given an **Unfavourable Bad** assessment (see table 8.4).

The un-adjusted area figures for 2004 in table 8.3 show that there was a large increase in sub-marginal ecotope and decrease in marginal ecotope from 2004 to 2012. However, most of this was due to re-interpretation of vegetation, for instance the community complex 3/6/2 was mapped as marginal in 2004, but this community complex was considered to be a sub-marginal complex in 2012. Although the community 3/6/2 has abundant *Trichophorum germanicum* and *Carex panicea*, *Eriophorum* species were also abundant and *Sphagnum* cover was generally 26 to 33%. These areas were mainly re-mapped as 9/7/6 variants 9/7/2 and 9/7/3. This has been taken into account in the 2004 (amended) figures in table 8.3.

In addition, more comprehensive survey in 2012 led to some areas that had previously been classified as marginal ecotope being mapped as sub-marginal ecotope in 2012: the north lobe (E 1652765 / N 264532); western lobe (E 165748 / N 263140); south-eastern section of high bog (E 167083 / N 262433) and south-western lobe (E 165625 / N 262561). More accurate mapping also slightly decreased the amount of face-bank ecotope, changed the extent of inactive flushes (e.g. X; Z; Z1; W1; X1 and W1) and led to Flush V being newly recorded.

There was some expansion of sub-marginal vegetation as a result of rewetting associated with drainage blocking: eastern lobe (E 166662 / N 263212), where double drain bC was blocked (1ha approx.) and near drain bA (2ha approx.); and within two marginal areas surrounding bC in the middle section of high bog (E 166285 / N 262969) (0.8ha approx.). Subsidence due to peat cutting in the southwest section of the high bog (E 166155 / N 262214) also led to an increase in sub-marginal ecotope (1 ha approx.) in the vicinity of Sc18. The overall increase of sub-marginal ecotope due to rewetting was estimated to be 4.8ha.

Table 8.3 indicates that there has been an overall decrease (13.69ha) in the area of Degraded Raised Bog. The decrease is the result of expansion of Active Raised Bog (13.18ha) and a high bog loss of 0.50ha caused by peat cutting. As a result the habitat is given a **Decreasing** trend.

The Area of Degraded Raised Bog at Lisnageeragh Bog is assessed as Unfavourable Bad-Decreasing (see table 8.5).

Structure & Functions

The FRV for S&Fs is for a maximum 25% of the Degraded Raised Bog area to be made up of marginal and face bank, i.e. the lower quality and drier vegetation communities. This value is 59.98ha (25% of 239.91ha, the current area of Degraded Raised Bog). The current marginal and face bank ecotopes area value (75.17ha) is 25.33% above the FRV (in the particular case of Degraded Raised Bog a current area value equal or smaller than FRV is desirable). A current value more than 25% above FRV falls into the **Unfavourable Bad** assessment category.

Table 8.3 shows a decrease in the area of marginal ecotope (5.1 ha approx.) caused by loss due to peat cutting (0.30ha approx.) and expansion of sub-marginal ecotope (4.8ha approx.). Face bank also decreased (0.2ha) due to peat cutting. There was an overall decrease of 5.31ha (6.6%) of marginal and face bank ecotopes within the reporting period (2004-2012). Although there was a loss of 0.5ha due to peat-cutting, there was a much larger decrease due to expansion of sub-marginal ecotope. This is due to restoration measures and represents an improvement in habitat quality of former marginal ecotope. S&Fs trend is assessed based on actual changes within marginal and face banks ecotope (e.g. decreases due to rewetting processes or increases as a result of further drying out). Thus, the DRB's S&Fs at Lisnageeragh are given an **Improving** trend.

The mapping of boundary between marginal and sub marginal is difficult and decreases are only recorded where major changes in the vegetation are evident. Therefore, where no changes are shown, more subtle negative effects cannot be ruled out, and therefore negative changes may have been underestimated. The basic assumption is that were peat cutting has taken place subsidence will occur and will continue for some decades and this will dry out the adjacent areas of the bog

Typical good quality indicators and typical plant species are still found throughout the entire bog on sub-marginal ecotope.

The Structure & functions of Degraded Raised Bog at Lisnageeragh Bog are assessed as Unfavourable Bad-Improving (see table 8.5).

Future Prospects

Although there has been an improvement in Degraded Raised Bog due to restoration works; DRB has decreased as result of peat cutting and is likely to continue to decline unless there is a cessation of peat cutting. Furthermore, drainage on the high bog continues to damage the habitat and to hinder its recovery to FRVs, as well as minimising the chances to convert face bank and marginal ecotope into sub-marginal and/or Active Raised bog.

Habitat **Area** is currently 50.33% above FRV (see table 8.4) and a Decreasing trend is expected in the following two reporting periods (12 years). Habitat Area is expected to remain more than 15% above FRV. Thus, habitat's **Area Future Prospects** are assessed as **Unfavourable Bad-Decreasing**. Habitat's **S&Fs** are currently 25.33% above FRV (see table 8.4). A Declining trend is foreseen in the following two reporting periods as a result of remaining negatively impacting activities (e.g. peat cutting, drainage) and despite restoration works. **S&Fs** are expected to remain more than 25% above FRV. Thus, habitat's **S&Fs Future Prospects** are assessed as **Unfavourable Bad-Declining**.

The Future Prospects for Degraded Raised Bog are considered to be Unfavourable Bad-Declining, despite the potential quality improvements associated with drainage blocking, but due to further habitats losses to peat cutting (see table 8.5).

The overall conservation status of Degraded Raised Bog at Lisnageeragh Bog is assessed as Unfavourable Bad-Declining (see table 8.5).

Table 8.3 Changes in Degraded Raised Bog area

Inactive Ecotopes	1994 ¹	2004	2004 (amended)	2012	Change (2004-2012)	
	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	%
Sub-marginal	96.89	96.94	155.21	146.83	(-)8.38	(-)5.40
Marginal ²	137.24	127.79	69.40	64.29	(-)5.11	(-)7.36
Face bank ²	na	11.56	11.08	10.88	(-)0.20	(-)1.81
Inactive flush	16.66	9.12	11.15	11.15	0.00	0.00
Conifer plantation(Clear felled area) ³	6.76	6.76	6.76	6.76	0.00	0.00
Total	257.55	252.17	253.6	239.91	(-)13.69	(-)5.40

¹These are the figures calculated from the vegetation map drawn by Kelly *et al.*, (1995) that was geo-referenced, digitised and in some cases adjusted as part of Fernandez *et al.* (2005) project.

² Any 2012 marginal and face bank ecotope value given within the report should be taken as a maximum value. Their extent is based on the 2012 habitat survey and 2010 aerial photographs. It cannot be ruled out that further marginal and/or face bank ecotope losses may have taken place at the margin of the high bog in the 2011-2012 period associated with peat cutting.

³ 6.76ha of high bog clear felled area have been added to the figures in table above. This area was clear felled in 2005 as part of a Coillte restoration project on the site. This area was not previously counted as part of the high bog.

Note: Table 8.3 includes 2004 figures and 2004 amended figures. The latter shows the ecotope area believed to be present in 2004 after surveying improvements in 2012. The comparison between 2004 (amended) and 2012 illustrates the actual changes in ecotope area in the 2004-2012 period. Any change in ecotope area between the 2004 and the 2004 (amended) values is due to improvement in mapping accuracy and/or the result of a more comprehensive survey in 2012.

Depressions on peat substrates of the *Rhynchosporion* (7150)

Rhynchospora alba depressions are found across the entire bog in both Active and Degraded Raised Bog. The species is more frequently found and reaches its finest quality associated within wet features (*Sphagnum* pools, lawns and hollows) on Active Raised Bog.

The physical structure and distribution of the habitat across large sections of the high bog makes the process of calculating its area unfeasible and as a consequence makes the process of calculating realistic FRVs unfeasible. Thus, the assessment of the habitat's Area conservation status is indirectly based on the assessment of Active Raised Bog habitat Area (a favourable assessment indicates that all sub-marginal ecotope has turned Active Raised Bog). The habitat Area is given an **Unfavourable Bad** assessment.

The Area trend assessment is based on the variation on Active Raised Bog and sub-marginal ecotope within Degraded Raised Bog in the reporting period. The area of Active Raised Bog has increased by 13.18ha (80.22%) in the reporting period and this includes an increase of both sub-central and central ecotopes (which support *R. alba* depressions). Although there was some expansion of sub-marginal ecotope, some of the ARB increases resulted in an overall loss of sub-marginal ecotope of ca. 5.0ha (-5.4%). There was an overall increase in habitat suitable to support *R. alba* depressions of ca. 75%. As result habitat Area is given an **Increasing** trend.

The habitat's Area Future Prospects status is equally based on the Active Raised Bog Area Future Prospects status assessment and the Area Future Prospects trend is based on the trend expected for Active Raised Bog and sub-marginal ecotope in the following two reporting periods. Impacting activities such as peat cutting, drainage and forestry on adjacent land continue to threaten Active and Degraded Raised Bog, despite the positive result of restoration works. Therefore, the habitat's Area Future Prospects are given an **Unfavourable Bad-Decreasing** assessment.

The S&Fs conservation assessment is also indirectly based on the Active Raised Bog S&Fs status and trend assessments, as Active Raised Bog supports the finest habitat quality type. Therefore, the habitat's S&Fs are given an **Unfavourable Bad-Improving** assessment.

The habitat's S&Fs Future Prospects status and trend are equally based on the Active Raised Bog S&Fs Future Prospects status and trend assessments in the following two reporting periods. Therefore, the habitat's S&Fs Future Prospects are given an **Unfavourable Bad-Declining** assessment.

The overall habitat's Future Prospects assessment is **Unfavourable Bad-Declining** assessment.

The conservation status of depressions on peat substrates of the Rhynchosporion at Lisnageeragh Bog is assessed as **Unfavourable Bad-Declining** assessment (see table 8.5).

Table 8.4 Habitats favourable reference values

Habitat	Area Assessment			Structure & Functions Assessment		
	FRV Target (ha) ¹	2012 value (ha) ²	% below target	FRV 2012 Target (ha) ³	2012 value (ha) ⁴	% below target
7110	109.93	29.61	73.06	14.81	2.76	81.36

¹ 1994 central, sub-central, active flush, bog woodland and sub-marginal ecotope area.
² 2012 central, sub-central ecotope, active flush and bog woodland area.
³ Half of the current central, sub-central ecotope and active flush area. The target is that the area of the highest vegetation quality (i.e. central ecotope and active flush) should be at least this figure.
⁴ 2012 central ecotope and active flush area.

