

Kilcarren Bog (SAC 000647), Co. Tipperary

Executive Summary

This survey, carried out in September 2011, aimed to assess the conservation status of habitats listed on Annex I of the European Habitats Directive (92/43EEC) on the high bog at Kilcarren 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 11.9ha (6.58%) of the high bog area. The highest quality example of Active Raised Bog consists of *Sphagnum* lawns, pools, hummocks and hollows in central complexes 15 and 10/15. *Sphagnum* cover reaches 100% in certain parts of complex 15, but this complex occupies only a very small area of central ecotope. Most of the Active Raised Bog at the site consists of sub-central ecotope, where pools are generally absent. Active Raised Bog also includes some active peat forming flushes.

Degraded Raised Bog covers 168.94ha (93.42%) 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. Degraded Raised Bog also includes some inactive flushes.

Depressions on peat substrates of the Rhynchosporion are found in both Active and Degraded Raised Bog, but tended to be best developed and most stable in the wettest areas of Active Raised Bog.

No physical management actions such as the blocking of drains have been carried out at the site. However, the NPWS has engaged in negotiation with landowners in order to gain turbary and ownership rights of various turf-cutting plots around the bog and this has contributed to the fact that turf cutting no longer takes place at Kilcarren Bog.

The current conservation objective for Kilcarren 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 130.32ha. 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 to 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 a slight decrease in the area of Active Raised Bog (2.22ha) at Kilcarren Bog in the 2005 to 2011 period. This loss has all been from sub-central ecotope with the largest losses occurring in the north-east of the high bog from former **Sc7**, **Sc8**, **Sc9** and former **Sc10**. There was also some loss of sub-central ecotope (former **Sc12**) in the north-west.

There are approximately 6.5km of drains on the high bog that are functional to some degree. Although most of these are considered to be reduced functional and are continuing to infill, they are still impacting on the high bog habitats and will continue to do so until they are blocked and/or become completely in-filled and thus non-functional. Cutover drainage (peripheral drainage) associated with former peat cutting is also present along the south and northeast cutover. Furthermore, drainage maintenance, associated with agricultural improvements, has taken place in 2005-11 on the north-west and south-east cutovers. In addition, the drain running parallel to the road separating Firville from Kilcarren Bogs is also likely to be impacting negatively on the high bog habitats.

A recent burn (2009/10) damaged 12.32% of high bog (22ha). Peat cutting no longer takes place at the site. Although *Pinus sylvestris* trees are present on the high bog, they do not pose a major threat to high bog habitats.

Active Raised Bog has been given an overall **Unfavourable Bad-Declining** conservation status assessment. Habitat Area has slightly decreased and the quality remained stable in the

reporting period. However, both are below favourable reference values. Future Prospects are considered Unfavourable Bad–Declining as high bog and cutover drainage continues to hinder the restoration of active peat forming communities.

Degraded Raised Bog has been given an overall **Unfavourable Bad-Declining** assessment and **Rhynchosporion depressions** has been given an overall **Unfavourable Bad-Declining** conservation status assessment because there has been some loss of associated habitats (Active Raised Bog).

The **overall raised bog** at **Kilcarren SAC** (part of Kilcarren and Firville SAC) has been given an **Unfavourable Bad-Declining** assessment.

A series of **recommendations** have been also given, these include: restoration works including the blocking of any functional or reduced functional high bog drains (and possibly cutover drains), further hydrological and topographical studies to ascertain more accurate FRVs; further botanical monitoring surveys on the high bog and an impact assessment of maintenance works on adjacent land drainage with a view to the potential of blocking these drains.

Site identification

SAC Site Code	000647	6" Sheet:	TY: 4/7
Grid Reference:	E 193000 / N 202000	1:50,000 Sheet:	53
High Bog area (ha) ¹ :	180.84ha		
Dates of Visit:	29 to 30/09/11		
Townlands:	Kilregane, Drumkilfadda, Dary and Kilcarren		

Site location

Kilcarren Bog is located in N. Tipperary approximately 13km SW of Birr, Co. Offaly on the west side of the Birr to Borrisokane road. Access to the bog is from the road in the east of the site. The R438 road linking Birr and Borrisokane separates it from Firville Bog (part of the same SAC). These two bogs are two of a group located at the mid-south of the main distribution of raised bogs in Ireland. Ballyduff and Clonfinane Bogs (both SAC 641) lie 5km to the ENE of the site and Arraghmore Bog (NHA 640) lies 1km to the east.

Description of the survey

The survey was carried out in September 2011 and involved a vegetation survey of the high bog at Kilcarren Bog and the recording of impacting activities affecting high bog vegetation. A similar survey was carried out in 2005 by Fernandez *et al.* (2005). High bog vegetation was described and mapped, based on raised bog ecotope vegetation community complexes developed by Kelly *et al.* (1995). 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

¹ This figure is slightly smaller than the one given in 2005, as a result of improvement on mapping accuracy; based on 2010 aerial photography.

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 Kilcarren Bog was re-surveyed. Sections mapped as sub-marginal, sub-central and central ecotope in 2005 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 2005 project (Fernandez *et al.* 2005) were re-surveyed and additional quadrats were recorded where necessary (see Appendix III). The size of quadrats was 4m x 4m.

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

This is a level bog with a shallow dome that elongates in an NW/SE direction. According to Cross (1990) this is a True Midland Raised Bog and it was classified as Ridge Basin Bog type which is situated at the top of a river valley.

Ecological information

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

The following Raised Bog EU Annex I habitats, are found in Kilcarren 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 at Kilcarren Bog is 11.9 ha (6.58% of the high bog), which is a decrease of 15.6ha since 1994.

Active Raised Bog includes central and sub-central ecotope as well as active flushes.

Central ecotope was found in Kilcarren Bog at one location (C1) and sub-central ecotope at thirteen locations (Sc1 to Sc13) (see Appendix IV, Map 1). The highest quality Active Raised Bog sections consist of central ecotope (vegetation community complex 15 and 10/15) in a depressed area featuring hummocks, lawns, hollows, and pools. *Sphagnum* cover ranges from 75 to 90%, but reaches >90% in places, and consists of *Sphagnum cuspidatum* dominated pools with lawns of *S. magellanicum*, low hummocks of *S. papillosum* and hummocks of *S. capillifolium* subsp. *rubellum*, *S. austinii* and *S. fuscum*. Other species present include *Calluna vulgaris* (11-25%), *Erica tetralix* (4-10%), *Eriophorum vaginatum* (4-10%), *E. angustifolium* (<4%), *Narthecium ossifragum* (<4%), *Rhynchospora alba* (11-25%), *Menyanthes trifoliata* and *Drosera anglica*.

Most of the Active Raised Bog at the site consists of sub-central ecotope, where pools are generally absent, less defined or support a lower cover of *Sphagnum cuspidatum*. The overall *Sphagnum* cover is also lower (generally 34-50% but higher in places). Complexes 9/10 and 9a/10 are the most dominant and are characterised by an abundance of *Eriophorum vaginatum* and *E. angustifolium* respectively. Other sub-central complexes found on Kilcarren Bog include 4/10, 9/7/6 + P and 9/7/10. Active Raised Bog also includes some active peat forming flushes.

Degraded Raised Bog (7120)

The current area of Degraded Raised Bog at Kilcarren Bog is 168.94ha (93.42% 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 features the most developed micro-topography within Degraded Raised Bog, with higher presence of hummocks and hollows (frequently dominated by *Narthecium ossifragum* and only occasionally *Sphagnum cuspidatum* and *S. tenellum*). *Sphagnum* covers up to 40% of the ground and mostly consists of *S. capillifolium* subsp. *rubellum*. *S. papillosum*, *S. magellanicum*, *S. tenellum*, *S. subnitens* and *S. cuspidatum* are also present. Very occasionally *S. austinii* and *S. fuscum* hummocks are found. *Calluna vulgaris*, *Erica tetralix*, *Eriophorum vaginatum*, *E. angustifolium*,

Rhynchospora alba, *N. ossifragum* and *Trichophorum germanicum* are also common at various degrees of coverage across the high bog.

Marginal ecotope is slightly drier than sub-marginal ecotope and mainly occurs as a narrow band near the margins of the high bog. Micro-topography consists of *C. vulgaris* hummocks, low *Sphagnum* hummocks, flats and very occasionally hollows. The *Sphagnum* cover is even lower here than in the sub-marginal ecotope (<10%) and the vegetation is characterised by higher cover of *N. ossifragum*, *T. germanicum* and *C. vulgaris*.

Face bank ecotope is characterised by firm ground, tall *C. vulgaris*, poor *Sphagnum* cover and flat micro-topography.

The high bog also features scattered *Betula pubescens* and *Pinus sylvestris* trees.

Depressions on peat substrates of the Rhynchosporion (7150)

Rhynchosporion vegetation is widespread on Kilcarren Bog. It is found in both Active and Degraded Raised Bog, but tends to be best developed and most stable in the wettest areas of Active Raised Bog. In these areas, the Rhynchosporion vegetation occurs along pool edges and on lawns underlain by deep, wet and quaking peat. Typical plant species include *Rhynchospora alba*, *Sphagnum cuspidatum*, *S. magellanicum*, *S. papillosum*, *Drosera anglica* and *Eriophorum angustifolium*.

R. alba was also found within degraded raised bog, but always associated with wet features such as hollows.

Detailed vegetation description of the high bog

A detailed description of high bog vegetation recorded during the 2011 survey of Kilcarren 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 Kilcarren 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) affected	Location	Habitat affected
C01.03	Peat extraction	M	-1	0.10ha cut away	2 different locations: to the west and south of high bog	7110/7120/7150
J02.07	Drainage	H	-1	6.559km ¹	On HB	7110/7120/7150
J02.07	Drainage	M	-1	n/av	Adjacent to HB	7110/7120/7150
J01	Fire	L	-1	22ha	On HB	7110/7120/7150
I02	Problematic native species	L	-1	<0.05ha	On HB	7110/7120/7150
G01.03	Motorised vehicles	L	-1	<0.05ha	On HB	7110/7120/7150
B01.02	Artificial planting on open ground (non-native trees)	L	-1	Unknown	Adjacent to HB	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 reduce-functional drains.

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

Peat cutting

Although peat cutting has apparently ceased at Kilcarren Bog in recent years (no peat cutting recorded in 2012/13), this activity has reduced the area of high bog by 0.10ha in the 2005-2011 period. In addition, old face banks and high bog and cutover drainage associated with past cutting continue to negatively impact on the high bog habitats. Therefore, this activity is considered to have had a medium importance/impact on high bog habitats in the reporting period.

Drainage

High bog drainage

Table 6.2 shows that there has been no change in the status of high bog drains. The majority of drains on the high bog remain either reduced functional (5.726km) or functional (0.833km). Both types of drains are negatively impacting on high bog habitats and will continue to do so until they are blocked and/or become completely in filled and thus non-functional.

High bog drains and flushes FV and FW, also associated with drainage, are considered to have high importance/impact on high bog habitats.

Table 6.2 High bog drainage summary

Status	2005 (km) ¹	2011 (km)	Change
NB: functional	0.833	0.833	0.000
NB: reduced functional	5.726	5.726	0.000
NB: non- functional	3.425	3.425	0.000
B: functional	n/a	n/a	n/a
B: reduced functional	n/a	n/a	n/a
B: non- functional	n/a	n/a	n/a

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 slight vary 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 Kilcarren Bog including any change in their functionality in the 2005 – 2011 reporting period (see Map 3).

