

Fisherstown Bog (SAC 001818), Co. Longford

Executive Summary

This survey, carried out in September 2012, aimed to assess the conservation status of habitats listed on Annex I of the European Habitats Directive (92/43EEC) on the high bog at Fisherstown 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 1.39 ha (1.36%) of the high bog area. Central ecotope is absent from the site, and there are very few *Sphagnum* pools present anywhere on the site. The sub-central ecotope present is of variable quality with the *Sphagnum* cover ranging from 34 to 90% composed mostly of hummocks, but also lawns.

Degraded Raised Bog covers 101.04 ha (98.64%) of the high bog area. It is drier than Active Raised Bog and supports a lower density of *Sphagnum* mosses. It has a less developed micro-topography while permanent pools and *Sphagnum* lawns are generally absent. The habitat also includes some inactive flushes mostly dominated by *Molinia caerulea*.

Depressions on peat substrates of the Rhynchosporion are found in both Active and Degraded Raised Bog, but tend to be best developed and most stable in the wettest areas of Active Raised Bog. On Fisherstown Bog it was found to be most common within the sub-central complex 10/4.

Restoration works took place at the site in 2006 including the blocking of the high bog drains within the two dense drainage networks. The site is also part of the Coillte Life project (LIFE09 NAT/IE/000222) to restore raised bogs. Under this programme, the *Pinus contorta* plantations on the high bog (1ha) and on the cutover in the south-west (11ha) are to be removed and the associated drainage networks blocked. This work was scheduled for 2012, but has been postponed until 2013 (Derwin, J. pers. comm..).

The current conservation objective for Fisherstown 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 76.06ha. 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 decrease in the area of Active Raised Bog (6.41ha) at Fisherstown Bog in the 2004 to 2012 period. All of this loss has taken place in areas that were burned in March 2012. There have also been changes in the distribution of Active Raised Bog across the site. A new area of Active Raised Bog has developed in the north-west of the site and is associated with re-wetting after drain blocking. Re-wetting after drain blocking has also resulted in the expansion of an area of Active Raised Bog in the west of the site. On the other hand, three areas of Active Raised Bog have declined in quality from 2004 to 2012 to become Degraded Raised Bog. The reason for the decline is likely to be largely due to the fire of March 2012, but may also be, at least partially, due to ongoing drying out effects caused by the two dense drainage networks on the high bog, despite their being blocked in 2006. There have also been several changes to the boundaries of sub-central ecotope areas as a result of more comprehensive survey, increased mapping accuracy and/or different interpretations of the vegetation in 2012.

Fire and the potential ongoing drainage effects from the two dense drainage networks that were excavated on the high bog from 1992 to 1994 are the largest threats to the Active Raised Bog on the site, despite these drains being blocked in 2006. Peat cutting no longer takes place at that site and 0ha of high bog were lost in the reporting period to peat cutting. 0km of drains remain functional and 10.2km (9.4km of this have been blocked but remain reduced functional) reduced functional. A severe fire burned 26.55ha of the high bog in March 2012.

Active Raised Bog has been given an overall **Unfavourable Bad–Declining** conservation status assessment. Habitat Area has decreased and the quality declined in the reporting period. Furthermore, the current Area value as well as the S&Fs are below reference values. However, Future Prospects are considered Unfavourable Bad-Improving as parts of the high bog are

expected to continue to re-wet after drainage blocking. Further improvements are also expected under the planned restoration work to be carried out as part of the Coillte Life project.

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

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

A series of **recommendations** have been also given, these include: restoration works including the removal of the conifer plantations from the high bog and cutover areas as well as the blocking of associated drains; further hydrological and topographical studies to ascertain more accurate FRVs; further botanical surveys on the high bog and cutover to assess the efficiency of restoration works and a hydrological investigation of the high bog, cutover, callows and the River Camlin in relation to cutover drainage (including those on agricultural land) and regional drainage works.