Habitat	Area Assessment			Structure & Functions Assessment		
	FRV Target (ha) ⁵	2012 value (ha) ⁶	% above target	FRV 2012 Target (ha) ⁷	2012 value (ha) ⁸	% above target
7120	159.59	239.91	50.33	59.98	75.17	25.33

⁵ 1994 current bog area minus 7110 area FRV.
⁶ 2012 Degraded Raised Bog area.
⁷ 25% of the current Degraded Raised Bog habitat area. The target is that the extent of marginal and face bank ecotopes should not be larger than 25% of the current Degraded Raised Bog habitat area.
⁸ Current marginal and face bank ecotopes area.

As table 8.5 below indicates, each individual EU habitat present on the high bog has been given the following overall conservation status assessment based on the three main parameters (Area, S&Fs and Future Prospects) individual assessments:

- **Active Raised Bog is assessed as being Unfavourable Bad- Declining.**
- **Degraded Raised Bog is assessed as being Unfavourable Bad-Declining.**

- **Rhynchosporion depressions is assessed as being Unfavourable Bad–Declining.**

Table 8.5 Habitats conservation status assessments

Habitat	Area Assessment	Structure & Functions Assessment	Future Prospects Assessment	Overall Assessment
7110	Unfavourable Bad-Increasing	Unfavourable Bad-Improving	Unfavourable Bad-Declining	Unfavourable Bad-Declining
7120	Unfavourable Bad-Decreasing	Unfavourable Bad-Improving	Unfavourable Bad-Declining	Unfavourable Bad-Declining
7150	Unfavourable Bad-Increasing	Unfavourable Bad-Improving	Unfavourable Bad-Declining	Unfavourable Bad-Declining

Conclusions

Summary of impacting activities

- Peat cutting still continues at the site and has taken place at 13 to 15 locations in the 2004-2012 reporting period. 0.50ha of high bog have been lost in this period due to peat cutting. Rate of cutting at most of these plots is relatively low with the only exception being some plots along the south-western edge of the high bog.
- 7.6km of drains on the high bog remain functional. Most of these are associated with former peat exploitation. Functional and reduced functional drains are still impacting on high bog habitats and will continue to do so until they are blocked and become completely in-filled and thus non-functional.
- Cutover drainage (peripheral drainage) associated with either currently active or no longer active peat cutting continues to impact on the high bog habitats. In addition, maintenance works have been carried out in the reporting period on drains in agriculture land along the eastern margin of the high bog.
- No fire events have been reported on the high bog in the 2004-2012 reporting period.
- The invasive species *Picea sitchensis* and *Campylopus introflexus* are present occasionally on the bog but are considered to have a low impact on high bog habitats.
- There are a number of forestry plantations within and adjacent to the SAC and the plantations to the ESE and S of the high bog are considered to have a negative impact on high bog habitats.

Changes in active peat forming areas

- There has been a large increase (13.18ha) in the area and improvement in quality of ARB on the site. This increase is the result of restoration works within the site.
- The former area of **C2** is no longer present and **Sc10** was re-mapped as **Sc10** and **Sc17**, but there was no overall decline in ARB in this area.
- There was a large increase in ARB (approx. 6ha) in three sub-central sections in 2012 (**Sc4**, **Sc7** and **Sc8**) as a result of rewetting associated with drain blocking.
- Several new peat-forming areas (**C4**, **C5** and **Sc18**) were described in 2012. The formation of **C4** and **C5** is a mainly a result of re-wetting associated with the blockage of drains bA and bB, although some central vegetation may have been present in the area of **C4** in 2004. **Sc18** is likely to have developed as a result of re-wetting from subsidence associated with the track to the west of **Sc18**.
- There were five newly mapped areas of sub-central ecotope (**Sc13**, **Sc14**, **Sc15**, **Sc16** and **Sc19**) (approx. 1ha in total) that were the result of more comprehensive mapping in 2012.

Other changes

- None

Quadrats analysis

- Quadrat **Qc1**: Previously classified as community complex 15, but classified as 35 in 2012. Increase in pool cover and associated increase in overall *Sphagnum* cover. Changes due to re-interpretation of vegetation and quadrat location.
- Quadrat **Qsm1**: previously named Qc2 but the 2004 description corresponds with sub-central ecotope. Declined from sub-central to sub-marginal ecotope with decrease in *Sphagnum* and pool cover and increase in *N. ossifragum* and *C. panicea*.
- Slight variation in **Qsc1** and **Qsc4** (such as changes in pool and *Sphagnum* cover) but this is due to differences in quadrat location and not actual vegetation changes. Permanent markers were inserted in quadrats recorded in 2012.
- Increase in *Sphagnum* cover and *Sphagnum* pools in **Qsc2** and **Qsc3** as a result of an increase in habitat quality due to rewetting resulting from drain blocking.

Restoration works

- Three major drains (bA, bB and bC) running across the centre of the high bog and three minor drains (bF, bG and bH) in the east of the high bog have been blocked. The total

length of blocked drains is 3.736km and the three major drains are now largely non-functional.

- Restoration works also took place at the site in 2005-2007 under Coillte's LIFE-funded raised bog restoration project. These works included felling two plantations: one on the south-east of the high bog and another plantation on the north-west cutover, as well as blocking of drains with peat dams. These restoration works have led to rising of water levels and re-colonisation of bog vegetation.
- NPWS has engaged in negotiation with landowners in relation to the cessation of peat cutting at the site. Despite negotiations, limited peat cutting continues at Lisnageeragh Bog.

Summary of conservation status

- **Active Raised Bog** has been given an **Unfavourable Bad-Declining** conservation status at Lisnageeragh Bog. Habitat Area has increased and quality (S&Fs) improved in the reporting period. However both values are below the FRVs. This increase is associated with the restoration works to block major drains across the centre of the high bog. Future Prospects are considered **Unfavourable Bad-Declining**; as despite the positive impact of restoration works (drain blocking), negatively impacting activities (peat cutting and drainage) continue to threaten the habitat.
- **Degraded Raised Bog** has been given an **Unfavourable Bad-Declining** conservation status at Lisnageeragh Bog. Habitat Area has decreased, mainly due to an increase in ARB but also due to losses associated with peat cutting. Habitat quality (S&Fs) has improved due to the impact of restoration works (drain blocking). Future Prospects are considered **Unfavourable Bad-Declining** as a result of expected ongoing losses of habitat Area and draining out associated with peat cutting and drainage.
- **Depressions on peat substrates of the Rhynchosporion** has been given an **Unfavourable Bad-Declining** conservation status at Lisnageeragh Bog. Habitat Area and quality (S&Fs) are considered to have Increased/Improved in the reporting period. However, Future Prospects are considered **Unfavourable Bad-Declining** as negatively impacting activities (peat cutting and drainage) continue to threaten the habitat.

The conservation status of the **overall raised bog** at **Lisnageeragh** is assessed as being **Unfavourable Bad- Declining**.

Recommendations

- **Cessation of peat cutting.**

- **Assessment of the actual impact of forestry** adjacent to the high bog.
- **Further restoration works** including blocking of remaining high bog reduced-functional and functional drains, as well as cutover drains.
- **Further hydrological and topographical studies** to ascertain the capacity of the high bog to support Active Raised Bog and thus estimate a more accurate favourable reference value.
- **Further botanical monitoring surveys** on the high bog in order to assess change in habitat's conservation status. If restoration works are undertaken on the cutover areas then these should be included in future botanical monitoring surveys.
- **Ongoing monitoring and management of restoration works** that are being carried out as part of Coillte's LIFE-funded raised bog restoration project should be continued.

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Appendix I Detailed vegetation description of the high bog

Active Raised Bog (7110)

Central Ecotope Complex

COMPLEX 35

- **Location:** within Sc3 in western lobe of the site, C1 (Sc4), C3 (Sc4), C4 & C5 (Sc8)
- **Ground:** quaking
- **Physical indicators:** absent
- **Calluna height:** 21-40cm
- **Cladonia cover:** <4%
- **Macro-topography:** flat
- **Pools:** interconnecting pools 26-33%
- **Sphagnum cover:** 76-90%
- **Narthecium cover:** 5-10%
- **Micro-topography:** High and low hummocks, lawns and pools
- **Tussocks:** absent
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (11-25%), *Eriophorum angustifolium* (<4%), *Menyanthes trifoliata* (<4%), *Narthecium ossifragum* (5-10%), *Trichophorum germanicum* (<4%), *Sphagnum capillifolium* (5-10%), *S. cuspidatum* (11-25%), *S. papillosum* (11-25%), *S. magellanicum* (11-25%), *Campylopus atrovirens* (<4%), *Racomitrium lanuginosum* (<4%), *Cladonia portentosa* (<4%), *C. uncialis* (<4%).
- **Additional comments:** small areas of central ecotope vegetation within Sc3. Presence in 2012 may be due to increased mapping detail or vegetation interpretation. Total *Sphagnum* cover is high for complex 35 as *Sphagnum magellanicum* has high cover.
- **C1** – this area is located in the north-east of Sc4 in a slight depression. The vegetation was similar to that described from C4 (Sc3), but the cover of interconnecting pools was higher (34-50%). Overall *Sphagnum* cover was similar (76-90%). *Sphagnum papillosum* was dominant in lawns (26-33%), *S. capillifolium* in hummocks (26-33%) and *S. cuspidatum* in pools (26-33%). Additional *Sphagna* included *S. denticulatum* (<4%) and *S. austinii* (<4%). *Narthecium ossifragum* cover (<4%) was slightly lower than C4 (Sc3) and *Eriophorum vaginatum* (<4%), *Drosera anglica* (<4%) *Rhynchospora alba* (<4%) and *Pleurozia purpurea* (<4%) were present in small amounts.

The non-native moss *Campylopus introflexus* (<4%) was present occasionally at the edges of pools.

- **C2** – area in SW of site now mapped as **Sc10**
- **C3** – this area is located in the north-west of **Sc4**. The vegetation was similar to that described from **C4 (Sc3)**, but with a higher cover of interconnecting pools (34-50%). Overall *Sphagnum* cover was lower (51-75%) but species composition was similar. *Sphagnum papillosum* was dominant in lawns (11-25%), *S. capillifolium* in hummocks (11-25%) and *S. cuspidatum* in pools (11-25%). *Trichophorum germanicum* (<4%), *Carex panicea* (<4%) and *Campylopus atrovirens* (<4%) were present in small amounts. This central area was similar to **C1** to the west, but the cover of pools was slightly lower and open water (without *Sphagnum*) was occasionally present. *Sphagnum* cover between pools was lower but there were some large *S. capillifolium* hummocks.
- **C4** – this is a newly mapped area of central ecotype within **Sc8**. This had typical complex 35 vegetation (as described above), with large hummocks and high cover of inter-connecting pools. *Sphagnum* cover was high with *S. capillifolium*, *S. papillosum*, *S. austinii*, *S. fuscum* and *S. magellanicum* in hummocks and lawns and *S. cuspidatum* and *S. denticulatum* in pools with *Menyanthes trifoliata* and *Drosera anglica*. Hummocks of *Racomitrium lanuginosum* present. *Eriophorum vaginatum* and *E. angustifolium* co-dominant (26-33%) with *Calluna vulgaris* and *Erica tetralix* (26-33%). This area is likely to be both the result of more comprehensive mapping and re-wetting due to blocking of drain bA to the north. Sc8 also contains a newly developed small central ecotope area to the north near blocked drains bA named **C5** which also consists of complex 35.