Table 6.3 High bog drainage detail

Drain Name	Length (km)	2005 status	2011 status	Change	Comment
bA	0.135	NB: non-functional	NB: non- functional	No	
bB	0.095	NB: functional	NB: functional	No	This section of the

					drain was wrongly classified as non-functional in 2005.
bB	0.265	NB: reduced functional	NB: reduced functional	No	This section of the drain was wrongly classified as non-functional in 2005.
bB	0.786	NB: non-functional	NB: non- functional	No	
bC	0.372	NB: reduced functional	NB: reduced functional	No	
bC1&bC4	1.561	NB: reduced functional	NB: reduced functional	No	
bC2	0.036	NB: functional	NB: functional	No	
bC3	0.036	NB: non-functional	NB: non- functional	No	
bD	0.025	NB: functional	NB: functional	No	
bE	0.050	NB: reduced functional	NB: reduced functional	No	
bH	2.108	NB: reduced functional	NB: reduced functional	No	This drain complex was not properly mapped in 2005. Some of the drain may not be functional.
bJ	0.411	NB: reduced functional	NB: reduced functional	No	
bK	0.478	NB: non-functional	NB: non- functional	No	
bL	0.611	NB: reduced functional	NB: reduced functional	No	
bM	0.313	NB: functional	NB: functional	No	
bM	0.080	NB: reduced functional	NB: reduced functional	No	

bN	0.052	NB: reduced functional	NB: reduced functional	No
bO	0.138	NB: functional	NB: functional	No
bP	0.216	NB: reduced functional	NB: reduced functional	No
bQ	1.578	NB: non-functional	NB: non- functional	No
bR	0.059	NB: functional	NB: functional	No
bS	0.112	NB: functional	NB: functional	No
bT	0.055	NB: functional	NB: functional	No
bT	0.412	NB: non-functional	NB: non- functional	No

Bog margin drainage

The cutover areas were not surveyed for drains during 2011.

Cutover drains associated with former peat cutting are present along the south and northeast cutover. These drains continue draining the high bog and impacting on high bog habitats.

The drain running parallel to the road separating both Kilcarren and Ballyduff Bogs is also likely to have some negative influence on high bog habitats.

Drainage maintenance is evident on the 2010 aerial photograph along the northwest margin of high bog, associated with agriculture improvements, as well as to the south of FW and FV. According to NPWS regional staff (Jones pers. comm., 2011) drainage maintenance work was undertaken on the cutover bog/agricultural land to the south east of the south eastern end of the site in the 2005-2011 reporting period.

Fernandez *et al.* (2005) also mentioned the negative influence of peripheral drainage along the north-eastern section of the high bog and its connection with the decline in Active Raised Bog along this section of high bog. A significant decline in Active Raised Bog has again occurred in the north-eastern section of the high bog in the period 2005-11.

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

Fire history

A recent burn (2009/10) damaged 12.32% of high bog area (22ha). However, no major evidence of damage was noted during the 2011 survey and therefore this activity is considered to have low importance/impact on high bog habitats.

Problematic native species

Fernandez *et al.* (2005) described scattered *Pinus sylvestris* trees on a mineral mound at the centre of the high bog (GR 192810/202004), as well as a clump of five pine trees in the southwest GR (192685/201548). These trees still remain on the high bog but are not spreading.

Problematic native species are considered to have low intensity/impact on high bog habitats.

Afforestation and forestry management

A small area of conifer plantation is found within the Firville/Kilcarren SAC. This is located to the north-east of Kilcarren Bog. This is considered to have low intensity/impact on high bog habitats.

Other impacting activities

Motorised vehicles tracks were noted on the high bog in the south-east of the high bog close to flush W at Kilcarren Bog. No other significant impacting activities were noted or recorded in 2011 impacting high bog habitats in the 2005-2011 reporting period.

Conservation activities

Although no physical management actions such as blocking of drainage have been carried out at the site, NPWS has engaged in negotiation with landowners. Turbary rights and ownership rights of various turf-cutting plots around the bog have been bought and this has contributed to the fact that turf cutting no longer takes place at Kilcarren Bog.

Conservation status assessment

The assessment of the conservation status of Annex I Active and Degraded Raised Bog 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

Table 8.1 indicates that there has been a decrease in the area of Active Raised Bog of 2.18ha in the 2005-2011 reporting period.

Central ecotope area is considered not to have changed in the reporting period and the discrepancy (0.49ha) between the 2005 (not amended) and the 2011 figures is due a more comprehensive surveying and accurate mapping in 2011, which resulted in an improved ecotope map.

However, sub-central ecotope has decreased by 2.22ha. Former Sc7, Sc10 and Sc12 areas are no longer present at the site and **Sc8** and **Sc9** have also decreased in area (see Map 1). Former Sc7 located in the north-east of the bog in and around drain bB is the most significant loss (1.19ha). Former Sc10 (0.13ha) was also located in this area while former Sc12 (0.08ha; Flush Y in Kelly *et al.*, 1995) was located in the north-west of the high bog, Sc8 (loss of 0.71ha) and Sc9 (loss of 0.11ha) are also located in the north-east of the high bog.

Fernandez *et al.* (2005) already mentioned the decrease of Active Raised Bog within the northeast and northwest sections of high bog and this trend has continued in the new reporting period. Further losses are also likely to have taken place within **Sc3** and **Sc13**, as the presence of sub-central ecotope dots (2005 map) within adjacent areas currently mapped as sub-marginal ecotope indicate (these potential additional losses are not included within the 2.22ha figure given above).

A more comprehensive surveying and accurate mapping in 2011 has resulted in a decrease in sub-central ecotope within the following areas (some of them now consisting of separated sub-central ecotope sections): **Sc1** to **Sc4**, **Sc8**, **Sc9**, **Sc11** and **Sc13**. Furthermore, **Sc5** boundary is slightly different than reported in 2005 also due to a more accurate mapping and comprehensive surveying.

Former FZ has been re-allocated to sub-central ecotope (**Sc5**). Flush **3a** is now considered to be active, also as a result of habitat re-interpretation.

Three new sub-central areas (**Sc7**, **Sc10** and **Sc12** these do not correspond with the ones reported on in 2005) have been reported in 2011. These areas are likely to have been missed in the 2005 survey. Thus, these are not considered to correspond with newly developed Active Raised Bog. In addition to these areas, other smaller pockets of sub-central ecotope have also been recorded during the 2011 survey. These new active peat forming areas are too small to be mapped and only sub-central ecotope complexes dots have been mapped (see Map 2).

The favourable reference value (FRV) for Area is considered to be the sum of Active Raised Bog (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, Active Raised Bog Area FRV is 130.32ha (based on 1994/95 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 Active Raised Bog. The current habitat area value (11.9ha) is 90.87% below the FRV. A current Area value more than 15% below FRV falls into the **Unfavourable Bad** assessment category.

Active Raised Bog would not reach a favourable assessment until its Area reaches the FRV. The southern and north-eastern cutover should be considered for the development and expansion of Active Raised Bog at the site.

A long term (1994/5-2011) trend indicates a reduction in the area of Active Raised Bog at the site (15.55ha) (see table 8.1). A more recent and short term trend analysis (7 years; 2005-2011) also gives a reduction on its area (2.22ha). Therefore, the habitat Area is given a **Decreasing** trend assessment.

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

Structure & Functions

The FRV for S&Fs is for at least half of the active raised bog area to be made up of central and active flush, i.e. the higher quality wetter vegetation communities. This value is 5.95ha (half of 11.9ha, the

current area of ARB). The current value is 2.44ha which is 58.99% below the FRV. A current value more than 25% below FRV falls into the **Unfavourable Bad** assessment category.

A long term (1994/5-2011) trend indicates a decrease of the total area of central ecotope and active flush at the site (2.06ha) (see table 8.1). A more recent and short term trend analysis (7 years; 2005-2011) shows no change. Therefore, S&Fs are given a **Stable** trend assessment.

Quadrats analysis (**Qc1**, **Qc2**, **Qsc1**, **Qsc2**, **Qsc3**, **Qsc4**, and **Qsc5**) indicates the following:

Qc1: Although the quadrats name has changed from Complex 14 in 2005 to Complex 10/15 in 2011, this may essentially be an interpretation discrepancy as the quadrats are largely similar, with both being dominated by *Sphagnum magellanicum* (at 51-75% cover). There has been a slight decrease in the total *Sphagnum* cover (from 91-100% in 2005 to 76-90% in 2011) and although the species composition has remained unchanged, the structure has changed with a decrease in *Sphagnum* lawns (from 26-33% in 2005 to 4-10% in 2011) and *Sphagnum* hollows (from 4-10% in 2005 to 'absent' in 2011), and an increase in *Sphagnum* hummocks (11-25% in 2005 to 34-50% in 2011). Other slight differences include an increase in the cover of *Calluna vulgaris* (4-10% in 2005 to 26-33% in 2011) and a decrease in *Narthecium ossifragum* (4-10% in 2005 to 1-3% in 2011). Although the slight decline in total *Sphagnum* cover suggests that there may have been a slight decline in the quality of the Active Raised Bog during the reporting period here, the quadrats are otherwise quite similar and thus any differences may merely be the result of lack of precision in relocating of the quadrat (up to 2m) between both year surveys, rather than an actual change.

Qc2: Although the quadrats name has changed from complex 14 in 2005 to complex 10/15 in 2011, this may essentially be an interpretation discrepancy as the quadrats are largely similar. There has been a slight increase in the total *Sphagnum* cover (from 76-90% in 2005 to 91-100% in 2011) and a change in the *Sphagnum* structure with a decrease in *Sphagnum* pools (from 11-25% in 2005 to 4-10% in 2011) and *Sphagnum* hummocks (34-50% in 2005 to 11-25% in 2011), and an increase in *Sphagnum* lawns (26-33% in 2005 to 51-75% in 2011). There has also been an increase in the cover of *S. magellanicum* (51-75% in 2005 to 76-90% in 2011) and although *S. fuscum* and *S. austinii* were recorded in 2005, they were not recorded in 2011. However, overall these quadrats are similar and any differences may merely be the result of lack of precision in relocating of the quadrat (up to 2m) between both year surveys, rather than an actual change.

Qsc1: There has been an increase in the total *Sphagnum* cover (from 51-75% in 2005 to 91-100% in 2011) with an associated increase in *Sphagnum* lawns (from 34-50% in 2005 to 51-75% in 2011) and *Sphagnum* hummocks (from 4-10% in 2005 to 11-25% in 2011). Further slight differences include an increase in the cover of *Calluna vulgaris* (11-25% in 2005 to 26-33% in 2011). Although the increase in

total *Sphagnum* cover suggests that there may have been a slight improvement in the quality of the Active Raised Bog during the reporting period here, the quadrats are otherwise quite similar and thus any differences may merely be the result of lack of precision in relocating of the quadrat (up to 2m) between both year surveys, rather than an actual change.

Qsc2: The total *Sphagnum* cover (51-75%) has not changed from 2005-2011 and overall the quadrats appear very similar. Small differences do occur such as a slight increase in cover of *S. papillosum* (11-25% in 2005 compared to 26-33% in 2011) and a slight decrease in the cover of *S. capillifolium* subsp. *rubellum* (11-25% in 2005 to 4-10% in 2011). Further small differences include a slight increase in the cover of *Calluna vulgaris* (11-25% in 2005 to 26-33% in 2011). However, overall these quadrats are very similar and any differences may merely be the result of lack of precision in relocating of the quadrat (up to 2m) between both year surveys, rather than an actual change.

Qsc3: The total *Sphagnum* cover (51-75%) has not changed from 2005-2011 and overall the quadrats appear similar. Small differences do occur such as a slight increase in cover of *S. cuspidatum* (26-33% in 2005 compared to 34-50% in 2011) and of *S. capillifolium* subsp. *rubellum* (4-10% in 2005 to 11-25% in 2011), and a slight decrease in the cover of *S. magellanicum* (4-10% in 2005 to 1-3% in 2011). Further small differences include a slight increase in the cover of *Calluna vulgaris* (11-25% in 2005 to 26-33% in 2011) and *Rhynchospora alba* (4-10% in 2005 to 11-25% in 2011), and a slight decrease in the cover of *Narthecium ossifragum* (4-10% in 2005 to 1-3% in 2011). The largest difference between the two quadrats is that in 2005, the *Sphagnum* in pools was recorded as 34-50% while it is recorded as 'absent' in 2011. Conversely, *Sphagnum* in hollows was recorded as 4-10% compared to 34-50% in 2011. This may be due to observer variation or may indicate a decline in quality of the Active Raised Bog. However, overall these quadrats are similar and any differences may merely be the result of lack of precision in relocating of the quadrat (up to 2m) between both year surveys, rather than an actual change.