Site identification

SAC Site Code	001818	6" Sheet:	Ld 8 & 13
Grid Reference:	E 207500 / N277400	1:50,000 Sheet:	40
High Bog area (ha):	102.43ha		
Dates of Visit:	03/04 & 06/09/12		
Townlands:	Cloondara		

Site location

This medium sized raised bog is located in Co. Longford, 6.5km NE of Longford town. The River Camlin runs to the NE, east and south of the site, while the Shannon lies 1.5km to the NW. Fisherstown Bog forms part of a larger Special Area of Conservation (SAC), the Lough Forbes Complex (SAC 001818), which also includes Ballykenny bog. Ballykenny lies immediately to the north (separated from Fisherstown Bog by the Camlin River and callows). Brown Bog (SAC 002346) lies about 1.5km to the south-east.

The site is accessed from the Longford to Strokestown road (N5), turning right just before reaching Termonbarry, immediately east of the Shannon along a cul de sac by a factory (Atlantic Mills- now closed). Where the road ends park the car and proceed down a grassy lane from which the north-west end of the bog may be entered.

Description of the survey

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

Appendix II. The survey aimed to assess the conservation status of Habitats Directive (Council Directive 92/43/EEC) Annex I habitats on the high bog.

The entire high bog of Ferbane Bog was re-surveyed. Sections mapped as sub-marginal and sub-central ecotope in 2004 were surveyed in more detail. These are the areas where changes were likely to have occurred. Quadrats, which describe the micro-topographical features and indicator species, recorded in the 2004 project (Fernandez *et al.* 2005) were re-surveyed 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 bog has been classified as a Broad Floodplain bog type and a Midland Raised Bog (Cross, 1990). It is situated at a wide point in the River Shannon valley and lies in its former floodplain. The site lies at a mean of 45m OD. In general it is very flat with little slumping or cracking and slopes are mainly gradual except to the west and north-west where peat cutting has taken place. A mineral mound lies to the south-west of the site, the bog grades into this and the peat depth appears to be shallow (no drains separate them). To the NE and SE, the bog vegetation grades into the Camlin River callows. To the south, there is a natural lag zone where the bog slopes to the river.

Ecological Information

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

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

- Active Raised Bog (EU code 7110),
- Degraded Raised Bog (EU code 7120),

- Depressions on peat substrates of the Rhynchosporion (EU code 7150).

Active Raised Bog (7110)

The current area of Active Raised Bog at Fisherstown Bog is 1.39ha (1.36% of the high bog), which is a decrease of 50.00ha since 1994.

Active Raised Bog includes only sub-central ecotope.

Sub-central ecotope was found at two locations (**Sc4** & **Sc6**) (see Appendix IV, Map 1). Although five different sub-central complexes were recorded, only two occurred over a significant enough area to be mapped. Complex 10/4 dominated in **Sc4** and was composed mainly of low hummocks/hollows and lawns with scattered pools and tall hummocks. The *Sphagnum* cover generally ranged from 34 to 50%, but was higher in places. *S. capillifolium* dominated the *Sphagnum* hummocks layer *S. tenellum*, *S. papillosum*, *S. austinii* and *S. fuscum* were also present. *Sphagnum* lawns were dominated by *S. papillosum* and *S. magellanicum* while *S. cuspidatum* dominated in pools. *Calluna vulgaris* and *Eriophorum vaginatum* dominated the vegetation along with prominent *Rhynchospora alba*. Other species recorded include *Menyanthes trifoliata*, *Drosera anglica* and *Vaccinium oxycoccos*. Complex 10/6 dominated in **Sc6** and here the *Sphagnum* cover ranged from 51-90% composed mostly of hummocks of *S. capillifolium* with *S. magellanicum*, *S. papillosum* and *S. cuspidatum* dominating in hollows. *Narthecium ossifragum* dominated the vegetation along with *Calluna vulgaris* and *Eriophorum vaginatum*.