Sub-Central Ecotope Complexes

COMPLEX 6/35

- **Location:** this complex dominates sub-central areas **Sc2-8, Sc10-12, Sc16-19**
- **Ground:** soft to quaking
- **Physical indicators:** bare peat absent
- **Calluna height:** 21-40cm
- **Cladonia cover:** 5-10%
- **Macro-topography:** flat to gently sloping
- **Pools:** interconnecting pools 11-25%
- **Sphagnum cover:** 51-75%

- **Narthecium cover:** 5-10%
- **Micro- topography:** high hummocks, low hummocks, pools, lawns and flats
- **Tussocks:** *Eriophorum vaginatum* <4%
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (11-25%), *Erica tetralix* (<4%), *Eriophorum angustifolium* (<4%), *E. vaginatum* (<4%), *Menyanthes trifoliata* (<4%), *Narthecium ossifragum* (5-10%), *Trichophorum germanicum* (<4%), *Drosera anglica* (<4%), *Sphagnum capillifolium* (11-25%), *S. cuspidatum* (11-25%), *S. papillosum* (5-10%), *S. austinii* (<4%), *S. subnitens* (<4%), *S. magellanicum* (<4%), *Campylopus atrovirens* (<4%), *Pleurozia purpurea* (<4%), *Racomitrium lanuginosum* (<4%), *Cladonia portentosa* (5-10%), *C. uncialis* (<4%).
- **Additional comments:** pools with *Sphagnum cuspidatum*, *Menyanthes trifoliata* and *Drosera anglica*. Hummocks of *S. capillifolium* and occasionally *S. austinii*, with *S. papillosum* and *S. magellanicum* in lawns. Patchy *Calluna vulgaris* with *Cladonia* species and *Hypnum jutlandicum*.
- **Sc2** – vegetation described from this are. **Sc2** area mapped in 2012 is smaller due to more detailed mapping.
- **Sc3** – this area had lower cover of *Cladonia* (<4%), total *Sphagnum* (34-50%) and *Sphagnum capillifolium* (5-10%) and higher cover of *Narthecium ossifragum* (34-50%) and *Calluna vulgaris* (26-33%). *Carex panicea* (<4%), *Trichophorum germanicum* (<4%) and *Andromeda polifolia* (<4%) were present in small amounts. *S. capillifolium* and *S. papillosum* were of equal abundant, high hummocks and pools were occasional and *N. ossifragum* abundant in hollows. *Rhynchospora fusca* was recorded from this complex (E166198/ N262700).
- **Sc4** – a large area of sub-central vegetation in the centre of the high bog. The vegetation was similar to **Sc2**, but cover of *Cladonia* (11-25%) and *Calluna vulgaris* (26-33%) were higher. Overall *Sphagnum* cover was lower (34-50%), with occasional high hummocks. *Sphagnum papillosum* was dominant in lawns (11-25%) and *S. cuspidatum* in pools (11-25%), with *S. capillifolium* (5-10%), *S. magellanicum* (5-10%), *S. denticulatum* (<4%) and *S. tenellum* (<4%). *Narthecium ossifragum* cover (<4%) was slightly lower than **Sc2** and *Myrica gale* (<4%) was present in small amounts. High hummocks of *Racomitrium lanuginosum* were locally abundant but overall of low cover (<4%). There were occasional patches of sub-marginal complex 6/3 + TP (or 6/3 + P) within the area mapped as **Sc4** and the sub-central complex graded to 6/3 at the edges.
- **Sc5** – this area was previously mapped as 9a/10 sub-central complex but has improved through the blocking of drain bA. The vegetation has developed into 6/35 sub-central complex and

now is linked to **Sc4** (refer to **Sc4** vegetation description). Some sub-marginal areas (6/3 + TP) within the area mapped as sub-central, but these were too small to map.

- **Sc6** - showed signs of regeneration and had greatly increased in size both to the north and south of blocked drain bA. The vegetation was similar to **Sc2**, but cover of *Cladonia* (11-25%), interconnecting pools (26-33%), *Eriophorum vaginatum* (11-25%) was higher. Overall *Sphagnum* cover the same but *Sphagnum papillosum* was dominant (26-33%) and *S. tenellum* was present (1-4%). *Narthecium ossifragum* cover was slightly lower (<4%) and *Carex panicea* (<4%), *Rhynchospora alba* (<4%), *Drosera rotundifolia* (<4%), *Trichophorum germanicum* (<4%), *Huperzia selago* (<4%) and *Sphagnum fuscum* were present in small amounts. This area was originally mapped as 9A/10 with open water but low pools and high cover of *Eriophorum angustifolium*. In 2012 pools were of high cover and *Sphagnum* hummocks and lawns developing due to blocked drains.
- **Sc7** – this is an area of sub-central east of the centre of the high bog. The vegetation was similar to **Sc2**, but cover of interconnecting pools (26-33%) and *Eriophorum vaginatum* (11-25%) was higher. *Cladonia* (<4%) and *Narthecium ossifragum* (<4%) cover was slightly lower and *Carex panicea* was present (<4%) in small amounts. Overall *Sphagnum* cover was similar (51-75%), with some large hummocks. *Sphagnum cuspidatum* was dominant in pools (11-25%) with *S. papillosum* (11-25%) and *S. magellanicum* (11-25%) dominant in lawns and *S. capillifolium* (11-25%) in hummocks. *S. fuscum* (<4%) and *S. austinii* (<4%) were locally frequent. Some of this sub-central ecotype was similar to the central ecotype 35 with high hummocks, high *Sphagnum* cover (75-90%) and pools (51-75%) but these were localised and not mapped. This area showed signs of regeneration due to blocking of drain bA to the north. A new area of sub-central ecotype to the west of Sc7 has developed (E166238/N262697). Regenerated due to blocked drain bA. The vegetation was similar to **Sc2**, but cover of *Cladonia* (11-25%) and interconnecting pools (26-33%) was higher. Overall *Sphagnum* cover was lower (34-50%) and no high hummocks were present. *Sphagnum magellanicum* (11-25%) and *S. papillosum* (11-25%) were dominant with *S. capillifolium* (5-10%), *S. cuspidatum* (5-10%) and *S. tenellum* (<4%). *Narthecium ossifragum* cover was slightly lower (<4%) than Sc2 and *Trichophorum germanicum* (<4%) was present in small amounts. *Carex panicea* (5-10%) remained frequent to locally abundant with some bare peat (<4%), but overall the *Sphagnum* layer was well developed with hummocks and lawns. Occasional patches of sub-marginal ecotype in north of area but in a mosaic with the sub-central ecotype and therefore not mapped.
- **Sc8** – this is a large sub-central area to the east of the central high bog. The vegetation was similar to **Sc2**, but cover of interconnecting pools (26-33% and higher locally), *Calluna vulgaris*

(26-33%) and *Eriophorum angustifolium* (5-10%) were higher. *Trichophorum germanicum* tussocks were present (5-10%). Overall Sphagnum cover was similar (51-75%), with high and low hummocks. *Sphagnum cuspidatum* was dominant in pools (26-33%) with *S. papillosum* (5-10%) and *S. magellanicum* (5-10%) dominant in lawns. Additional Sphagna species included *S. capillifolium* (5-10%), *S. fuscum* (<4%), *S. subnitens* (<4%), *S. tenellum* (<4%) and *S. denticulatum* (<4%). *Carex panicea* was locally frequent (<4%). The drain to the north of this area (bA) has been blocked and this has led to an increase in the mapped area of Sc8. Some areas of Sc8 had high cover of pools and Sphagnum and were similar to central complex 35, but were too localised to map. An area to the north of drain bA (previously mapped as sub-marginal ecotype) was included in Sc8 in 2012. This has similar species composition to that described above but *S. magellanicum* and *S. papillosum* lawns were dominant, with some low hummocks.

- **Sc9** – now part of **Sc8**
- **Sc10** – a small area of vegetation previously mapped as central ecotype (**C2**) was mapped as sub-central complex 6/35 in 2012. The vegetation was similar to **Sc2**, but cover of interconnecting pools (51-75%), *Calluna vulgaris* and *E. vaginatum* (11-25%) were higher (26-33%). Overall Sphagnum cover was similar (51-75%) with *Sphagnum capillifolium* dominant in lawns (11-25%) and *S. cuspidatum* dominant in pools (34-50%) and *S. papillosum* (5-10%). *Rhynchospora alba* (<4%) was present in small amounts. This habitat has some characteristics of central complex 35 but some hummocks showing signs of degradation and Sphagnum cover was patchy overall. The Sphagnum cover in the quadrat recorded in this area (previously Qc2) was similar in 2004 and 2012. It is considered that **C2** was over-valued in 2004 and should have been mapped as sub-central ecotope. Mapping in 2012 in this area was more detailed than in previous surveys, which may also account for some differences in the extent of the sub-central ecotope in this area.
- **Sc11** – a large area of sub-central vegetation on the south-western lobe of the bog. The vegetation was similar to **Sc2**, but cover of interconnecting pools (34-50%) and *E. vaginatum* (5-10%) were slightly higher (26-33%). Overall Sphagnum cover was lower (34-50%) with *Sphagnum capillifolium* dominant in hummocks (11-25%) and *S. papillosum* in lawns (11-25%). *S. cuspidatum* was occasional in pools (<4%). Additional Sphagna included *S. magellanicum* (<4%), *S. tenellum* (<4%), *S. denticulatum* (<4%) and *S. subnitens* (<4%). *Rhynchospora alba* (<4%) was present in small amounts and *R. fusca* was abundant in at least three pools within the sub-central and adjacent vegetation (E165967/ N262281 within **Sc11**). Occasional large hummocks of *S. fuscum* and *S. austinii* were present throughout the area. Small areas had the characteristics of central vegetation (*Sphagnum* cover 51-75%, high cover of pools and high

hummocks of *S. capillifolium* and *S. fuscum*) but were too small to map. Pools had some *S. cuspidatum*, high cover of open water and low algal cover. This sub-central area appeared to have increased in size, in particular on the northern and north-western boundaries. But this is considered to be the result of vegetation re-interpretation as complex 6/35 found within **Sc11** has sub-marginal vegetation characteristics.