Qsc4: Although the total *Sphagnum* cover has increased from 34-50% in 2005 to 51-75% in 2011, the quadrats appear quite similar overall. This increase has occurred in *Sphagnum* hollows (from 4-10% in 2005 to 26-33% in 2011) while *Sphagnum* lawns have decreased (11-25% in 2005 to 'absent' in 2011). In term of species, *S. cuspidatum* has increased in cover (4-10% in 2005 to 26-33% in 2011) as has *S. capillifolium* subsp. *rubellum* (4-10% in 2005 to 11-25% in 2011), while there has been a slight decrease in the cover of *S. magellanicum* (4-10% in 2005 to 'absent' in 2011) and *S. papillosum* (11-25% in 2005 to 4-10% in 2011). In addition, *S. fuscum* and *S. austinii* were both recorded in 2011 and were not recorded in 2005. However, these were considered to be relic hummocks. Further small differences include a slight increase in the cover of *Calluna vulgaris* (4-10% in 2005 to 11-25% in 2011)

and a slight decrease in the cover of *Narthecium ossifragum* (4-10% in 2005 to 1-3% in 2011). The changes in *Sphagnum* cover suggest that there may have been a slight improvement in the quality of the Active Raised Bog during the reporting period here. However, overall these quadrats are similar and any differences may merely be the result of lack of precision in relocating of the quadrat (up to 2m) between both year surveys, rather than an actual change.

Qsc5: The total *Sphagnum* cover (34-50%) has not changed from 2005-2011 and overall the quadrats appear similar. Small differences do occur such as a slight increase in cover of *S. capillifolium* subsp. *rubellum* (4-10% in 2005 to 11-25% in 2011), *S. cuspidatum* (4-10% in 2005 to 11-25% in 2011), *S. denticulatum* ('absent' in 2005 to 11-25% in 2011), and a slight decrease in the cover of *S. papillosum* (4-10% in 2005 to 'absent' in 2011). Further small differences include an increase in the cover of *Calluna vulgaris* (4-10% in 2005 to 34-50% in 2011), and a slight decrease in *Rhynchospora alba* (4-10% in 2005 to 1-3% in 2011) and *Narthecium ossifragum* (4-10% in 2005 to 1-3% in 2011). However, overall these quadrats are similar and any differences may merely be the result of lack of precision in relocating of the quadrat (up to 2m) between both year surveys, rather than an actual change.

Typical good quality indicators and typical plant species are still found in sub-central and central ecotopes throughout the entire bog. No major changes of their occurrence within quadrats (**Qsc1** & **Qsc2**) have taken place (see Appendix III).

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

Future Prospects

Impacting activities such as drainage particularly high bog drainage, but also cutover drainage, and to a lesser area peat cutting (face banks remain open and draining high bog) continue to negatively impact on the habitat, as the decline in habitat area indicates. The flushes, FW and FV, which are likely to be associated with high bog drains (the central axis of FW is along drain bB), may also have played a major role in the drying out of the high bog. Considerable subsidence and bog slumping were noted at the edge of high bog where flush FV meets the high bog edge. Here the high bog margin is extremely dry. There is a 2m face bank and a severe slope on the high bog in the final 15-20m to the margin (a drop of ca. 2m).

Habitat **Area** is currently 90.87% below FRV (see table 8.4) and a Decreasing trend is foreseen due to the overriding influence of negatively impacting activities. The habitat Area is expected to be more than 15% below FRV in the following two reporting periods (12 years). Thus, habitat's **Area Future Prospects** are assessed as **Unfavourable Bad-Decreasing**. Habitat's **S&Fs** are currently 58.99%

below FRV (see table 8.4) and a Declining trend is also foreseen. Therefore S&Fs are expected to be 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 functional and reduced-functional drains is essential to reach FRV. Cutover areas (particularly the southern and northern-eastern) should be considered for restoration of the habitat and achieve FRVs.

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

Table 8.1 Changes in Active Raised Bog area

Active Ecotopes	1994/5 ¹	2005 ²	2005 (amended)	2011	Change (2005-2011)	
	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	%
Central	3.62	2.24	1.75	1.75	0.00	0.00
Sub-central	22.95	14.28	11.68	9.46	(-)2.22	(-)19.01
Active flush	0.88	0.44	0.69	0.69	0.00	0.00
Total	27.45	16.96	14.12	11.9	(-)2.22	(-)15.72

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

² 2005 figures have been slightly modified based on a more accurately mapped high bog boundary undertaken as part of this project. This has mostly affected face bank ecotope figures.

Note: Table 8.1 includes 2005 figures and 2005 amended figures. The latter shows the ecotope area believed to be present in 2005 after surveying improvements in 2011. The comparison between 2005 (amended) and 2011 illustrates the actual changes in ecotope area in the 2005-2011 period. Any change in ecotope area between the 2005 and the 2005 (amended) values is due to improvement in mapping accuracy and/or the result of a more comprehensive survey in 2011 (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,Qc2	Stable	Slightly smaller than mapped in 2005. This change is the result of more comprehensive surveying in 2011 which resulted in a more accurate mapping.	<p>Qc1: The 2005 and 2011 quadrats are similar and although the slight decline in total <i>Sphagnum</i> cover suggests that there may have been a slight decline in the quality of the Active Raised Bog, the quadrats are otherwise quite similar.</p> <p>Qc2: The 2005 and 2011 quadrats are similar and although there has been a slight increase in the total <i>Sphagnum</i> cover. However, overall these quadrats are similar.</p>
Sc1	Qsc1	Stable	Sc1 currently consists of two separated sections. This change is likely to be the result of more comprehensive surveying in 2011 which resulted in a more accurate mapping.	Qsc1: The 2005 and 2011 quadrats are similar although the total <i>Sphagnum</i> cover has increased between 2005 and 2011. Although the increase in total <i>Sphagnum</i> cover suggests that there may have been a slight improvement in the quality of the Active Raised Bog, the quadrats are otherwise quite similar.
Sc2	Qsc4	Stable (possibly decreasing)	Sc2 currently consists of three separated sections. This change is likely to be the result of more comprehensive surveying in 2011 which resulted in a more accurate mapping. However, it is also possible that some of this could be due to habitat loss.	Qsc4: The 2005 and 2011 quadrats are similar although the total <i>Sphagnum</i> cover has increased between 2005 and 2011. In term of species, <i>S. cuspidatum</i> has increased in cover as has <i>S. capillifolium</i> subsp. <i>rubellum</i> while there has been a slight decrease in the cover of <i>S. magellanicum</i> and <i>S. papillosum</i> . The changes in <i>Sphagnum</i> cover suggest that there may have been a slight improvement in the quality of the Active Raised Bog during the reporting period here. However,

				overall these quadrats are similar.
Sc3	None	Stable (possibly decreasing)	Sc3 currently consists of two separated sections. This change is, at least partly, the result of more comprehensive surveying in 2011 which resulted in a more accurate mapping. However, there may also have been some real habitat loss here.	
Sc4	None	Stable (possibly decreasing)	Sc4 currently consists of four separated sections. This change is likely to be the result of more comprehensive surveying in 2011 which resulted in a more accurate mapping. However, it is also possible that some of this could be due to habitat loss.	
Sc5	Qsc3	Stable	Slight changes in boundary. This change is the result of more comprehensive surveying in 2011 which resulted in a more accurate mapping.	Qsc3: The 2005 and 2011 quadrats are similar with the total <i>Sphagnum</i> cover remaining the same. Small differences do occur such as a slight increase in cover of <i>S. cuspidatum</i> and <i>S. capillifolium</i> subsp. <i>rubellum</i> , and a slight decrease in the cover of <i>S. magellanicum</i> . There has also been a slight increase in the cover of <i>Rhynchospora alba</i> and a slight decrease in the cover of <i>Narthecium ossifragum</i> . The largest difference between the two quadrats is that in 2005, the <i>Sphagnum</i> in pools was recorded as 34-50% while it is recorded as 'absent' in 2011. Conversely, <i>Sphagnum</i> in hollows was recorded as 4-10% compared to 34-50% in 2011. This may be an interpretation difference or may indicate a decline in quality of the Active Raised Bog. However, overall these quadrats are similar.

Sc6	None	Stable	Area and description similar. However, this area was suggested to have been degrading by Fernandez <i>et al.</i> (2005).	
Sc7	None	Unknown	This specific area was not surveyed in 2005. This is likely to be the result of more comprehensive surveying in 2011 which resulted in a more accurate mapping.	
Sc8	None	Decreasing	This area has continued to degrade as already suggested by Fernandez <i>et al.</i> (2005).	
Sc9	Qsc5	Decreasing	This area appears to be declining slightly in area.	Qsc5: The 2005 and 2011 quadrats are similar with the total <i>Sphagnum</i> cover remaining the same. Small differences do occur such as a slight increase in cover of <i>S. capillifolium</i> subsp. <i>rubellum</i> , <i>S. cuspidatum</i> and <i>S. denticulatum</i> , and a slight decrease in the cover of <i>S. papillosum</i> . Further small differences include a slight decrease in <i>Rhynchospora alba</i> . However, overall these quadrats are similar.
Sc10	None	Unknown	This specific area was not surveyed in 2005. This is likely to be the result of more comprehensive surveying in 2011 which resulted in a more accurate mapping.	
Sc11	Qsc2	Stable	Slightly smaller than mapped in 2005. This change is the result of more comprehensive surveying in 2011 which resulted in a more accurate mapping.	Qsc2: The 2005 and 2011 quadrats are very similar with the total <i>Sphagnum</i> cover not changing from 2005-2011. Although small differences do occur such as a slight increase in cover of <i>S. papillosum</i> and a slight decrease in the cover of <i>S. capillifolium</i> subsp. <i>rubellum</i> , overall these quadrats are very similar.

Sc12	None	Unknown	This specific area was not surveyed in 2005. This is likely to be the result of more comprehensive surveying in 2011 which resulted in a more accurate mapping.
Sc13	None	Stable (possibly decreasing)	Sc13 is slightly smaller than mapped in 2005 and is now detached from Sc2. This change is, at least partly, the result of more comprehensive surveying in 2011 which resulted in a more accurate mapping. However, it is likely that there was also some real habitat loss here.
3a	None	Stable	This flush within Sc2 is now considered to be active. This is the result of habitat re-interpretation rather than an actual change.
FW	None	Stable	Active section of FW slightly larger than mapped in 2005. This change is the result of more comprehensive surveying in 2011 which resulted in a more accurate mapping.
FV	None	Stable	Active sections of FV slightly larger than mapped in 2005. This change is the result of more comprehensive surveying in 2011 which resulted in a more accurate mapping.

Degraded Raised Bog (7120)

Area

The Degraded Raised Bog FRV for area is 50.52ha at Kilcarren Bog. This value corresponds with the difference between the current high bog area (180.84ha) and Active Raised Bog FRV (130.32ha) for area. Degraded Raised Bog is a particular habitat type, for which 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 234.40% bigger than FRV and therefore the habitat Area is given an **Unfavourable Bad** assessment (see table 8.4).

Table 8.3 indicates that there has been an increase of the area of Degraded Raised Bog of 2.18ha at the expense of Active Raised Bog. 0.10ha have been lost as a result of turf cutting. Therefore the habitat is given an **Increasing** trend. However, this trend should not be taken as positive.

The Area of Degraded Raised Bog at Kilcarren Bog is assessed as Unfavourable Bad-Increasing (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 42.24ha (25% of 168.94ha, the current area of Degraded Raised Bog). The current marginal and face bank ecotopes area value (44.07ha) is 4.34% above the FRV (in the particular case of Degraded Raised Bog a current area value equal or smaller than FRV is desirable) (see Table 8.4). A current value more between 0 and 5% above FRV falls into the **Favourable** assessment category.

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). As table 8.3 indicates, only face bank ecotope has decreased by 0.10ha due to turf cutting, which is considered rather small figure to impact on the overall habitat's S&Fs. Although sub-marginal ecotope has increased, this is due to Active Raised Bog losses. Therefore, the S&Fs of the habitat have not changed substantially in the reporting period. Thus, the DRB's S&Fs at Kilcarren Bog are given a **Stable** 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.

The Structure & functions of Degraded Raised Bog at Kilcarren Bog are assessed as Favourable-Stable (see table 8.5).

Future Prospects

Although peat cutting has apparently ceased at the site, impacting activities such as high bog and cutover drainage continue to negatively impact the habitat. The habitat area has increased, at the expense of Active raised Bog, indicating further drying out processes within high bog in the reporting period and unless restoration works are undertaken this trend is likely to continue. Habitat **Area** is currently 234.40% above FRV (see table 8.4) and an Increasing trend is expected in the following two reporting periods (12 years). As a result habitat Area is expected to remain more than 15% above FRV. Thus, habitat's **Area Future Prospects** are assessed as **Unfavourable Bad-Increasing**. Habitat's **S&Fs** are currently 4.34% above FRV (see table 8.4). A Declining trend in the following two reporting periods cannot be ruled out. **S&Fs** are likely to reach a greater than 5% value above FRV. Thus, habitat's **S&Fs Future Prospects** are assessed as **Unfavourable Inadequate-Declining**.

Therefore the Future Prospects for Degraded Raised Bog are considered Unfavourable Bad-Declining (see table 8.5).

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

Table 8.3 Changes in Degraded Raised Bog area

Inactive Ecotopes	1994/5 ¹	2005 ²	2005 (amended)	2011	Change (2005-2011)	
	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	%
Sub-marginal	102.87	118.13	118.96	121.18	(+)2.22	(+)1.87
Marginal	38.85	29.52	35.69	35.69	0.00	0.00
Face bank	Na	8.47	8.48	8.38	(-)0.10	(-)1.18
Inactive flush	10.69	5.58	3.69	3.69	0.00	0.00
Total	152.41	161.7	166.82	168.94	(+)2.12	(+)1.27

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

² 2005 figures have been slightly modified based on a more accurately mapped high bog boundary undertaken as part of this project. This has mostly affected face bank ecotope figures.

Note: Table 8.1 includes 2005 figures and 2005 amended figures. The latter shows the ecotope area believed to be present in 2005 after surveying improvements in 2011. The comparison between 2005 (amended) and 2011 illustrates the actual changes in ecotope area in the 2005-2011 period. Any change in ecotope area between the 2005 and the 2005 (amended) values is due to improvement in mapping accuracy and/or the result of a more comprehensive survey in 2011 (see table 8.2 for further detail).

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 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 combined area of Active Raised Bog and sub-marginal ecotope has remained stable in the reporting period. As result habitat Area is given a **Stable** 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 (e.g. high bog and cutover drainage) continue to negatively impact associated habitats (particularly Active Raised Bog). 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-Stable** 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.

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

Table 8.4 Habitats favourable reference values

Habitat	Area Assessment			Structure & Functions Assessment		
	FRV Target	2011 value	% below	FRV Target	2011 value	% below
	(ha) ¹	(ha) ²	target	2011 (ha) ³	(ha) ⁴	target
7110	130.32	11.9	90.87	5.95	2.44	58.99
¹ 1994/95 central, sub-central, active flush, bog woodland and sub-marginal ecotope area. ² 2011 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 2011 central ecotope and active flush area.						
Habitat	FRV Target	2011 value	% above	FRV 2011	2011 value	% above
	(ha) ⁵	(ha) ⁶	target	Target (ha) ⁷	(ha) ⁸	target
7120	50.52	168.94	234.40	42.24	44.07	4.34
⁵ 1994/95 high bog area minus 7110 area FRV. ⁶ 2011 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** despite the increase in area, as this increase is due to a decrease in Active Raised Bog and should not be taken as positive. Impacting activities continue to threaten the habitat.
- **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-Decreasing	Unfavourable Bad-Stable	Unfavourable Bad-Declining	Unfavourable Bad-Declining
7120	Unfavourable Bad-Increasing	Favourable-Stable	Unfavourable Bad-Declining	Unfavourable Bad-Declining
7150	Unfavourable Bad-Stable	Unfavourable Bad-Stable	Unfavourable Bad-Declining	Unfavourable Bad-Declining

Conclusions

Summary of impacting activities

- Peat cutting appears to have ceased at the site in the period 2005-11. 0.1ha of high bog was lost to cutting in this period. However, open face banks may still be continuing to drain the high bog.
- There are approximately 6.5km of drains on the high bog that are functional to some degree. Although most of these are considered to be reduced functional and are continuing to infill, they are still impacting on the high bog habitats and will continue to do so until they are blocked and/or become completely in-filled and thus non-functional.
- Cutover drainage (peripheral drainage) associated with former peat cutting is present along the south and northeast cutover. These drains continue to drain the high bog and impacting on its habitats.
- Drainage maintenance, associated with agricultural improvements, is evident on the 2010 aerial photograph along the north-west margin of the high bog. Drainage maintenance work was also undertaken on the cutover bog/agricultural land to the south east of the site between 2005-11.
- The drain running parallel to the road separating Firville from Kilcarren Bog is also likely to have some negative influence on the high bog habitats.
- A recent burn (2009/10) damaged 12.32% of high bog (22ha).
- *Pinus sylvestris* although present do not appear to have spread in the reporting period and are not considered a major threat.

Changes in active peat forming areas

- Three new peat forming areas (Sc7, Sc10 and Sc12) have been described at the site (see table 8.2). These new sub-central ecotope areas are likely to be the result of improvements of mapping accuracy rather than actual changes in Active Raised Bog.
- Three areas formerly (2005) considered to be peat forming are no longer present (Sc7, Sc10 and Sc12). Sc7 and Sc10 were located in the north-east of the high bog, while Sc12 was located in the north-west of the high bog. Both of these areas appear to be suffering from ongoing desiccation. In addition, Sc8 and Sc9, which are also located in the north-east of the site, contracted in size during the reporting period.
- There has been a 2.22ha decrease in the area of Active Raised Bog, all within sub-central ecotope.

Other changes

There have been no other major changes.

Quadrats analysis

- No major changes in vegetation have taken place within those quadrats recorded in 2005 that were re-surveyed in 2011 (see Appendix III).
- Although high accuracy GPS equipment was used during the 2005 and 2011 surveys, the devices still only allow up to 0.5m accuracy. The lack of precision in relocating of the quadrat may justify certain differences in the vegetation described. Permanent markers were inserted into quadrats recorded in 2011.

Restoration works

- No physical management actions such as the blocking of drains have been carried out at the site. However, the NPWS has engaged in negotiation with landowners in order to gain turbary and ownership rights of various turf-cutting plots around the bog and this has contributed to the fact that turf cutting no longer takes place at Kilcarren Bog.

Summary of conservation status

- **Active Raised Bog** has been given an overall **Unfavourable Bad-Declining** conservation status at Kilcarren Bog. Habitat Area has slightly decreased and quality (S&Fs) remained Stable in the reporting period. However, both values are below the FRVs. Future Prospects are considered Unfavourable Bad-Declining as high bog and cutover drainage continues to hinder the restoration of active peat forming communities.

- **Degraded Raised Bog** has been given an overall **Unfavourable Bad-Declining** conservation status at Kilcarren Bog. Habitat Area has slightly increased (2.18ha) due to a decrease in Active raised Bog (2.22ha). There has been a small loss due to turf cutting (0.10ha). Habitat quality (S&Fs) has not changed in the reporting period. Habitat Area is above the FRV. Future Prospects are considered Unfavourable Bad- Declining.
- **Depressions on peat substrates of the Rhynchosporion** has been given an overall **Unfavourable Bad-Declining** conservation status at Kilcarren Bog. Habitat Area and quality (S&Fs) are considered to have remained unchanged in the reporting period. Future Prospects are considered Unfavourable Bad-Declining.

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

Recommendations

- **Further restoration works** including the blocking of any high bog functional or reduced functional drains, and possibly the 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.
- **An Impact assessment of maintenance works** on adjacent land drainage with a view to the potential of blocking these drains.

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Appendix I Detailed vegetation description of the high bog

Active Raised Bog (7110)

Central Ecotope Complexes

COMPLEX 15

- **Location:** found mostly in the southern part of C1.
- **Ground:** quaking
- **Physical indicators:** absent
- **Calluna height:** 21-30cm
- **Cladonia cover:** <4%
- **Macro-topography:** depression
- **Pools:** 34-50%
- **Sphagnum cover:** >90% (75-90% in places)
- **Narthecium cover:** <4%
- **Micro- topography:** High hummocks/hollows/lawns and pools.
- **Tussocks:** absent
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (11-25%), *Erica tetralix* (4-10%), *Eriophorum vaginatum* (4-10%), *E. angustifolium* (<4%), *Narthecium ossifragum* (<4%), *Rhynchospora alba* (11-25%), *Sphagnum capillifolium* subsp. *rubellum* (H; 4-10%), *S. papillosum* (H & P; 4-10%), *S. magellanicum* (L & P; 4-10%), *S. tenellum* (H; <4%), *S. fuscum* (H; <4%), *S. cuspidatum* (P; 26-33%).
- **Additional comments:** Some sections of this complex consist of large *Sphagnum cuspidatum* dominated pools with low *S. magellanicum* and *S. papillosum* hummocks at the edges. *Eriophorum angustifolium*, *Rhynchospora alba* and *Menyanthes trifoliata* are also found. Overall *Sphagnum* cover reaches 100% in places.

COMPLEX 10/15

- **Location:** found dominating C1.
- **Ground:** very soft
- **Physical indicators:** bare peat <4%
- **Calluna height:** 31-40cm
- **Cladonia cover:** absent

- **Macro-topography:** depression
- **Pools:** 11-25% (Regular)
- **Sphagnum cover:** 75-90%
- **Narthecium cover:** <4% (4-10% in places)
- **Micro- topography:** High hummocks/hollows/lawns and pools.
- **Tussocks:** *Eriophorum vaginatum* (26-33%)
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (26-33%), *Erica tetralix* (<4%), *Eriophorum vaginatum* (26-33%), *E. angustifolium* (4-10%), *Narthecium ossifragum* (<4%), *Rhynchospora alba* (<4%), *Menyanthes trifoliata* (<4%), *Sphagnum capillifolium* subsp. *rubellum* (H; 4-10%), *S. papillosum* (H & P; 11-25%), *S. magellanicum* (L; 51-75%), *S. cuspidatum* (P; 4-10%).
- **Additional comments:** None

Quadrats Qc1 and Qc2 were recorded within this complex.

Sub-Central Ecotope Complexes

COMPLEX 9A/10

- **Location:** found dominating Sc5 and Sc7, and to southeast of Sc1.
- **Ground:** very soft
- **Physical indicators:** absent
- **Calluna height:** 31-40cm
- **Cladonia cover:** <4%
- **Macro-topography:** depression
- **Pools:** 11-25% (but more like *Sphagnum*-filled depressions)
- **Sphagnum cover:** 34-50%
- **Narthecium cover:** 11-25% (4-10% in places)
- **Micro- topography:** High hummocks/hollows and pools
- **Tussocks:** *Eriophorum vaginatum* (4-10%)
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (11-25%), *Erica tetralix* (<4%), *Eriophorum vaginatum* (4-10%), *E. angustifolium* (4-10%), *Narthecium ossifragum* (11-25%), *Rhynchospora alba* (<4%), *Menyanthes trifoliata* (<4%), *Sphagnum capillifolium* subsp. *rubellum* (H; 4-10%), *S. austinii* (H; <4%), *S. fuscum* (H; <4%), *S. papillosum* (H & HI; 11-25%), *S. magellanicum* (L; <4%), *S. cuspidatum* (HI; 11-25%).

- **Additional comments:** The pools here are more like *Sphagnum cuspidatum* filled depressions and there are very large hummocks (>0.5m) of *S. austinii* within this area.

This complex is also found in the south of **Sc5**. Here the cover of *Sphagnum cuspidatum* is higher (34-50%), but appears to be a very thin layer. The cover of *Cladonia portentosa* (11-25%), *Trichophorum germanicum* (4-10%) and *Eriophorum angustifolium* (11-25%) is also higher.