- **Sc12** – this is a small area of sub-central vegetation to the east of **Sc11**. The vegetation was similar to Sc2, but cover of interconnecting pools (34-50%) was higher and cover of *Cladonia* species (<4%) and *Narthecium ossifragum* (<4%) slightly lower. Overall Sphagnum cover was similar (51-75%) with *Sphagnum capillifolium* dominant in hummocks (11-25%), *S. papillosum* in lawns (11-25%) and *S. cuspidatum* in pools (<34-50%). There were occasional large hummocks of *S. fuscum* and *S. austinii* and *Trichophorum germanicum* (<4%) was present in small amounts. This area was previously mapped with few points and therefore the boundary may have changed due to increased mapping detail. This area was previously mapped as 9a/10 but although *Eriophorum angustifolium* was locally abundant in the inter-pool areas, overall Sphagnum cover was very high. The area was mapped as 6/35 (high quality example), but could also have been mapped as 9/35.
- **Sc16** – new area of sub-central ecotype adjacent to Flush Z. Regenerated due to blocked drain bA. The vegetation was similar to **Sc2**, but cover of interconnecting pools (26-33%) and *Eriophorum vaginatum* (11-25%) was higher. Overall Sphagnum cover was lower (34-50%) and no high hummocks were present. *Sphagnum magellanicum* was dominant (11-25%) with *S. capillifolium* (5-10%), *S. cuspidatum* (5-10%), *S. papillosum* (5-10%), *S. austinii* (<4%) and *S. fuscum* (<4%). *Narthecium ossifragum* cover (<4%) was slightly lower than **Sc2** and *Carex panicea* (<4%), *Rhynchospora alba* (<4%) and *S. fuscum* (<4%) were present in small amounts.
- **Sc17**- This is one of the two separated areas of sub-central ecotype found where previously only **Sc10** was mapped, which now consists of **Sc10** and **Sc17**. Vegetation similar to Sc10 but slightly poorer and thus sections considered borderline sub – marginal/sub-central.
- **Sc18** – this is a newly mapped area to the east of functional drain bD in the south-east of the site. The vegetation was similar to **Sc2**, but cover of interconnecting pools (26-33%) was higher. Overall Sphagnum cover was lower (34-50%) but high and low hummocks were present. *Sphagnum papillosum* was dominant (11-25%) with *S. cuspidatum* dominant in pools (11-25%). Additional Sphagna include *S. magellanicum* (5-10%) and *S. capillifolium* (<4%). Occasional high hummocks were present. No *S. austinii* or *S. fuscum* were recorded, but *S. fuscum* was present in adjacent sub-marginal vegetation (to the north). *Carex panicea* (<4%), was present in small amounts. In 2004, marginal vegetation was recorded from this area.

Therefore it is likely that the presence of sub-central vegetation in 2012 is the result of re-wetting caused by subsidence associated with the track to the west of **Sc18**. It may be that the peat in this area is cracking and filling with water.

- **Sc19** – this is located to the south-west of **Sc11** and **Sc12** and is the result of more comprehensive mapping. The vegetation is similar to that in **Sc11** and **Sc12** and was not described separately. *Eriophorum angustifolium* was locally frequent and this area was mapped as 9/35 (6/35 variant).

Quadrats **Qsc2 (Sc8)**, **Qsc3 (Sc7)** and **Qsc4 (Sc4)** were recorded within this complex.

COMPLEX 9/7/10

- **Location:** this complex dominates **Sc1**, northern section of **Sc4** and northern section of **Sc7**
- **Ground:** very soft to quaking
- **Physical indicators:** bare peat absent
- **Calluna height:** 21-40cm
- **Cladonia cover:** <4%
- **Macro-topography:** flat
- **Pools:** regular pools 5-10%
- **Sphagnum cover:** 51-75%
- **Narthecium cover:** 5-10%
- **Micro-topography:** high hummocks, low hummocks, shallow pools and flats
- **Tussocks:** absent
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (34-50%), *Erica tetralix* (<4%), *E. vaginatum* (11-25%), *Menyanthes trifoliata* (<4%), *Carex panicea* (<4%), *Narthecium ossifragum* (5-10%), *Drosera anglica* (<4%), *Sphagnum capillifolium* (11-25%), *S. cuspidatum* (11-25%), *Sphagnum magellanicum* (11-25%), *S. papillosum* (5-10%), *Racomitrium lanuginosum* (<4%), *Cladonia portentosa* (<4%).
- **Additional comments:** *Eriophorum vaginatum* and *Calluna vulgaris* co-dominant with *Sphagnum capillifolium* in low and high hummocks. *Sphagnum magellanicum* dominant in lawns near occasional pools. Pools dominated by *Sphagnum cuspidatum* with *Menyanthes trifoliata* and *Drosera anglica*. Complex described from **Sc1**. Quadrat **Qsc3** was recorded within this complex (**Sc1**).
- **Sc4** supports similar vegetation with *Eriophorum vaginatum* and *Calluna vulgaris* co-dominant in large hummocks, *S. papillosum* dominant in lawns and pools occasional to absent. *S. austini*

occasional with overall *Sphagnum* cover high (75-91%), *Trichophorum germanicum* frequent (<4%) and *Cladonia portentosa* locally abundant (<4%).

COMPLEX 9/7 + P

- **Location:** Sc14 and small isolated patches within sub-marginal ecotype to the north of Sc1 (E 165862/N 264224) and to the north of Sc4 (E 166094 / N 2643506)
- **Ground:** soft
- **Physical indicators:** bare peat (<4%)
- **Calluna height:** 21-40cm
- **Cladonia cover:** 5-10%
- **Macro-topography:** gentle slope
- **Pools:** interconnecting pools 11-25%
- **Sphagnum cover:** 51-75%
- **Narthecium cover:** <4%
- **Micro-topography:** occasional high hummock
- **Tussocks:** *Eriophorum vaginatum* <4%
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (11-25%), *Erica tetralix* (<4%), *Eriophorum angustifolium* (5-10%), *E. vaginatum* (11-25%), *Narthecium ossifragum* (<4%), *Sphagnum capillifolium* (34-50%), *S. papillosum* (5-10%), *S. tenellum* (<4%), *S. cuspidatum* (26-33%), *Leucobryum glaucum* (<4%), *Cladonia portentosa* (5-10%).
- **Additional comments:** complex described from very localised patch within sub-marginal area and some hummocks showed signs of degradation.
- **Sc14** supports similar vegetation on flat ground, very soft to quaking with bare peat absent. Vegetation composition was similar to the description above, but cover of *Cladonia* (11-25%) and *Calluna vulgaris* (26-33%) was higher. *Eriophorum vaginatum* had slightly lower cover (5-10%). Overall *Sphagnum* cover was similar (51-75%) but with more high hummocks. *Sphagnum capillifolium* was dominant (26-33%) with *S. cuspidatum* (11-25%), *S. magellanicum* (11-25%), *S. papillosum* (5-10%) and *S. fuscum* (<4%). *Menyanthes trifoliata* (<4%), *Rhynchospora alba* (<4%), *Pleurozium schreberi* (<4%), *Dicranum scoparium* (<4%), *Racomitrium lanuginosum* (<4%), *Pleurozia purpurea* (<4%) and *Cladonia portentosa* (5-10%) were present in small amounts. This is a newly mapped area due to increased mapping detail. Mapped area contains small areas of 9/7/3 sub-marginal complex.

COMPLEX 10/9A

- **Location:** this complex dominates Sc15
- **Ground:** very soft to quaking
- **Physical indicators:** bare peat (<4%)
- **Calluna height:** 21-40cm
- **Cladonia cover:** <4%
- **Macro-topography:** depression
- **Pools:** regular pools 11-25%
- **Sphagnum cover:** 51-75%
- **Narthecium cover:** <4%
- **Micro- topography:** low hummocks, pools, flats and hollows
- **Tussocks:** *Trichophorum germanicum* (<4%)
- **Degradation or regeneration evidence:** regeneration
- **Species cover:** *Calluna vulgaris* (51-75%), *E. vaginatum* (11-25%), *Eriophorum angustifolium* (<4%), *Rhynchospora alba* (<4%), *Narthecium ossifragum* (<4%), *Sphagnum capillifolium* (11-25%), *S. cuspidatum* (<4%), *S. magellanicum* (34-50%), *S. papillosum* (<4%), *Cladonia portentosa* (<4%)
- **Additional comments:** None

COMPLEX 6 + P

- **Location:** this complex dominates Sc13
- **Ground:** soft to quaking
- **Physical indicators:** bare peat absent
- **Calluna height:** 21-40cm
- **Cladonia cover:** 5-10%
- **Macro-topography:** flat
- **Pools:** interconnecting pools 11-25%
- **Sphagnum cover:** 51-75%
- **Narthecium cover:** 5-10%
- **Micro- topography:** high hummocks, low hummocks, pools, lawns and flats
- **Tussocks:** *Eriophorum vaginatum* <4%
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (11-25%), *Erica tetralix* (<4%), *Eriophorum angustifolium* (<4%), *E. vaginatum* (<4%), *Menyanthes trifoliata* (<4%), *Trichophorum germanicum* (<4%), *Narthecium ossifragum* (5-10%), *Drosera anglica* (<4%), *Sphagnum capillifolium* (11-25%), *S. cuspidatum* (11-

25%), *S. papillosum* (5-10%), *S. austinii* (<4%), *S. subnitens* (<4%), *S. magellanicum* (<4%), *Cladonia portentosa* (5-10%).

- **Additional comments:** newly mapped area of **Sc13** as a result of more detailed survey. Pools with *Sphagnum cuspidatum*, *Narthecium ossifragum* flats and *Drosera anglica*. Hummocks of *S. capillifolium* with *S. papillosum* and *S. magellanicum* in lawns.

Active flushes

FLUSH Z

- **Location:** located in the centre of the high bog
- **Ground:** soft to very soft
- **Physical indicators:** absent
- **Calluna height:** 21-40cm
- **Cladonia cover:** 11-25%
- **Macro-topography:** depression
- **Pools:** <4%
- **Sphagnum cover:** 34-50%
- **Narthecium cover:** absent
- **Micro- topography:** low hummocks/hollows
- **Tussocks:** absent
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Molinia caerulea* (75-90%), *Calluna vulgaris* (11-25%), *Erica tetralix* (<4%), *Eriophorum angustifolium* (<4%), *Carex panicea* (<4%), *Drosera anglica* (<4%), *Trichophorum germanicum* (<4%), *Aulacomnium palustre* (<4%), *Sphagnum capillifolium* (11-25%), *S. cuspidatum* (11-25%), *S. magellanicum* (5-10%), *S. papillosum* (<4%), *Cladonia portentosa* (11-25%).
- **Additional comments:** located in the central part of flush **Z** with a small area of inactive flush to the south and a larger area to the north. Locally very wet in the vicinity of the blocked drain bA.