COMPLEX 9/10

- **Location:** found dominating **Sc1, Sc2, Sc9, Sc12** and **Sc13**.
- **Ground:** very soft
- **Physical indicators:** absent
- **Calluna height:** 31-40cm
- **Cladonia cover:** <4%
- **Macro-topography:** gentle slope
- **Pools:** absent
- **Sphagnum cover:** 34-50%
- **Narthecium cover:** <4%
- **Micro- topography:** High hummocks/hollows
- **Tussocks:** *Eriophorum vaginatum* (11-25%)
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (11-25%), *Erica tetralix* (4-10%), *Eriophorum vaginatum* (26-33%), *E. angustifolium* (<4%), *Narthecium ossifragum* (<4%), *Rhynchospora alba* (<4%), *Carex panicea* (<4%), *Sphagnum capillifolium subsp. rubellum* (H; 4-10%), *S. papillosum* (H & HI; 26-33%), *S. cuspidatum* (HI; 11-25%).
- **Additional comments:** This complex also occurs in an area of a depression in **Sc9**. Here the cover of *Calluna vulgaris* (34-50%) is higher while the cover of *Erica tetralix* (<4%) and *Eriophorum vaginatum* (4-10%) is lower.

This complex is also found in **Sc11**. Here the *Sphagnum* cover is higher (51-75%) composed of *S. capillifolium subsp. rubellum* (H; 4-10%), *S. subnitens* (H; <4%), *S. tenellum* (H; <4%), relic *S. austinii* (H; <4%), *S. papillosum* (H & HI; 26-33%), *S. cuspidatum* (HI; 11-25%). The cover of *Calluna vulgaris* (26-33%) and *Rhynchospora alba* (4-10%) is higher while the cover of *Eriophorum vaginatum* (11-25%) is lower.

A 'new' area of this complex is found east of **Sc12**. Here the *Sphagnum* cover is higher (51-75% and 75-90% in places) composed of *S. capillifolium subsp. rubellum* (H; 4-10%), *S. tenellum* (H; <4%), active *S. austinii* (H; <4%), *S. papillosum* (H & HI; 11-25%), *S. magellanicum* (L; <4%), *S.*

cuspidatum (Hl; 51-75%). The cover of *Calluna vulgaris* is 11-25%, *Rhynchospora alba* is 4-10%, *Eriophorum vaginatum* is 11-25% and *E. angustifolium* is 4-10%.

Complex 9/10 dominates the southeast section of **Sc1**, where a former pool was visible on the six inch map. Here *Sphagnum magellanicum* lawns and low hummocks characterise the complex with a high cover (50-75%). *S. cuspidatum* hollows are also recorded. Other species in the complex include *Calluna vulgaris* (4-10%), *Erica tetralix* (11-25%), *Eriophorum vaginatum* (35-50%), *E. angustifolium* (<4%), *Rhynchospora alba* (11-25%), *Menyanthes trifoliata* (<1%) and *Aulacomnium palustre* (<1%).

Quadrats **Qsc1**, **Qsc2** and **Qsc5** were recorded within this complex at **Sc1**, **Sc11** and **Sc9**.

COMPLEX 4/10

- **Location:** found dominating sections of **Sc2**, **Sc3**, **Sc4**, **Sc5** and **Sc10**.
- **Ground:** soft
- **Physical indicators:** absent
- **Calluna height:** 21-30cm
- **Cladonia cover:** absent
- **Macro-topography:** gentle slope
- **Pools:** 11-25% (more like dried out pools or depressions)
- **Sphagnum cover:** 34-50% (51-75% in places)
- **Narthecium cover:** 4-10%
- **Micro- topography:** Low hummocks/hollows and pools
- **Tussocks:** *Eriophorum vaginatum* (11-25%)
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (11-25%), *Erica tetralix* (4-10%), *Eriophorum vaginatum* (11-25%), *E. angustifolium* (<4%), *Narthecium ossifragum* (4-10%), *Rhynchospora alba* (26-33%), *Sphagnum capillifolium* subsp. *rubellum* (H; 4-10%), *S. austinii* (H<4%), *S. fuscum* (H<4%), *S. papillosum* (H & Hl; 11-25%), *S. magellanicum* (L; 4-10%), *S. cuspidatum* (Hl/P; 4-10%).
- **Additional comments:** The pools are dried out and support only a very patchy cover of *Sphagnum cuspidatum* and are colonised mostly by *Rhynchospora alba*. Towards the south of the complex, the cover of *Sphagnum cuspidatum* increases (26-33%) and the pools become more regular.

There is also a small flushed area within this complex with one *Betula pubescens* (4m tall) and a *Pinus sylvestris* (2.5m tall) as well as *Aulacomnium palustre* and *Vaccinium oxycoccos*. The *Sphagnum*

cover is 51-75% and tall (0.5-0.6m) *Calluna vulgaris* dominates along the edges of this flushed area.

This complex is also found in a depression in the south of **Sc3**. Here again, the pool-like features are more like depressions and the cover of *Narthecium ossifragum* (<4%) and *Eriophorum vaginatum* (<4%) is lower while the cover of *Rhynchospora alba* (34-50%) and *Erica tetralix* (11-25%) is higher. The overall *Sphagnum* cover is 34-50% composed of *Sphagnum capillifolium* subsp. *rubellum* (H; 4-10%), *S. austinii* (H<4%), *S. papillosum* (H & HI; 11-25%), *S. magellanicum* (HI; <4%), *S. cuspidatum* (HI; 11-25%).

This complex is found in **Sc5**. *Sphagnum papillosum*, *S. cuspidatum* dominate the hollows. Low *S. papillosum*, *S. capillifolium* subsp. *rubellum* and *S. magellanicum* hummocks are also found. Other species recorded include *Calluna vulgaris* (11-25%), *Erica tetralix* (11-25%) and *Narthecium ossifragum* (4-10%). Overall *Sphagnum* cover ranges from 50 to 75%. A small active flush was mapped in 2005 to the north of Sc5. The new 2001 survey has not found this flush and thus the entire section is only mapped as sub-central ecotope.

Sc10 is a small area and is essentially a *Sphagnum cuspidatum* filled pool and an *S. austinii* and *S. fuscum* hummock.

Quadrats **Qsc3** and **Qsc4** were recorded within this complex at **Sc1** and **Sc5**.

COMPLEX 9/7/6 + P

- **Location:** found dominating **Sc3**, **Sc4**, **Sc6** and **Sc9**.
- **Ground:** firm to soft in places
- **Physical indicators:** bare peat (<4%)
- **Calluna height:** 21-30cm
- **Cladonia cover:** <4%
- **Macro-topography:** flat
- **Pools:** 11-25% (regular)
- **Sphagnum cover:** 34-50%
- **Narthecium cover:** 34-50%
- **Micro- topography:** Low hummocks/hollows/*Narthecium ossifragum* flats and pools
- **Tussocks:** absent
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (4-10%), *Erica tetralix* (4-10%), *Eriophorum vaginatum* (4-10%), *E. angustifolium* (4-10%), *Narthecium ossifragum* (35-50%), *Trichophorum germanicum* (<4%), *Rhynchospora alba* (4-10%), *Andromeda polifolia* (<1%), *Sphagnum capillifolium* subsp. *rubellum* (H; 4-

10%), *S. papillosum* (H; 4-10%), *S. magellanicum* (H; 4-10), *S. tenellum* (H; <4%), *S. austinii* (H; <1%), *S. fuscum* (H; <1%), *S. cuspidatum* (H; 11-25%), *Drosera rotundifolia* (<1%), *Odontoschisma sphagni* (<1%).

- **Additional comments:** Sc3 was inaccurately mapped in 2005. Only a few sub-central complex dots were recorded in 2005 and these were used to map a medium sized (1.14ha) sub-central ecotope polygon that was mapped in 2005. The new 2011 survey shows that Sc3 mainly consists of isolated *Sphagnum* dominated pools, surrounded by sub-marginal ecotope, which are too small as to be mapped as part of a sub-central area. Only a small section of complex 9/7/6+P (sub-central ecotope) is considered to have the minimum size to be mapped as a sub-central ecotope.

Large sections of former Sc4 also consists of isolated 9/7/6+ P type pools too small to be mapped as sub-central ecotope. However, a small sub-central section is considered to be large enough as to be mapped as sub-central ecotope (complex 9/7/6+P). Overall *Sphagnum* cover ranges from 35 to 50%. Only the most middle section of Sc4 (GR 202036/192662) features higher *Sphagnum* cover (50%) consisting of *Sphagnum cuspidatum*, *S. papillosum* and *Rhynchospora alba* dominated pools. *S. austinii*, *S. fuscum* large hummocks were also recorded, but the inter-pool area is characterised by abundant *Narthecium ossifragum*.

Complex 9/7/6+P is also found within Sc9. Tear pools are the dominant pools within the complex, which are mostly *Sphagnum cuspidatum*, *Eriophorum angustifolium*, *Rhynchospora alba* and *Menyanthes trifoliata*. Although inter-pool area is dominated by *Narthecium ossifragum* (35-50%), *Calluna vulgaris* (11-25%), *Erica tetralix* (<4%), *Eriophorum vaginatum* (4-10%), *E. angustifolium* (4-10%) and *Trichophorum germanicum* (4-10%) are also found. Scattered *Sphagnum papillosum*, *S. capillifolium subsp. rubellum* hummocks are also found adjacent to the pools. Overall *Sphagnum* cover varies from 35 to 50%.

In places the cover of *Narthecium ossifragum* decreases and the complex is termed 9/7 + P.

COMPLEX 9/7/10

- **Location:** found dominating Sc8 and southern and eastern section of Sc1.
- **Ground:** firm to soft in places
- **Physical indicators:** absent
- **Calluna height:** 31-40cm
- **Cladonia cover:** 34-50%
- **Macro-topography:** flat
- **Pools:** absent

- **Sphagnum cover:** 50-75%
- **Narthecium cover:** <4%
- **Micro- topography:** *Eriophorum vaginatum* tussocks/low hummocks/hollows
- **Tussocks:** *Eriophorum vaginatum* (50-75%)
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (11-25%), *Erica tetralix* (<4%), *Eriophorum vaginatum* (50-75%), *E. angustifolium* (<4%), *Narthecium ossifragum* (<4%), *Rhynchospora alba* (<4%), *Andromeda polifolia* (<1%), *Sphagnum capillifolium* subsp. *rubellum* (H; 50-75%), *S. papillosum* (H; <4%), *S. tenellum* (H; <4%), *S. austinii* (H; <1%), *S. cuspidatum* (H; <4%), *Aulacomnium palustre* (<1%), *Hylocomium splendens* (<1%), *Drosera rotundifolia* (<1%), *Odontoschisma sphagni* (<1%).
- **Additional comments:** Where *Myrica gale* becomes abundant to northeast of **Sc1**, the complex is named 9/7/101+My. In addition *Molinia caerulea* also becomes frequent to the east of **Sc1**, then the complex is named 9/7/101+My+Mo. These sections have flush type characteristics.

Active Flushes

FLUSH V (FV)

- **Location:** southern section of high bog
- **Ground:** soft
- **Physical indicators:** absent
- **Calluna height:** 41-50cm
- **Cladonia cover:** n/a
- **Macro-topography:** n/a
- **Pools:** absent
- **Sphagnum cover:** 26-33% (higher in active areas)
- **Narthecium cover:** very variable
- **Micro- topography:** low hummocks/lawns
- **Tussocks:** *Molinia caerulea*
- **Degradation or regeneration evidence:** regeneration associated with dam construction
- **Species cover:** Very variable. See additional comments.
- **Additional comments:** This is a variable flush parts of which are wet and active and part of which are dry and inactive (especially towards its southern and eastern extent). *Sphagnum magellanicum* (L & P; 51-75%) dominates in an active area centred along an old drain. Other species recorded include *Narthecium ossifragum* (26-33%), *Myrica gale* (11-25%), *Eriophorum*

vaginatum (<4%), *E. angustifolium* (<4%), *Erica tetralix* (4-10%), *Menyanthes trifoliata* (<4%), *Rhynchospora alba* (11-25%). *Molinia caerulea* is present in the south of the active section of the flush.

Much of the flush vegetation here resembles a sub-central 9/7/10 complex or a sub-marginal 9/7 complex with *Calluna vulgaris* (25-33%) and *Eriophorum vaginatum* (4-10%) characterising much of the vegetation. The overall *Sphagnum* cover averages at ca. 50% with *S. palustre* particularly common in active areas. *S. capillifolium subsp. rubellum* and *S. papillosum* occur at 11-25% cover and tussocks of *Molinia caerulea* (11-25%) are also a feature as well as *Myrica gale* (11-25%).