Degraded Raised Bog (7120)

Sub-Marginal Ecotope Complexes

COMPLEX 9/7

- **Location:** found across many sections of high bog such as surrounding Sc1,Sc2 and to the north of Sc4
- **Ground:** soft
- **Physical indicators:** absent
- **Calluna height:** 21-40cm
- **Cladonia cover:** <4%
- **Macro-topography:** flat
- **Pools:** absent
- **Sphagnum cover:** 34-50%
- **Narthecium cover:** <4%
- **Micro- topography:** low hummocks
- **Tussocks:** absent
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (51-75%), *Eriophorum vaginatum* (11-25%), *Myrica gale* (<4%), *Erica tetralix* (<4%), *Narthecium ossifragum* (<4%), *Sphagnum capillifolium* (26-33%), *S. papillosum* (<4-%), *S. tenellum* (<4%).
- **Additional comments:** highly homogenous vegetation with moderately high *Sphagnum* cover and no pools. *Cladonia* cover low overall.
 - Variant 1 – 9/7+ My: *Myrica gale* locally frequent (5-10% or higher).
 - Variant 2 – 6/7/9 + My + Ph: *Myrica gale* locally frequent (5-10% or higher) with *Phragmites australis* (5-10% or higher). Small area of this variant located to the north of flush W1.

COMPLEX 9/7/6

- **Location:** this is the most widespread sub-marginal ecotope complex on the site and is found across the entire high bog
- **Ground:** soft
- **Physical indicators:** bare peat (<4%)
- **Calluna height:** 21-40cm
- **Cladonia cover:** 11-25%
- **Macro-topography:** gentle slope
- **Pools:** absent
- **Sphagnum cover:** 26-33%
- **Narthecium cover:** 5-10%
- **Micro- topography:** low hummocks and hollows

- **Tussocks:** *Eriophorum vaginatum* (<4%)
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (34-50%), *Eriophorum vaginatum* (5-10%), *Narthecium ossifragum* (5-10%), *Sphagnum capillifolium* (11-25%), *S. papillosum* (<4%), *S. tenellum* (<4%), *S. cuspidatum* (<4%), *Cladonia portentosa* (11-25%).
- **Additional comments:** area to E of Sc1 mapped as 9/7/6, but some areas around pools had affinity with 9/7/10 but were too small to map.
 - Variant 1 – 9/7/3: *Carex panicea* locally abundant (5-10% or higher). *Rhynchospora fusca* was recorded from this complex to the west of Sc11 (E165817/ N262259).
 - Variant 2 – 6/7/9: Higher cover of *Narthecium ossifragum* (26-33%) in hollows with *Sphagnum papillosum* (5-10%) and *S. capillifolium* (5-10%) of equal cover. Lower cover of total *Sphagnum* (11-25%), *Calluna vulgaris* (26-33%) and *Eriophorum vaginatum* (<4%). *S. austinii* rare (<4%) with occasional *Andromeda polifolia* (<4%) and *Pleurozia purpurea* (<4%).
 - Variant 3 – 9/7/6 + AP: Algal pools frequent with frequent *Campylopus atrovirens* (<4%), *Pleurozia purpurea* (<4%), *Racomitrium lanuginosum* (<4%), *Erica tetralix* (<4%) and *Rhynchospora alba* (<4%). In some areas this complex variant grades to sub-central ecotype with *Sphagnum cuspidatum* in pools and increased *Sphagnum* cover but patches localised (larger areas mapped separately as sub-central ecotype).
 - Variant 4 – 9/7/2: *Carex panicea* (5-10%) frequent as in 9/7/3 but *Trichophorum germanicum* (26-33%) abundant. No pools but *S. cuspidatum* occasionally present in hollows. Lower cover of *Calluna vulgaris* (11-25%), *Eriophorum vaginatum* (<4%), *Cladonia portentosa* (5-10%) and *Sphagnum capillifolium* (5-10%). Slightly higher cover of *Erica tetralix* (5-10%), *S. papillosum* (5-10%) and *S. cuspidatum* (5-10%). *S. magellanicum* rare (<4%).
 - Variant 5 – 9A/7/6: As 9/7/6 but *Eriophorum angustifolium* locally abundant (5-10% or higher).

COMPLEX 6/3 + TP

- **Location:** this complex is mainly found surrounding sub-central ecotope (e.g. Sc2, Sc4, Sc7, Sc8, west of Sc18 and east of Sc12)
- **Ground:** soft
- **Physical indicators:** bare peat (<4%)
- **Calluna height:** 21-40cm
- **Cladonia cover:** <4%
- **Macro-topography:** flat

- **Pools:** tear pools (5-10%)
- **Sphagnum cover:** 11-25%
- **Narthecium cover:** 26-33%
- **Micro- topography:** occasional high hummocks, frequent low hummocks
- **Tussocks:** *Eriophorum vaginatum* (<4%)
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (25-33%), *Eriophorum vaginatum* (5-10%), *Erica tetralix* (<4%), *Drosera anglica* (<4%), *Menyanthes trifoliata* (<4%), *Narthecium ossifragum* (26-33%), *Sphagnum capillifolium* (5-10%), *S. tenellum* (<4%), *S. cuspidatum* (<4%), *S. denticulatum* (<4%), *Campylopus atrovirens* (<4%), *Pleurozia purpurea* (<4%), *Cladonia portentosa* (<4%).
- **Additional comments:** Some pools are algal pools but some have frequent *Sphagnum cuspidatum*. Grades to areas of sub-central ecotype (complex 6/35). *Rhynchospora fusca* was recorded from this complex to the west of the high bog (E165658/ N263469) and to the west of **Sc4** (E165923/ N263277).
 - Variant 1 – 6/3/2 + TP: Higher cover of *Carex panicea* and *Trichophorum germanicum*. Overall *Sphagnum* cover still high with locally abundant *S. capillifolium* and *S. papillosum*. *Menyanthes trifoliata* occasional in pools.
 - Variant 2 – 6/3 + AP: This was mapped in an area previously mapped as sub-central and central ecotypes (**Sc10**). This complex had occasional interconnecting pools, algal pools and hollows. Vegetation similar to 6/3 + TP as described above with low *Sphagnum* cover (11-25%) and high *Narthecium ossifragum* cover (26-33%). *Calluna vulgaris* cover was slightly lower (11-25%) and *Eriophorum vaginatum* slightly higher (11-25%) than described above. *Carex panicea* (5-10%) was locally abundant. *Sphagnum* cover was dominated by *S. capillifolium* (5-10%) with small amounts of *S. papillosum* (<4%), *S. tenellum* (<4%), *S. magellanicum* (<4%) and *S. subnitens* (<4%). Algal pools had occasional *S. cuspidatum* (<4%), *Menyanthes trifoliata* (<4%) and *Rhynchospora alba* (<4%). This area had degraded from a sub-central ecotype (mapped as **C2** in 2004 but re-interpretation of the data suggests that **C2** was actually an area of sub-central ecotope). This area could be drained by forestry to the south-east of the site as the ground slopes in that direction.
 - Quadrats **Qsm1** (former **Qc2** within previously mapped as **C2**), was recorded within this complex.

Marginal Ecotope Complexes

COMPLEX 3/6

- **Location:** this complex is found at the edge of high bog in many locations across the high bog
- **Ground:** firm
- **Physical indicators:** bare peat (<4%)
- **Calluna height:** 21-40cm
- **Cladonia cover:** <4%
- **Macro-topography:** gentle slope
- **Pools:** occasional regular pools (<4%) with bare peat at edges
- **Sphagnum cover:** 5-10%
- **Narthecium cover:** 5-10%
- **Micro- topography:** small hummocks and hollows
- **Tussocks:** *Eriophorum vaginatum* (<4%)
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (34-50%), *Eriophorum vaginatum* (5-10%), *Carex panicea* (5-10%), *Huperzia selago* (<4%), *Narthecium ossifragum* (5-10%), *Sphagnum capillifolium* (5-10%), *S. cuspidatum* (<4%), *S. tenellum* (<4%), *S. papillosum* (<4%), *S. subnitens* (5-10%), *Leucobryum glaucum* (<4%), *Pleurozia purpurea* (<4%), *Cladonia portentosa* (5-10%), *C. uncialis* (<4%), *C. furcata* (<4%).
- **Additional comments:**
- Variant 1 – 3/6 + My: areas with frequent *Myrica gale* (<4%) and abundant *Narthecium ossifragum* (11-25), poor micro-topography (low hummocks and *Narthecium ossifragum* flats), lower cover of *Sphagnum* (5-10%) and *Calluna vulgaris* (26-33%) and presence of *Rhynchospora alba* (<4%).
- Variant 2 – 3/6 + Cl: total *Cladonia* cover higher (26-33%).

COMPLEX 3/2

- **Location:** this complex is found at the edge of high bog in many locations across the high bog
- **Ground:** firm
- **Physical indicators:** bare peat (5-10%)
- **Calluna height:** 21-40cm
- **Cladonia cover:** <4%
- **Macro-topography:** gentle slope
- **Pools:** absent
- **Sphagnum cover:** 5-10%
- **Narthecium cover:** <4%
- **Micro- topography:** occasional low hummocks

- **Tussocks:** *Trichophorum germanicum* (11-25%)
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (21-40%), *Erica tetralix* (<4%), *Trichophorum germanicum* (11-25%), *Sphagnum capillifolium* (<4%), *S. cuspidatum* (<4%), *S. tenellum* (<4%), *Campylopus introflexus* (<4%), *Cladonia portentosa* (<4%), *C. uncialis* (<4%).
- **Additional comments:**
 - Variant 1 - 3/2 + ER: eroding channels present with *Rhynchospora alba* (5-10%).
 - Variant 2 - 3/2 + My: frequent *Myrica gale* (5-10%) with *Carex panicea* (<4%), *Narthecium ossifragum* (<4%), algal hollows with *Rhynchospora alba* and total *Sphagnum* cover 5-10%.

Inactive flushes

FLUSH V

- **Location:** in the south-west of the site
- **Ground:** firm
- **Physical indicators:** absent
- ***Calluna* height:** 21-40cm
- ***Cladonia* cover:** absent
- **Macro-topography:** gentle slope
- **Pools:** absent
- ***Sphagnum* cover:** <4%
- ***Narthecium* cover:** absent
- **Micro- topography:** high hummocks of *Molinia caerulea*
- **Tussocks:** *Molinia caerulea* (91-100%)
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (<4%), *Molinia caerulea* (91-100%), *Potentilla erecta* (<4%), *Salix* species (<4%), *Sphagnum cuspidatum* (<4%) and *S. papillosum* (<4%).
- **Additional comments:** Low species richness with *Molinia caerulea* tussocks dominant and occasional patches of *Sphagnum* in channels. This is a newly mapped area due to more comprehensive survey in 2012.