The inactive area occupies the largest part of this flush and is dominated by *Molinia caerulea* (75-90%) and has a *Sphagnum* cover of 26-33% composed mostly of *S. capillifolium subsp. rubellum* as well as *Calluna vulgaris* (4-10%), *Myrica gale* (4-10%), *Potentilla erecta* (<4%) and *Eriophorum vaginatum* (<4%).

Frangula alnus was recorded close to flush V.

FLUSH W (FW)

- **Location:** south-east of high bog; the active section of this flush is in its north-eastern extent.
- **Ground:** soft
- **Physical indicators:** absent
- **Calluna height:** 41-50cm
- **Cladonia cover:** n/a
- **Macro-topography:** n/a
- **Pools:** absent
- **Sphagnum cover:** 26-33% (higher in active areas)
- **Narthecium cover:** very variable
- **Micro- topography:** low hummocks/lawns
- **Tussocks:** *Molinia caerulea*
- **Degradation or regeneration evidence:** regeneration associated with dam construction
- **Species cover:** Very variable. See additional comments.
- **Additional comments:** This is a large flush with both active and inactive areas. The most prominent feature of the flush is an area with ca. 30-40 3-4m tall *Betula pubescens*. In this area the overall *Sphagnum* cover is 75-90% composed mostly of large hummocks of *S. papillosum* and *S. palustre*. Also recorded in this area is *Eriophorum vaginatum* (34-50%), *Molinia caerulea* (4-10), *Polytrichum alpestre* (<4%), *Aulacomnium palustre* (<4%), *Menyanthes trifoliata* (<4%) and *Vaccinium*

oxycoccus (<4%). The edge of this area of tall birch is dominated by tall (>0.5m) *Calluna vulgaris* and *Myrica gale*.

To the east of the *Betula* there is a large pool, ca. 15m x 5m in area containing *Sphagnum magellanicum* (L & H; 51-75%), *S. cuspidatum* (P & L; 34-50), *S. papillosum* (H; 4-10) and *S. capillifolium* subsp. *rubellum* (H; <4%). Within this pool there are ca. 10 hummocks of *Polytrichum alpestre* (4-10%), *Aulacomnium palustre* (<4%), *Menyanthes trifoliata* (<4%), *Rhynchospora alba* (4-10%), *Narthecium ossifragum* (4-10%), *Myrica gale* (<4%), *Calluna vulgaris* (<10cm; 4-10%), *Andromeda polifolia* (<4%), *Vaccinium oxycoccus* (<4%), *Erica tetralix* (<4%), *Polytrichum commune* (<4%), *Eriophorum vaginatum* (<4%) and *E. angustifolium* (<4%).

The middle section of flush W is inactive and is dominated by dense *Molinia caerulea* and *Myrica gale*. *Osmunda regalis* is also found and scattered *Betula pubescens* trees.

FLUSH 3A

This small flush occurs to the north of middle of the high bog (GR 192925/201883). The flush is associated with a small *Pinus sylvestris* tree (3-4 m high) and one *Betula pubescens* tree (2 m high) on a small mound. The flush is dominated by *Calluna vulgaris* and *Eriophorum vaginatum*. *Vaccinium oxycoccus* is relatively frequent in this flush. *Pleurozium schreberi*, *Hypnum cupressiforme*, *Sphagnum capillifolium* subsp. *rubellum*, *Aulacomnium palustre*, *Dicranum scoparium* are all present in this flush (This description is taken from Fernandez *et al.* (2005)).

Degraded Raised Bog (7120)

Sub-Marginal Ecotope Complexes

COMPLEX 6/9 + P

- **Location:** this complex is found to the north of **Sc8**, area between **Sc2** and **Sc7**, west of **Sc5** and north of **Sc6**.
- **Ground:** very soft
- **Physical indicators:** absent
- **Calluna height:** 21-30cm
- **Cladonia cover:** absent
- **Macro-topography:** depression
- **Pools:** 11-25%
- **Sphagnum cover:** 26-33%

- **Narthecium cover:** <5%
- **Micro- topography:** low hummocks/hollows and pools
- **Tussocks:** absent
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (4-10%), *Erica tetralix* (4-10%), *Eriophorum vaginatum* (11-25%), *E. angustifolium* (4-10%), *Narthecium ossifragum* (26-33%), *Rhynchospora alba* (4-10%), *Myrica gale* (11-25%), *Menyanthes trifoliata* (<4%), *Drosera rotundifolia* (<4%), *Vaccinium oxycoccos* (<4%), *Andromeda polifolia* (<4%), *Sphagnum capillifolium* subsp. *rubellum* (H; 4-10%), *S. papillosum* (H & HI; 11-25%), *S. magellanicum* (H; <4%), *S. fuscum* (H; <4%), *S. cuspidatum* (P; 4-10%).
- **Additional comments:** where pools are tear pools complex is named 6/9+TP, the latter features abundant *Myrica gale* to the east of high bog and there complex was called 6/9+TP+My.

COMPLEX 9/7

- **Location:** this complex found in several locations on the high bog: north of Sc9, between FW and Sc8 and to the west of Sc12.
- **Ground:** soft
- **Physical indicators:** absent
- **Calluna height:** 31-40cm
- **Cladonia cover:** 4-10%
- **Macro-topography:** flat
- **Pools:** absent
- **Sphagnum cover:** 34-50% (very thin layer)
- **Narthecium cover:** <4%
- **Micro- topography:** high hummocks/hollows
- **Tussocks:** *Eriophorum vaginatum* (11-25%)
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (34-50%), *Erica tetralix* (<4%), *Eriophorum vaginatum* (26-33%), *E. angustifolium* (<4%), *Narthecium ossifragum* (<4%), *Carex panicea* (<4%), *Sphagnum capillifolium* subsp. *rubellum* (H; 26-33%), *S. papillosum* (H; 4-10%), *S. tenellum* (H; 11-25%), *S. cuspidatum* (H; <4%).
- **Additional comments:** section to the north of Sc9 was formerly classed as sub-central (Sc7); *Sphagnum* cover is ca. 50% in places but appears to be a very thin layer. *Myrica gale* becomes abundant within this complex where is found surrounding FV and FW. Here complex is named 9/7+My.

COMPLEX 9/7/6

- **Location:** this is the most widespread complex recorded on the high bog, thus it is found dominating almost the entire sub-marginal ecotope in Kilcarren Bog.
- **Ground:** soft
- **Physical indicators:** absent
- **Calluna height:** 31-40cm
- **Cladonia cover:** <4%
- **Macro-topography:** flat
- **Pools:** absent
- **Sphagnum cover:** 26-33%
- **Nartheceum cover:** <4%
- **Micro- topography:** high hummocks/hollows
- **Tussocks:** absent
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (26-33%), *Erica tetralix* (<4%), *Eriophorum vaginatum* (11-25%), *Nartheceum ossifragum* (26-33%), *Carex panicea* (4-10%), *Sphagnum capillifolium* subsp. *rubellum* (H; 11-25%), *S. papillosum* (H; 4-10%), *S. subnitens* (H; 4-10%), *S. fuscum* (H; <4%), *S. austinii* (H; <4%), *S. cuspidatum* (H; <4%).
- **Additional comments:** *Rhynchospora fusca* was recorded to the south of Sc6 within this complex. *Myrica gale* becomes abundant within this complex to the east of high bog (e.g. between FV and FW). Here complex is named 9/7/6+My.
Eriophorum angustifolium becomes abundant in a small section to the north of Sc12. Here complex is named 9a/7/6.
Where *Carex panicea* becomes abundant the complex is named 9/7/3. In certain locations (surrounding FV) *Myrica gale* becomes abundant, then the complex is named 9/7/3+My.

COMPLEX 7/6

- **Location:** this complex frequently found at Kilcarren Bog is more commonly found across the western half of the high bog.
- **Ground:** soft
- **Physical indicators:** : old burn; bare peat 4-10%, *Campylopus introflexus* 4-10%
- **Calluna height:** 11-20cm
- **Cladonia cover:** absent
- **Macro-topography:** gentle slope

- **Pools:** absent
- **Sphagnum cover:** 11-25%
- **Narthecium cover:** 11-25%
- **Micro- topography:** high and low hummocks/hollows
- **Tussocks:** absent
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (26-33%), *Erica tetralix* (4-10%), *Eriophorum vaginatum* (4-10%), *Narthecium ossifragum* (11-25%), *Carex panicea* (11-25%), *Sphagnum capillifolium* subsp. *rubellum* (H; 4-10%), *S. papillosum* (H; 4-10%), *S. subnitens* (H; <4%).
- **Additional comments:** *Leucobryum glaucum* hummocks show signs of damage from an old burn. *Myrica gale* becomes abundant to the east of high bog within this complex. Here complex is named 7/6+My.

Marginal Ecotope Complexes

COMPLEX 6/7

- **Location:** found across entire marginal ecotope.
- **Ground:** firm to soft
- **Physical indicators:** bare peat <4%, *Campylopus introflexus* <4%
- **Calluna height:** 31-40cm
- **Cladonia cover:** <4%
- **Macro-topography:** steep slope
- **Pools:** absent
- **Sphagnum cover:** 4-10%
- **Narthecium cover:** 34-50%
- **Micro- topography:** High hummocks /hollows/flats
- **Tussocks:** absent
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (11-25%), *Erica tetralix* (4-10%), *Eriophorum vaginatum* (<4%), *E. angustifolium* (<4%), *Narthecium ossifragum* (34-50%), *Carex panicea* (4-10%), *Rhynchospora alba* (<4%), *Trichophorum germanicum* (<4%), *Leucobryum glaucum* (H; <4%), *Sphagnum capillifolium* subsp. *rubellum* (H; 4-10%), *S. papillosum* (H; <4%).
- **Additional comments:** where *Myrica gale* becomes abundant the complex is named 6/7+My.

COMPLEX 3/6

- **Location:** this complex is found along the west, south and east high bog margin.
- **Ground:** firm
- **Physical indicators:** burnt; bare peat 4-10%
- **Calluna height:** <10cm
- **Cladonia cover:** absent
- **Macro-topography:** steep slope
- **Pools:** absent
- **Sphagnum cover:** 4-10%
- **Narthecium cover:** 26-33%
- **Micro- topography:** Flats with scattered low hummocks/hollows
- **Tussocks:** absent
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (4-10%), *Erica tetralix* (4-10%), *Eriophorum vaginatum* (<4%), *E. angustifolium* (<4%), *Narthecium ossifragum* (26-33%), *Carex panicea* (26-33%), *Rhynchospora alba* (<4%), *Drosera rotundifolia* (<4%), *Andromeda polifolia* (<4%), *Leucobryum glaucum* (H; <4%), *Sphagnum capillifolium subsp. rubellum* (H; 4-10%), *S. papillosum* (H; <4%), *S. subnitens* (H; <4%).
- **Additional comments:** Complex 3/6 is named 3/6+Mo, when *Molinia caerulea* becomes frequent (cover greater than 25%).

COMPLEX 7/2

- **Location:** this complex is found in several locations along the high bog margin.
- **Ground:** firm
- **Physical indicators:** bare peat 4-10%
- **Calluna height:** 11-20cm
- **Cladonia cover:** absent
- **Macro-topography:** steep slope
- **Pools:** absent
- **Sphagnum cover:** 4-10%
- **Narthecium cover:** 11-25%
- **Micro- topography:** High hummocks/hollows
- **Tussocks:** absent
- **Degradation or regeneration evidence:** absent

- **Species cover:** *Calluna vulgaris* (11-25%), *Eriophorum vaginatum* (<4%), *Narthecium ossifragum* (11-25%), *Trichophorum germanicum* (4-10%), *Sphagnum capillifolium* subsp. *rubellum* (H; 4-10%), *S. papillosum* (H; <4%).
- **Additional comments:** None.