FLUSH W1

- **Location:** in the north of the site
- **Ground:** firm

- **Physical indicators:** absent
- **Calluna height:** 21-40cm
- **Cladonia cover:** absent
- **Macro-topography:** gentle slope
- **Pools:** absent
- **Sphagnum cover:** <4%
- **Narthecium cover:** absent
- **Micro- topography:** high hummocks of *Molinia caerulea*
- **Tussocks:** *Molinia caerulea* (91-100%)
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (<4%), *Molinia caerulea* (91-100%), *Myrica gale* (<4%), *Phragmites australis* (<4%), *Vaccinium oxycoccos* (<4%), *Andromeda polifolia* (<4%), *Erica tetralix* (<4%), *Sphagnum capillifolium* (<4%), *Cladonia portentosa* (<4%).
- **Additional comments:** Low species richness with *Molinia caerulea* tussocks dominant and occasional patches of *Sphagnum*.

FLUSH X

- **Location:** on the eastern edge of the site
- **Ground:** firm
- **Physical indicators:** absent
- **Calluna height:** 41-60cm
- **Cladonia cover:** absent
- **Macro-topography:** gentle slope
- **Pools:** absent
- **Sphagnum cover:** absent
- **Narthecium cover:** absent
- **Micro- topography:** high hummocks of *Molinia caerulea*
- **Tussocks:** *Molinia caerulea* (91-100%)
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (<4%), *Molinia caerulea* (91-100%), *Myrica gale* (<4%), *Potentilla erecta* (<4%), *Eriophorum vaginatum* (<4%) and *Sphagnum subnitens* (<4%).
- **Additional comments:** Located on old cutover at the edge of the site and vegetation grades into adjacent bog vegetation. Standing water present locally. *Salix* saplings and small shrubs present. A newly mapped area to the south may be the result of more detailed mapping. This

has *Eriophorum vaginatum* and *Calluna vulgaris* and is similar to 9/7/2 sub-marginal complex. However, *Molinia caerulea* is abundant (34-50%) with frequent *Myrica gale*. Sphagnum is locally frequent (*S. capillifolium*, *S. papillosum* and *S. subnitens*) but lower than 50% cover overall so this area of the flush is also inactive.

FLUSH X1

- **Location:** in the north-east of the site
- **Ground:** firm
- **Physical indicators:** absent
- **Calluna height:** 21-40cm
- **Cladonia cover:** absent
- **Macro-topography:** gentle slope
- **Pools:** absent
- **Sphagnum cover:** 11-25%
- **Narthecium cover:** absent
- **Micro- topography:** high hummocks of *Molinia caerulea*
- **Tussocks:** *Molinia caerulea* (51-75%)
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (5-10%), *Molinia caerulea* (51-75%), *Myrica gale* (<4%), *Potentilla erecta* (<4%), *Erica tetralix* (<4%), *Polygala serpyllifolia* (<4%), *Sphagnum capillifolium* (<4%), *S. subnitens* (<4%), *S. papillosum* (<4%),
- **Additional comments:** Low species richness with *Molinia caerulea* tussocks dominant and occasional patches of *Sphagnum*.

FLUSH Y

- **Location:** to the north-east of the high bog
- **Ground:** firm
- **Physical indicators:** absent
- **Calluna height:** absent
- **Cladonia cover:** absent
- **Macro-topography:** gentle slope
- **Pools:** absent
- **Sphagnum cover:** 5-10%
- **Narthecium cover:** absent

- **Micro- topography:** high hummocks of *Molinia caerulea*
- **Tussocks:** *Molinia caerulea* (91-100%)
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Molinia caerulea* (91-100%), *Myrica gale* (<4%), *Potentilla erecta* (<4%), *Erica tetralix* (<4%), *Sphagnum capillifolium* (<4%), *S. fallax* (<4%).
- **Additional comments:** None

FLUSH Z

- **Location:** centre of high bog
- **Ground:** firm
- **Physical indicators:** absent
- **Calluna height:** absent
- **Cladonia cover:** absent
- **Macro-topography:** slight depression
- **Pools:** absent
- **Sphagnum cover:** absent
- **Narthecium cover:** absent
- **Micro- topography:** high hummocks of *Molinia caerulea*
- **Tussocks:** *Molinia caerulea* (91-100%)
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Molinia caerulea* (91-100%).
- **Additional comments:** vegetation described from inactive area of Flush Z located in the south-east of the flush. Species-poor and dominated by *Molinia caerulea*. The northern section was also dominated by *Molinia caerulea*, but *Salix* species were also occasional (<4%) on the edges and within the flush. *Pteridium aquilinum* was also occasional (<4%).

FLUSH Z1

- **Location:** in the north-west of the site
- **Ground:** firm
- **Physical indicators:** absent
- **Calluna height:** 21-40cm
- **Cladonia cover:** absent
- **Macro-topography:** depression
- **Pools:** absent

- **Sphagnum cover:** <4%
- **Narthecium cover:** absent
- **Micro- topography:** high hummocks of *Molinia caerulea*
- **Tussocks:** *Molinia caerulea* (91-100%)
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (<4%), *Molinia caerulea* (91-100%), *Potentilla erecta* (<4%), *Polygala serpyllifolia* (<4%), *Vaccinium myrtillus* (<4%), *Agrostis stolonifera* (<4%), *Sphagnum capillifolium* (<4%), *Polytrichum strictum* (<4%), *Cladonia portentosa* (<4%).
- **Additional comments:** Some standing water, very low species richness with *Molinia caerulea* tussocks dominant and low bryophyte cover.

Face bank Complexes

COMPLEX 1

- **Location:** this complex is found at the edge of high bog in many locations across the high bog
- **Ground:** firm
- **Physical indicators:** absent
- **Calluna height:** 41-60 cm
- **Cladonia cover:** 26-33%
- **Macro-topography:** steep slope
- **Pools:** absent
- **Sphagnum cover:** generally absent but <4% in places
- **Narthecium cover:** absent
- **Micro- topography:** tall robust *Calluna vulgaris*
- **Tussocks:** absent
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (76-90%), *Cladonia portentosa* (26-33%), *Eriophorum angustifolium* (<4%), *Pteridium aquilinum* (<4%), *Hypnum jutlandicum* (26-33%), *Cladonia portentosa* (26-33%).
- **Additional comments:** none

Clearfells

CLEARFELL 1

CF1 area was not surveyed in 2012. Its surveying in future monitoring surveys is recommended.

Bog Woodland (91D0)

None present

Depressions on peat substrates of the Rhynchosporion (7150)

The habitat occurs at Lisnageeragh Bog in both Active and Degraded Raised Bog, but it is only occasional found on degraded habitat. Both *Rhynchospora alba* and *R. fusca* were recorded within the 2012 survey at this site.

R. alba was found in several different ecotopes in Lisnageeragh Bog, such as: central ecotope (35); sub-central ecotope (6/35; 9/7 + P; 10/9A); sub-marginal ecotope (9/7/6 +P; 6/3 + TP); and marginal ecotope (3/2; 3/2). *R. fusca* was found in sub-central ecotope (6/35) only.

The Rhynchosporion vegetation occurred within *Sphagnum* hollows and along *Sphagnum* pool edges and in lawns. Typical plant species included *Rhynchospora alba* (usually less than 4% cover at this site), *Sphagnum cuspidatum*, *S. papillosum*, *S. magellanicum*, *S. papillosum*, *Drosera anglica* and *Eriophorum angustifolium*.

Appendix II Photographical records

Photograph Number	Aspect	Type	Feature	Date
106-0674	NE	Overview	Qc1	26/09/2012
106-0669	NE	Overview	Qsc1	25/09/2012
106-0677	NE	Overview	Qsc2	27/09/2012
106-0676	NE	Overview	Qsc3	27/09/2012
106-0675	NE	Overview	Qsc4	26/09/2012
106-0678	NE	Overview	Qsm1	27/09/2012

Appendix III Quadrats

Ecotope type	Central	Central	Central	Sub-marginal
Complex Name	15	35	35	6/3 + AP
Quadrat Name	Qc1	Qc1	Qc2	Qsm1
Easting	166087	166090.50	166568	166570.31
Northing	263353	263357.73	262555	262559.68
Date	15/11/2004	26/09/2012	15/11/2004	27/09/2012
Firmness	Very soft	Quaking	Firm-soft	Soft
Burnt	No	No	No	No
Algae in hollows %	Absent	Absent	Absent	Absent
Algae in pools %	Absent	Absent	4-10	Absent
Bare peat %	Absent	Absent	Absent	Absent
High hummocks %	Na	1-3 (many indiv)	na	Absent
Low hummocks %	4-10	11-25	11-25	11-25
Hollows %	11-25	Absent	11-25	Absent
Lawns %	Absent	Absent	Absent	Absent
Pools %	34-50	51-75	na	Absent
Pool type	Interconnecting	Interconnecting	Interconnecting	Regular
S.austinii hum type	Na	Absent	na	Absent
S.austinii hum %	4-10	Absent	Absent	Absent
S.austinii height(cm)	Na	Absent	na	Absent
S.fuscum hum type	Na	Absent	na	Absent
S.fuscum hum %	Absent	Absent	Absent	Absent
S.fuscum height(cm)	Na	Absent	na	Absent
Leucobryum glaucum	Absent	Absent	Absent	Absent
Trichophorum type	Tussocks	Absent	Tussocks	Absent
Trichophorum %	4-10	Absent	1-3 (many indiv)	Absent
S.magellanicum %	4-10	Absent	4-10	4-10
S.cuspidatum %	11-25	51-75	11-25	1-3 (many indiv)
S.papillosum %	4-10	4-10	4-10	Absent
S.denticulatum %	Absent	Absent	Absent	Absent
S.capillifolium%	4-10	26-33	11-25	4-10
S.tenellum %	Na	Absent	na	Absent
S.subnitens %	Absent	1-3 (many indiv)	Absent	4-10

Ecotope type	Central	Central	Central	Sub-marginal
Complex Name	15	35	35	6/3 + AP
R.fusca %	Absent	Absent	Absent	Absent
R.alba %	4-10	4-10	4-10	1-3 (many indiv)
N.ossifragum %	Na	1-3 (many indiv)	4-10	26-33
Sphag pools %	11-25	51-75	na	Absent
Dominant pool Sphag	S. cuspidatum	S. cuspidatum	S. cuspidatum	S. cuspidatum
Sphag lawns %	Absent	4-10	Absent	4-10
Sphag humm %	4-10	11-25	11-25	Absent
Sphag holl %	4-10	Absent	4-10	Absent
Total Sphag %	41-50	76-90	41-50	34-50
Hummocks indicators	S. austinii	Absent	Absent	Absent
Cladonia portent %	4-10	4-10	4-10	4-10
Other Cladonia sp	Na	Cladonia uncialis	na	Cladonia uncialis
C. panicea %	Absent	Absent	Absent	4-10
Calluna cover %	4-10	26-33	11-25	11-25
Calluna height(cm)	11-20	Absent	21-30	21-30
Other Notable Species		Pleurozia purpurea		na
Other comment		Quadrat differences due to location. Re-classification of complex due to re-interpretation of data		Degraded to SM from C ecotope. Re-interpretation of 204 data suggests that this should have been previously mapped as SC