Face bank Complexes

COMPLEX 1

- **Location:** this complex was found along the bog margin
- **Ground:** firm
- **Physical indicators:** bare peat variable
- **Calluna height:** <50cm
- **Cladonia cover:** 4-10%
- **Macro-topography:** steep slope
- **Pools:** absent
- **Sphagnum cover:** <5%
- **Narthecium cover:** absent
- **Micro- topography:** absent
- **Tussocks:** absent
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Calluna vulgaris* (76-90%), *Erica tetralix* (4-10%), *Eriophorum vaginatum* (<4%), *E. angustifolium* (<4%), *Molinia caerulea* (<4%), *Trichophorum germanicum* (<1%), *Myrica gale* (<4%), *Hypnum jutlandicum* (<4%), *Hylocomium splendens* (<1%).
- **Additional comments:** None.

Inactive Flushes (These descriptions are taken from Fernandez et al. (2005).

FLUSH 1A

This is a small flush (10 m wide) that occurs in the eastern side of the high bog (GR 193788/201307). There are several *Betula pubescens* trees (up to 1.5 m high) present. The flush contains *Molinia caerulea* and is surrounded by flushed *Calluna vulgaris* and abundant *Eriophorum vaginatum*. There is frequent *Hypnum cupressiforme*, *S. capillifolium* and occasional *Aulacomnium palustre* and *Hylocomium splendens* present. The *Cladonia* spp cover is 20%.

FLUSH 2A

This flush (10-15 m wide) occurs on the eastern side of the high bog (GR 193576/201651). Several *Pinus* sp. and *Betula pubescens* trees (3-4 m high) are present. The vegetation is dominated by *Molinia caerulea* and *Calluna vulgaris* with occasional *Eriophorum vaginatum*. *S. capillifolium*, *Aulacomnium palustre* and *Polytrichum alpestre* occurs in the bryophyte layer.

FLUSH 4A

This feature occurs in the north-western part of the high bog (GR 192811/201877). Two *Pinus sylvestris* trees (5 m high) occur on a slight mound with *Molinia caerulea* and *Calluna vulgaris*. Numerous young *Pinus sylvestris* seedlings occur around the edge of the flush ranging between 0.3-1 m high). *Dicranum scoparium*, *Aulacomnium palustre* and *Hypnum cupressiforme* occur relatively frequently.

FLUSH 5A

This feature occurs in the north-western part of the high bog (GR 192807/201821). A single *Pinus sylvestris* tree (3 m high) occurs on a high mound.

FLUSH 6A

This flush (20 m wide) occurs in the north-western part of the high bog (GR 192730/201874). The flush is dominated by *Myrica gale*. The flush also contains *Calluna vulgaris* (0.4 m high), *Eriophorum vaginatum*, *Sphagnum capillifolium* subsp. *rubellum*, *Pleurozium schreberi* and *Hypnum cupressiforme*.

FLUSH 7A

This inactive flush is located to the southeast of Sc11 GR (192784/202272). This flush is 5-10m in diameter and is composed of one 2-3m tall *Betula pubescens* and ca. 10 *Betula* of 0.5-2m in height. Also recorded in this area is tufts of *Eriophorum vaginatum*, *Polytrichum alpestre* (<4%), *Aulacomnium palustre* (<4%) and tall (>0.5m) *Calluna vulgaris*.

Depressions on peat substrates of the Rhynchosporion (7150)

The habitat occurs at Kilcarren Bog in both Active and Degraded Raised Bog, but it is only occasional found on degraded habitat. *Rhynchospora alba* and *R. fusca* were recorded in the 2011 survey at this site.

R. alba is found in all ecotopes except the face bank in Kilcarren Bog, such as: central ecotope (complex 10/15; 15); sub-central ecotope (9a/10; 9/10; 4/10; 9/7/6 + P; 9/7/10); sub-marginal ecotope (6/9 + P) and marginal ecotope (6/7; 3/6). *R. fusca* was recorded only in sub-marginal ecotope (9/7/6) within the 2011 survey at this site.

The species becomes very frequent within complexes 15 (central ecotope), 4/10 (sub-central) and parts of 9/10 (sub-central).

The species is always found associated with wet features such as *Sphagnum* pools, *Sphagnum* lawns and hollows, along with *Sphagnum magellanicum*, *S. papillosum*, *S. cuspidatum*. It was also found within *Narthecium ossifragum* dominated hollows in sub-marginal and marginal ecotope complexes.

Appendix II Photographical records

Photograph Number	Aspect	Type	Feature	Date
102-0470	W	Overview	Qsc1	29/09/2011
102-0471	S	Overview	Qc2	29/09/2011
102-0472	SE	Overview	Qc1	29/09/2011
102-0473	NE	Overview	Qsc4	29/09/2011
102-0474	SE	Overview	Qsc5	30/09/2011
102-0475	SW	Overview	Qsc3	30/09/2011
102-0476	N	Overview	Qsc2	30/09/2011

Appendix III Quadrats

Ecotope type	Central	Central	Central	Central
Complex Name	14	10/15	14	10/15
Quadrat Name	Qc1	Qc1	Qc2	Qc2
Easting	193095	193096	193042	193046
Northing	201605	201602	201544	201546
Firmness	Very soft	Quaking	Quaking	Quaking
Burnt		No		No
Algae in hollows %	4-10	Absent	Absent	Absent
Algae in pools %	Absent	Absent	Absent	Absent
Bare peat %	Absent	Absent	Absent	Absent
High hummocks %	Na	4-10	na	Absent
Low hummocks %	4-10	34-50	34-50	11-25
Hollows %	4-10	Absent	4-10	1-3 (many indiv)
Lawns %	4-10	4-10	34-50	51-75
Pools %	11-25	26-33	11-25	4-10
Pool type	Regular	Interconnecting	Regular	Regular
S.austinii hum type	Absent	Absent	na	Absent
S.austinii hum %	Absent	Absent	1-3 (many indiv)	Absent
S.austinii height(cm)	Absent	Absent	na	Absent
S.fuscum hum type	Absent	Absent	na	Absent
S.fuscum hum %	Absent	Absent	1-3 (many indiv)	Absent
S.fuscum height(cm)	Absent	Absent	na	Absent
Leucobryum glaucum	Na	Absent	Absent	Absent
Trichophorum type	Tussocks	Absent	Absent	Absent
Trichophorum %	1-3 (many indiv)	Absent	Absent	Absent
S.magellanicum %	51-75	51-75	51-75	76-90
S.cuspidatum %	11-25	11-25	4-10	4-10
S.papillosum %	4-10	4-10	4-10	4-10
S.denticulatum %	Na	Absent	Absent	Absent
S.capillifolium%	4-10	1-3 (many indiv)	4-10	4-10

S.tenellum %	Na	1-3 (many indiv)	na	1-3 (many indiv)
S.subnitens %	Na	Absent	Absent	Absent
R.fusca %	Absent	Absent	Absent	Absent
R.alba %	4-10	4-10	4-10	1-3 (many indiv)
N.ossifragum %	4-10	1-3 (several indiv)	Absent	Absent
Sphag pools %	26-33	26-33	11-25	4-10
Dominant pool Sphag	Na	S.cuspidatum	S.cuspidatum	S.cuspidatum
Sphag lawns %	26-33	4-10	26-33	51-75
Sphag humm %	11-25	34-50	34-50	11-25
Sphag holl %	4-10	Absent	1-3 (many indiv)	1-3 (many indiv)
Total Sphag %	91-100	76-90	76-90	91-100
Hummocks indicators		Absent	S.austini&S.fuscu m	Absent
Cladonia portent %	1-3 (many indiv)	Absent	4-10	Absent
Other Cladonia sp				
C. panicea %	Absent	Absent	Absent	Absent
Calluna cover %	4-10	26-33	26-33	26-33
Calluna height(cm)	11-20	21-30	21-30	11-20
Other NotableSpecies		M. trifoliolate, D.anglica		A.palustre,M.trifoli ate
Other comment		Q reclassified		Q reclassified
Date	11/03/2005	29/09/2011	11/03/2005	29/09/2011

Ecotope type	Sub-central	Sub-central	Sub-central	Sub-central
Complex Name	9/7/10	9/10	9/10	9/10
Quadrat Name	Qsc1	Qsc1	Qsc2	Qsc2
Easting	193116	193106	192808	192807
Northing	201532	201534	202300	202300
Firmness	Quaking	Very soft	Very soft	Very soft
Burnt	before 1995survey	No		No
Algae in hollows %	Absent	Absent	1-3 (many indiv)	Absent
Algae in pools %	Absent	Absent	Absent	Absent
Bare peat %	Absent	Absent	Absent	Absent

High hummocks %	Na	4-10	na	34-50
Low hummocks %	4-10	11-25	34-50	4-10
Hollows %	4-10	1-3 (many indiv)	4-10	26-33
Lawns %	34-50	51-75	Absent	Absent
Pools %	Absent	4-10	Absent	Absent
Pool type	Absent	Regular	Absent	Absent
S.austinii hum type	Absent	Absent	Absent	Absent
S.austinii hum %	Absent	Absent	Absent	Absent
S.austinii height(cm)	Absent	Absent	Absent	Absent
S.fuscum hum type	Absent	Absent	Absent	Absent
S.fuscum hum %	Absent	Absent	Absent	Absent
S.fuscum height(cm)	Absent	Absent	Absent	Absent
Leucobryum glaucum	Absent	Absent	Absent	Absent
Trichophorum type	Absent	Absent	Absent	Absent
Trichophorum %	Absent	Absent	Absent	Absent
S.magellanicum %	51-75	51-75	Absent	Absent
S.cuspidatum %	4-10	4-10	4-10	26-33
S.papillosum %	Absent	4-10	11-25	26-33
S.denticulatum %	Absent	Absent	Absent	Absent
S.capillifolium%	Absent	4-10	11-25	4-10
S.tenellum %	na	4-10	na	1-3 (many indiv)
S.subnitens %	na	Absent	Absent	1-3 (several indiv)
R.fusca %	Absent	Absent	Absent	Absent
R.alba %	4-10	4-10	4-10	4-10
N.ossifragum %	1-3 (many indiv)	1-3 (many indiv)	Absent	1-3 (many indiv)
Sphag pools %	4-10	4-10	Absent	Absent
Dominant pool Sphag	na	S.cuspidatum	na	
Sphag lawns %	34-50	51-75	Absent	Absent
Sphag humm %	4-10	11-25	34-50	34-50
Sphag holl %	4-10	1-3 (many indiv)	4-10	26-33
Total Sphag %	51-75	91-100	51-75	51-75
Hummocks indicators		Absent		Absent
Cladonia portent %	na	Absent	na	Absent

Other Cladonia sp				
C. panicea %	Absent	Absent	Absent	Absent
Calluna cover %	11-25	26-33	11-25	26-33
Calluna height(cm)	21-30	21-30	21-30	21-30
Other NotableSpecies	M .trifoliata ,A. palustre, Dicranum scoparium			
Other comment	Stable;described as part of flush V in1995	Q reclassified		
Date	11/03/2005	29/09/2011	11/03/2005	30/09/2011
Ecotope type	Sub-central	Sub-central	Sub-central	Sub-central
Complex Name	4/14	4/10	4/10	4/10
Quadrat Name	Qsc3	Qsc3	Qsc4	Qsc4
Easting	193062	193064	192909	192909
Northing	202218	202220	201837	201835
Firmness	Very soft	Very soft	Very soft	Soft
Burnt		No		No
Algae in hollows %	Absent	Absent	Absent	Absent
Algae in pools %	Absent	Absent	Absent	Absent
Bare peat %	Absent	1-3 (many indiv)	Absent	1-3 (many indiv)
High hummocks %	na	26-33	na	4-10
Low hummocks %	11-25	11-25	26-33	34-50
Hollows %	4-10	34-50	26-33	34-50
Lawns %	Absent	Absent	4-10	Absent
Pools %	26-33	Absent	Absent	Absent
Pool type	Regular	Absent	Absent	Absent
S.austinii hum type	Absent	Absent	Absent	Relic
S.austinii hum %	Absent	Absent	Absent	1-3 (few indiv)
S.austinii height(cm)	Absent	Absent	Absent	21-30
S.fuscum hum type	Absent	Absent	Absent	Relic
S.fuscum hum %	Absent	Absent	Absent	1-3 (few indiv)
S.fuscum height(cm)	Absent	Absent	Absent	21-30