Ecotope type	Sub-Central	Sub-Central	Sub-Central	Sub-Central
Complex Name	9/7/10	9/7/10	35	6/35
Quadrat Name	Qsc1	Qsc1	Qsc2	Qsc2
Easting	165860	165860.78	166712	166692.13
Northing	264052	264055.72	262777	262763.40
Date	15/11/2004	25/09/2012	15/11/2004	27/09/2012
Firmness	Quaking	Very soft	Soft	Very soft
Burnt	No	No	No	No
Algae in hollows %	Absent	Absent	Absent	Absent
Algae in pools %	Absent	Absent	26-33	Absent
Bare peat %	Absent	Absent	Absent	Absent
High hummocks %	Na	91-100	na	4-10
Low hummocks %	51-75	4-10	4-10	11-25

Ecotope type	Sub-Central	Sub-Central	Sub-Central	Sub-Central
Complex Name	9/7/10	9/7/10	35	6/35
Hollows %	4-10	Absent	4-10	Absent
Lawns %	Absent	Absent	Absent	11-25
Pools %	26-33	Absent	34-50	11-25
Pool type	Regular	Absent	Interconnecting	Interconnecting
S.austinii hum type	Na	Absent	na	Absent
S.austinii hum %	Absent	Absent	4-10	Absent
S.austinii height(cm)	Na	Absent	na	Absent
S.fuscum hum type	Na	Absent	na	Active
S.fuscum hum %	Absent	Absent	1-3 (many indiv)	4-10
S.fuscum height(cm)	Na	Absent	na	11-20
Leucobryum glaucum	Absent	Absent	Absent	Absent
Trichophorum type	Tussocks	Absent	Tussocks	Tussocks
Trichophorum %	1-3 (many indiv)	Absent	4-10	4-10
S.magellanicum %	4-10	1-3 (many indiv)	1-3 (many indiv)	11-25
S.cuspidatum %	4-10	Absent	4-10	11-25
S.papillosum %	4-10	1-3 (many indiv)	4-10	1-3 (many indiv)
S.denticulatum %	Absent	Absent	Absent	Absent
S.capillifolium%	41-50	91-100	4-10	11-25
S.tenellum %	Na	Absent	na	1-3 (many indiv)
S.subnitens %	4-10	Absent	Absent	4-10
R.fusca %	Absent	Absent	Absent	Absent
R.alba %	Absent	Absent	4-10	4-10
N.ossifragum %	4-10	1-3 (few indiv)	4-10	4-10
Sphag pools %	26-33	Absent	11-25	11-25
Dominant pool Sphag	S. cuspidatum	na	S. cuspidatum	S. cuspidatum
Sphag lawns %	Absent	Absent	Absent	11-25
Sphag humm %	51-75	91-100	4-10	26-33
Sphag holl %	4-10	Absent	4-10	Absent
Total Sphag %	76-90	91-100	11-25	51-75
Hummocks indicators	Absent	Absent	S.austinii & S.fuscum	S.fuscum
Cladonia portent %	4-10	4-10	4-10	4-10
Other Cladonia sp	Na		na	Cladonia uncialis
C. panicea %	4-10	1-3 (few indiv)	Absent	4-10
Calluna cover %	26-33	51-75	4-10	26-33

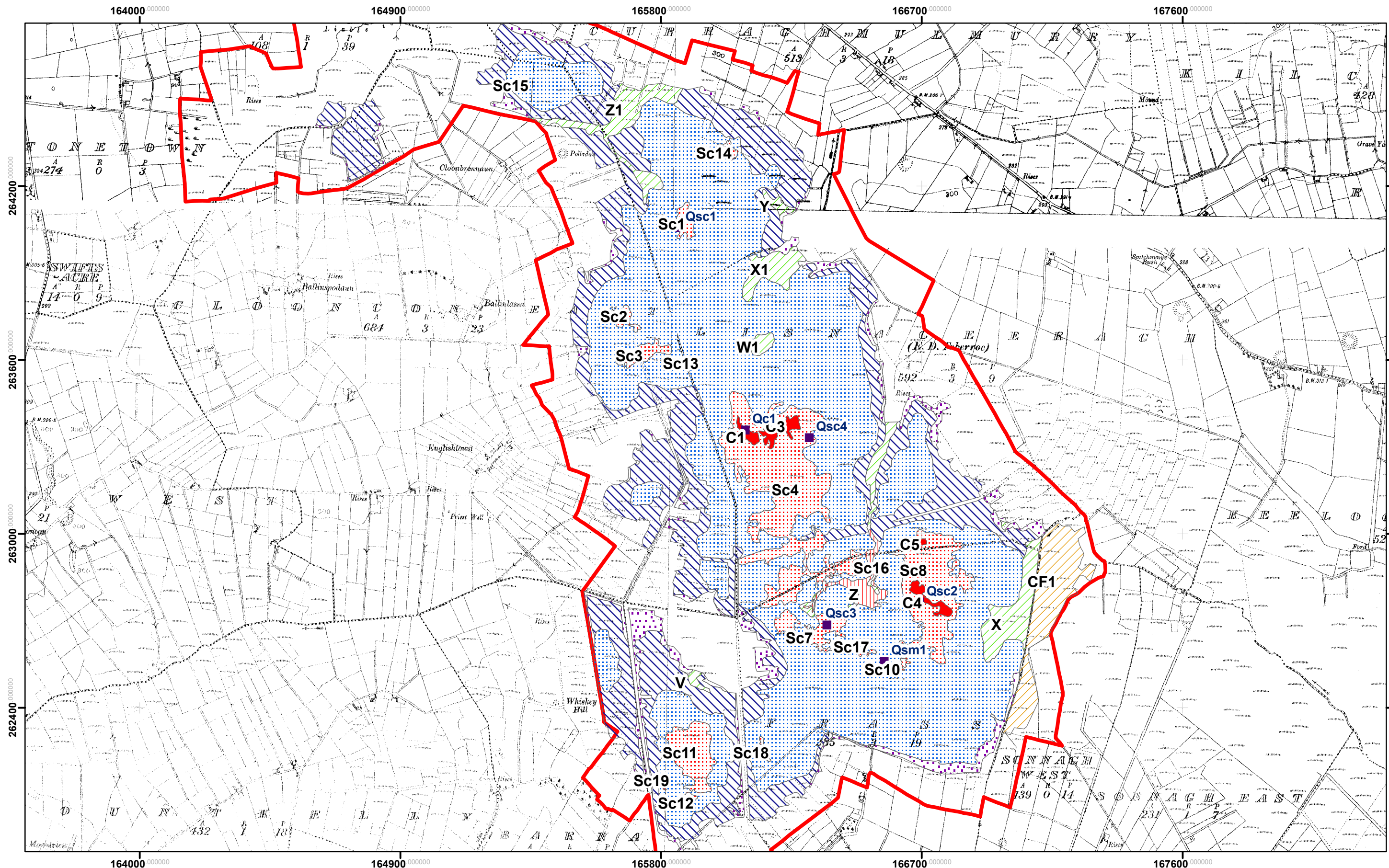
Ecotope type	Sub-Central	Sub-Central	Sub-Central	Sub-Central
Complex Name	9/7/10	9/7/10	35	6/35
Calluna height(cm)	21-30	11-20	21-30	21-30
Other Notable Species	Myrica gale	Menyanthes trifoliata	Racomitrium lanuginosum; Campylopus atrovirens	Campylopus atrovirens
Other comment		Changes from 2004 due to quadrat location		Changes from 2004 due to quadrat location

Ecotope type	Sub-central	Sub-central	Sub-central	Sub-central
Complex Name	35-	6/35	6/35-	6/35
Quadrat Name	Qsc3	Qsc3	Qsc4	Qsc4
Easting	166366	166372.63	166304	166311.49
Northing	262684	262685.46	263322	263330.99
Date	15/11/2004	27/09/2012	15/11/2004	26/09/2012
Firmness	Soft	Very soft	Soft	Soft
Burnt	No	No	No	No
Algae in hollows %	Absent	Absent	Absent	Absent
Algae in pools %	11-25	Absent	Absent	Absent
Bare peat %	Absent	Absent	Absent	Absent
High hummocks %	Na	4-10	na	4-10
Low hummocks %	4-10	11-25	4-10	11-25
Hollows %	4-10	Absent	4-10	Absent
Lawns %	4-10	26-33	Absent	Absent
Pools %	11-25	26-33	11-25	34-50
Pool type	Interconnecting	Interconnecting	Interconnecting	Interconnecting
S.austinii hum type	Na	Absent	na	Absent
S.austinii hum %	1-3 (many indiv)	Absent	Absent	Absent
S.austinii height(cm)	Na	Absent	na	Absent
S.fuscum hum type	Na	Active	na	Absent
S.fuscum hum %	1-3 (many indiv)	4-10	Absent	Absent
S.fuscum height(cm)	Na	0-10	na	Absent
Leucobryum glaucum	Absent	Absent	Absent	Absent
Trichophorum type	Tussocks	Absent	Absent	Flats
Trichophorum %	1-3 (many indiv)	Absent	Absent	Absent
S.magellanicum %	4-10	Absent	Absent	Absent
S.cuspidatum %	4-10	26-33	11-25	34-50

Ecotope type	Sub-central	Sub-central	Sub-central	Sub-central
Complex Name	35-	6/35	6/35-	6/35
S.papillosum %	4-10	11-25	4-10	11-25
S.denticulatum %	4-10	Absent	Absent	Absent
S.capillifolium%	4-10	26-33	4-10	11-25
S.tenellum %	Na	1-3 (many indiv)	na	1-3 (many indiv)
S.subnitens %	Absent	1-3 (few indiv)	Absent	4-10
R.fusca %	Absent	Absent	Absent	Absent
R.alba %	4-10	1-3 (many indiv)	4-10	Absent
N.ossifragum %	4-10	1-3 (many indiv)	11-25	4-10
Sphag pools %	4-10	26-33	11-25	34-50
Dominant pool Sphag	S. cuspidatum	S. cuspidatum	S. cuspidatum	S. cuspidatum
Sphag lawns %	4-10	26-33	Absent	4-10
Sphag humm %	4-10	26-33	4-10	26-33
Sphag holl %	4-10	Absent	4-10	Absent
Total Sphag %	11-25	51-75	11-25	34-50
Hummocks indicators	S. austinii & S. fuscum	S. fuscum	Absent	Absent
Cladonia portent %	4-10	4-10	4-10	4-10
Other Cladonia sp	Na	Cladonia uncialis	na	na
C. panicea %	Absent	1-3 (many indiv)	Absent	4-10
Calluna cover %	Na	11-25	4-10	26-33
Calluna height(cm)	21-30	21-30	21-30	Absent
Other Notable Species		Menyanthes trifoliata; Racomitrium lanuginosum	Racomitrium lanuginosum; Campylopus atrovirens; Campylopus introflexus	Menyanthes trifoliata,; Racomitrium lanuginosum; Campylopus atrovirens
Other comment		Differences due to increased habitat quality in 2012		Differences due to increased habitat quality in 2012

Note: Data for those 2004 quadrats re-surveyed in 2012 is given to the right of the original 2004 quadrat data in table above. Some 2004 quadrats may have been given a different ecotope category in 2012; further detail justifying the re-classification is given within the report.