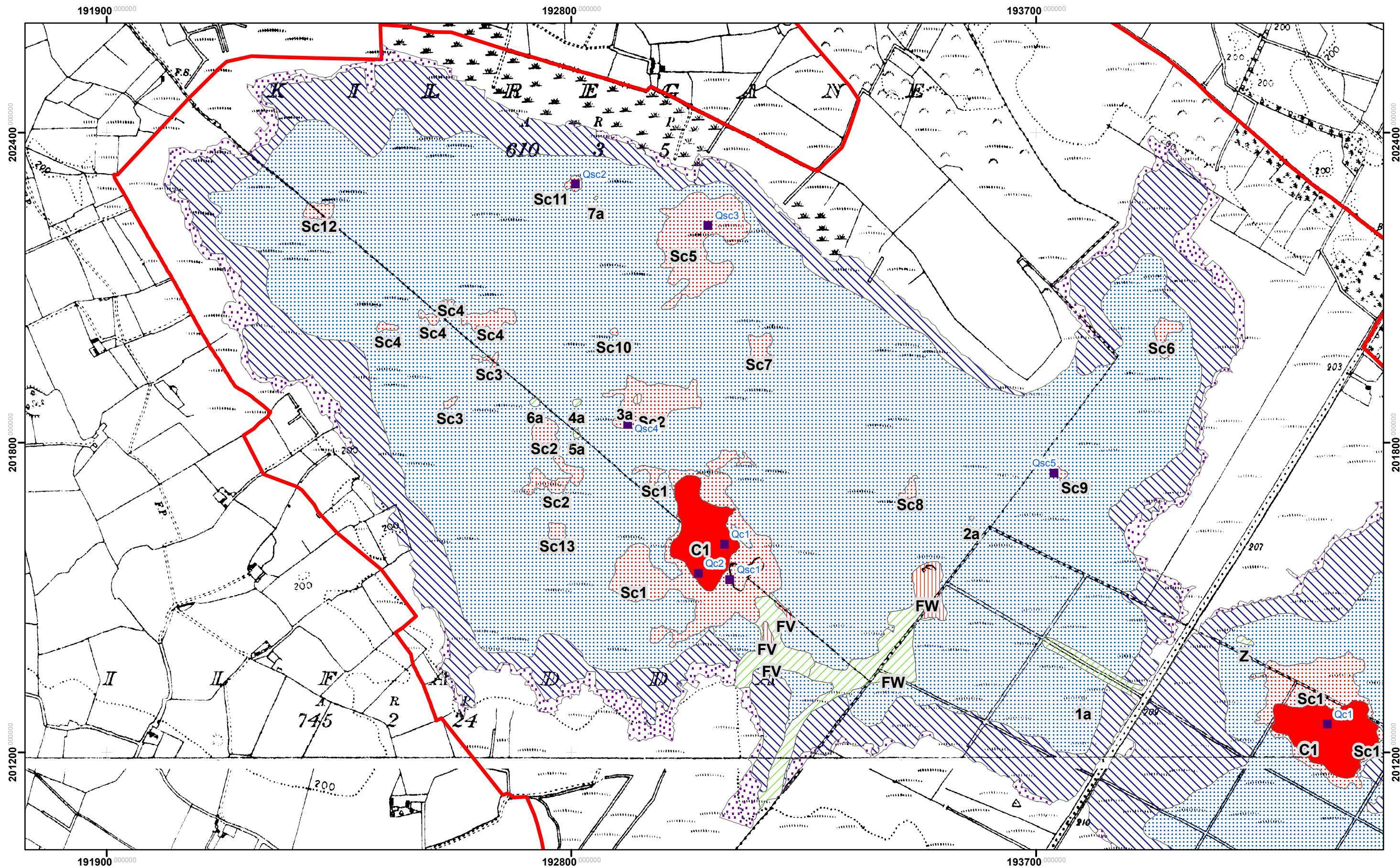
Leucobryum glaucum	Absent	Absent	na	Absent
Trichophorum type	Tussocks	Tussocks	Tussocks	Tussocks
Trichophorum %	4-10	1-3 (many indiv)	1-3 (many indiv)	1-3 (several indiv)
S.magellanicum %	4-10	1-3 (many indiv)	4-10	Absent
S.cuspidatum %	26-33	34-50	4-10	26-33
S.papillosum %	4-10	4-10	11-25	4-10
S.denticulatum %	Absent	Absent	na	Absent
S.capillifolium%	4-10	11-25	4-10	11-25
S.tenellum %	na	1-3 (many indiv)	na	1-3 (many indiv)
S.subnitens %	na	Absent	na	1-3 (many indiv)
R.fusca %	Absent	Absent	Absent	Absent
R.alba %	4-10	11-25	26-33	26-33
N.ossifragum %	4-10	1-3 (many indiv)	4-10	1-3 (many indiv)
Sphag pools %	34-50	Absent	Absent	Absent
Dominant pool Sphag	na		na	
Sphag lawns %	Absent	Absent	11-25	Absent
Sphag humm %	11-25	26-33	26-33	26-33
Sphag holl %	4-10	34-50	4-10	26-33
Total Sphag %	51-75	51-75	34-50	51-75
Hummocks indicators		Absent		S.austinii&S.fuscum
Cladonia portent %	na	4-10	na	1-3 (many indiv)
Other Cladonia sp				C. uncialis
C. panicea %	Absent	1-3 (few indiv)	Absent	Absent
Calluna cover %	11-25	26-33	4-10	11-25
Calluna height(cm)	21-30	21-30	11-20	21-30
Other NotableSpecies				
Other comment				
Date	11/03/2005	30/09/2011	11/03/2005	29/09/2011

Ecotope type	Sub-central	Sub-central
Complex Name	9/10/2	9/10
Quadrat Name	Qsc5	Qsc5
Easting	193736	193735

Northing	201742	201741
Firmness	Soft	Soft
Burnt		No
Algae in hollows %	4-10	Absent
Algae in pools %	Absent	Absent
Bare peat %	4-10	1-3 (many indiv)
High hummocks %	na	26-33
Low hummocks %	26-33	26-33
Hollows %	4-10	26-33
Lawns %	Absent	Absent
Pools %	Absent	Absent
Pool type	Absent	Absent
S.austinii hum type	Absent	Absent
S.austinii hum %	Absent	Absent
S.austinii height(cm)	Absent	Absent
S.fuscum hum type	Absent	Absent
S.fuscum hum %	Absent	Absent
S.fuscum height(cm)	Absent	Absent
Leucobryum glaucum	Absent	Absent
Trichophorum type	Tussocks	Tussocks
Trichophorum %	11-25	4-10
S.magellanicum %	Absent	Absent
S.cuspidatum %	4-10	11-25
S.papillosum %	4-10	Absent
S.denticulatum %	Absent	11-25
S.capillifolium%	4-10	11-25
S.tenellum %	na	1-3 (many indiv)
S.subnitens %	Absent	Absent
R.fusca %	Absent	Absent
R.alba %	4-10	1-3 (many indiv)
N.ossifragum %	4-10	1-3 (many indiv)
Sphag pools %	4-10	Absent
Dominant pool Sphag	na	

Sphag lawns %	Absent	Absent
Sphag humm %	26-33	26-33
Sphag holl %	4-10	11-25
Total Sphag %	34-50	34-50
Hummocks indicators		Absent
Cladonia portent %	na	1-3 (many indiv)
Other Cladonia sp		
C. panicea %	Absent	1-3 (many indiv)
Calluna cover %	4-10	34-50
Calluna height(cm)	11-20	21-30
Other NotableSpecies		
Other comment		Extremely small SC depression
Date	11/03/2005	30/09/2011

Appendix IV Survey maps



Raised Bog Monitoring Survey 2011

Map 1: Ecotopes Map and Quadrats

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Kilcarren Bog SAC (0006471) Co. Tipperary

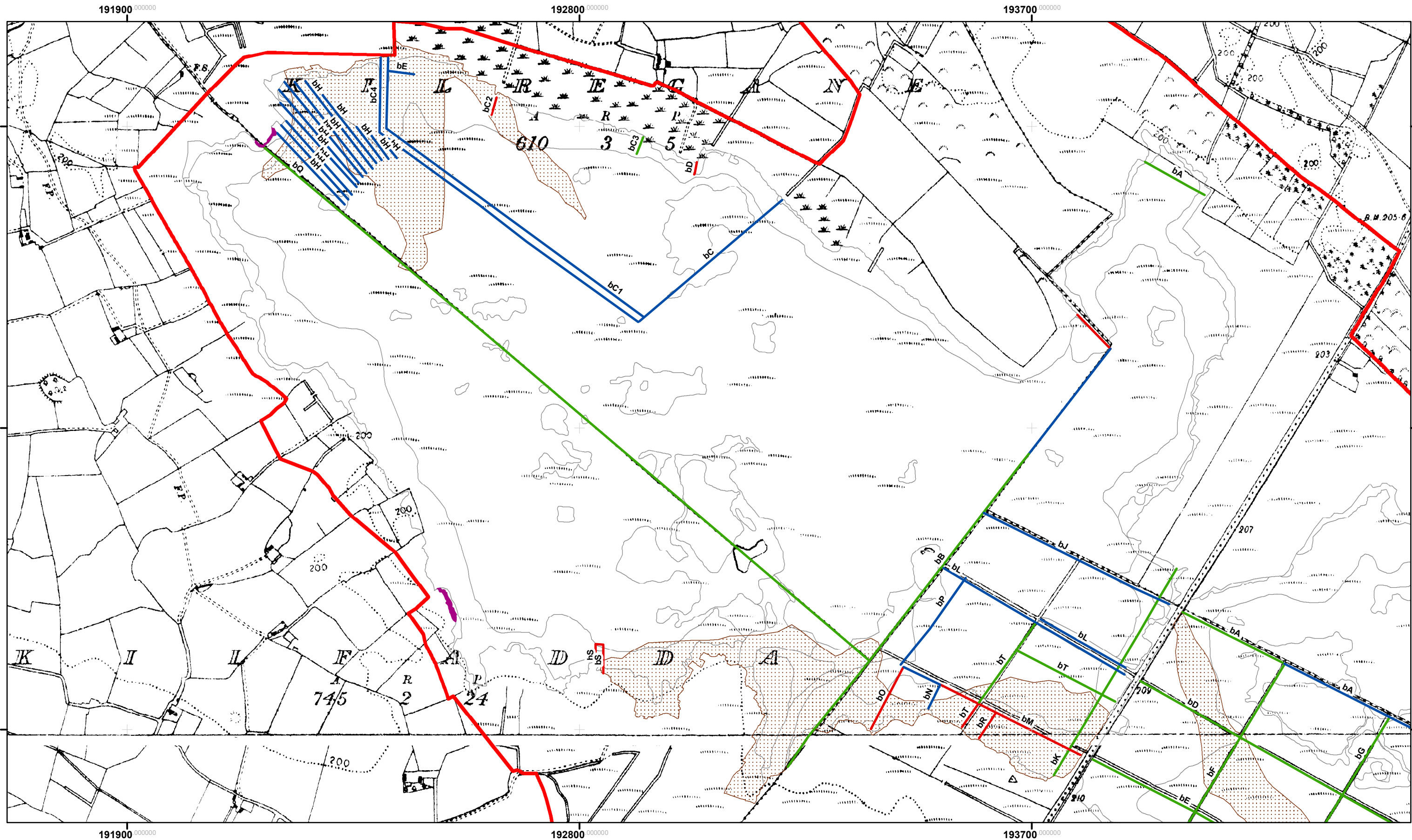
1:7,000

0 87.5 175 350 525 700 Meters



Legend

Ecotope type		Woodland	Inactive Flush
Central	Active Flush	Open water	Marginal
Sub-central	Bog Woodland	Sub-marginal	Face bank
		Quadrat	
		SAC	



Raised Bog Monitoring Survey 2011

Map 3: Impacts (High Bog drainage; Turf cutting; Fire events)

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Kilcarren Bog SAC (000647)

Co.Tipperary

1:7,000

0 95 190 380 570 760 Meters

N

Legend

High bog cut away 2005-2011	Not blocked: functional	Ecotopes
High Bog drainage	Not blocked: non-functional	SAC
Blocked: non-functional	Not blocked: reduced functional	
Blocked: reduced functional	Recently burnt	