Appendix IV Survey maps



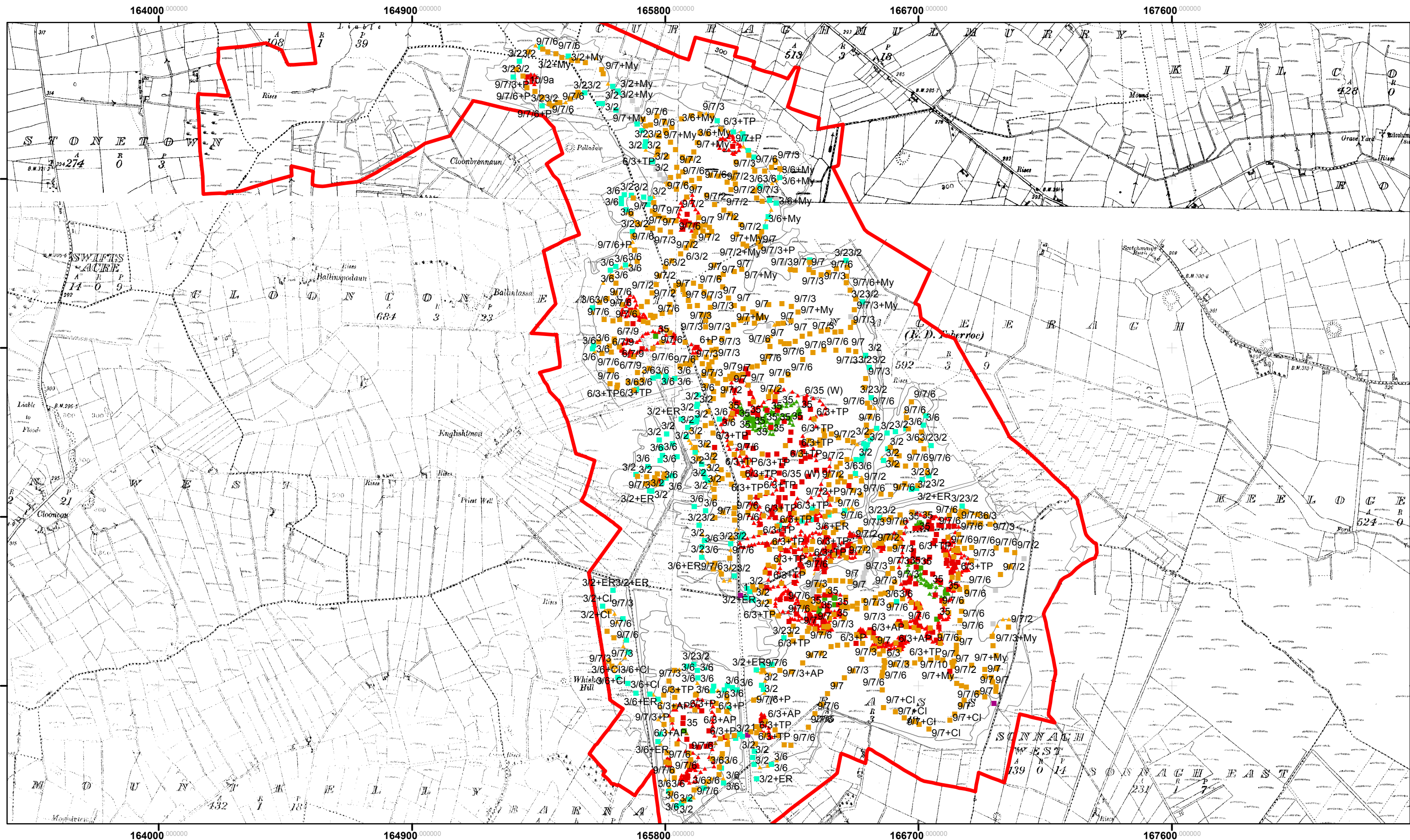
Raised Bog Monitoring & Assessment Survey 2013
Map 1: Ecotopes Map and Quadrats
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Lisnageeragh SAC (000296)
Co. Galway



Legend

Quadrat	Active Flush	Face bank
Ecotope type	Sub-marginal	Open water
Central	Marginal	Conifer plantation
Sub-central	Inactive Flush	Clear felled area
Bog Woodland	Woodland	SAC



Raised Bog Monitoring & Assessment Survey 2013

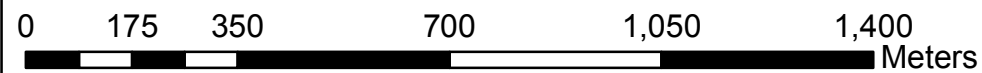
Map 2: Vegetation community complexes

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Lisnageeragh SAC (000296) Co. Galway

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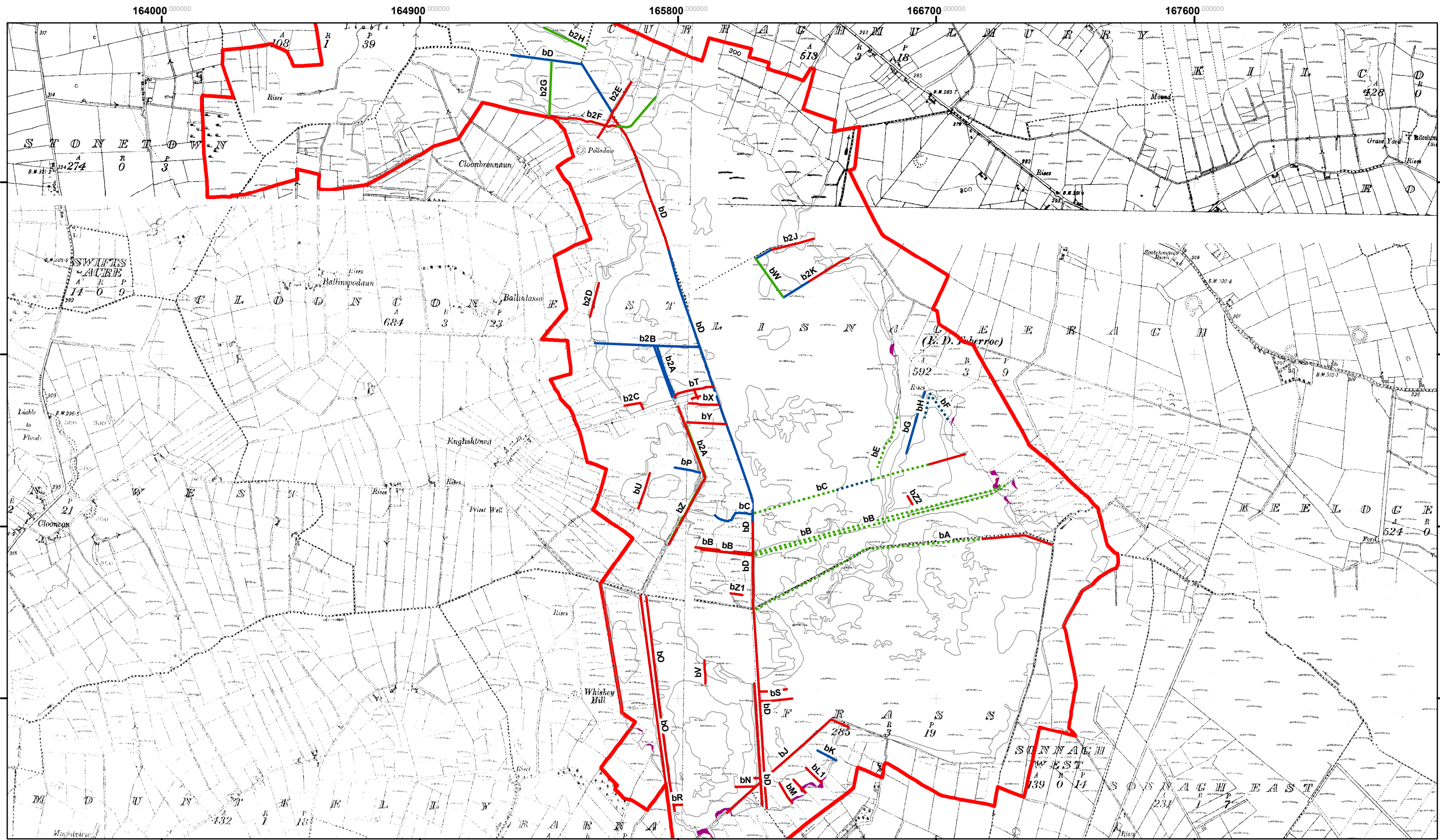
Legend

Ecotope type

- Central ecotope complex
- Sub-central ecotope complex
- Sub-marginal ecotope complex
- Marginal ecotope complex
- Face bank ecotope complex

Boundary type

- Flush
- ▲ SC/C
- ▲ F/C
- ▲ SM/C
- ▲ M/C
- ▲ F/SC
- ▲ SM/SC
- ▲ M/SC
- ▲ FB/SC
- ▲ F/SM
- ▲ M/SM
- ▲ SM/FB
- ▲ F/M
- ▲ M/FB
- ▲ F/FB
- ▲ Other
- SAC



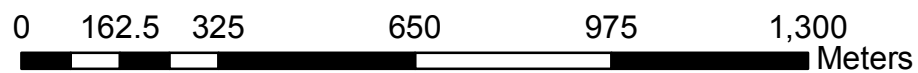
Raised Bog Monitoring & Assessment Survey 2013
Map 3: Impacts (High bog drainage; Turf cutting; Fire events)

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Lisnageeragh SAC (000296)
Co. Galway

1:12,500



Legend

- | | | |
|-----------------------------------|-----------------------------------|-------|
| High Bog drainage | — Not blocked: functional | □ SAC |
| Blocked: non-functional | — Not blocked: non-functional | |
| Blocked: reduced functional | — Not blocked: reduced functional | |
| | ■ Burnt high bog (2004/05-12/13) | |
| | ■ High bog cutaway (2004/05-10) | |