Degraded Raised Bog (7120)

The current area of Degraded Raised Bog at Fisherstown Bog is 101.04ha (98.64% 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. Complex 9/7 was the best quality community complex recorded on Fisherstown Bog although it supported no pools. This complex was found in the south-west of the high bog and north of flush Z and had a relatively high *Sphagnum* cover (34-50%), which bordered on being classed as sub-central ecotope. However, *S. capillifolium* was the only *Sphagnum* species found with a cover value of >5% although *S. fuscum*, *S. magellanicum*, *S. tenellum* and *S. cuspidatum* were all present. *Calluna vulgaris* and *Eriophorum vaginatum* dominated the vegetation. Hummocks of *Racomitrium*

lanuginosum were also present. A burnt version of this complex (burnt in March 2012) was also recorded in which hummocks of *Leucobryum glaucum* were prominent. Complex 9/7/6, which dominated across much of the high bog, is a slightly more degraded version of this complex with a *Sphagnum* cover of 26-33% and a higher cover of *Narthecium ossifragum* in hollows. A burnt version of this complex was also recorded. Complex 9/7/4 was recorded in the east of the high bog (as well as in the south of the blocked drainage complex bO/bN). Although no pools are present, there are depressions where *Rhynchospora alba* dominates that appear as if they may have once been pools. *Sphagnum papillosum* is more frequent than in other DRB complexes and *S. austinii* is also present.

Although patches of ARB were recorded as developing within the blocked drainage network bN/bO, DRB dominated. The vegetation was very variable, but there were areas where the sub-marginal complex 4/6 dominated with *Narthecium ossifragum* and *Rhynchospora alba* dominating the vegetation. The *Sphagnum* cover here was 26-33% and *Sphagnum cuspidatum* dominated pools were present, but were likely to be associated with areas where peat was excavated in order to build the dams. However, the marginal complex 2/4 dominated within the blocked drainage complex. This had a lower *Sphagnum* cover and disturbance indicators such as bare peat, *Trichophorum germanicum* tussocks and *Campylopus introflexus* were frequent. The area within the blocked drainage complex bAB was still re-vegetating and large parts of this area were still dominated by bare peat with *Eriophorum vaginatum* dominating the vegetation. Overall, however, marginal ecotope, which is slightly drier than sub-marginal ecotope is absent from most of the high bog at Fisherstown Bog, being recorded only in the very north of the site and in the areas associated with the blocked drainage complexes. Some scattered *Betula pubescens* and *Pinus* sp. were recorded within complex 2/4 that were mostly 1.0 - 2.0m in height.

Face bank ecotope is characterised by firm ground, tall *Calluna vulgaris*, poor *Sphagnum* cover and a flat micro-topography. This ecotope covers a narrow band at the edge of the high bog mainly in the north-west and the north-east of the high bog.

The high bog also features two inactive flushes (Y and Z). Flush Y was found along an old drain dominated by *Molinia caerulea*. Flush Z was found in the south-east of the high bog and was partially burnt in March 2012. This flush was dominated by *Molinia caerulea* and *Eriophorum vaginatum* and had a *Sphagnum* cover of 11-25% dominated by *S. capillifolium* and *S. papillosum*. However, there were some very narrow wet channels within this flush which had a much higher *Sphagnum* cover (51-75%) including *S. fallax* and *S. palustre*. These channels could be considered as ARB, but they were too small to map. The bog grades into callows associated with the River Camlin at this point of the bog.

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

Rhynchosporion vegetation is widespread on Fisherstown 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 within *Sphagnum* hollows and along *Sphagnum* pool edges and on lawns. However, neither pools nor lawns are very common at this site. On Fisherstown Bog, it was found to be most common within the sub-central complex 10/4. 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 and run off channels. Rhynchosporion vegetation was quite frequent on Fisherstown Bog within the sub-marginal complexes 9/4, 4/6 and 4/6 (Burnt).

Detailed vegetation description of the high bog

A detailed description of high bog vegetation recorded during the 2012 survey of Fisherstown 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 Fisherstown Bog, according to their occurrence on the high bog or adjacent to the high bog; area or length affected, and whether they influence negatively (i.e. drainage, peat extraction) or positively (i.e. restoration works):

Table 6.1 Impacting activities

Code	Activity	Ranking	Influence	Area (ha) /Length(km)	Location	Habitat affected
J02.07	Drainage	H	-1	10.164km ¹	Inside High Bog	7110/7120/7150
J02.07	Drainage	L	-1	n/av	Outside High Bog	7110/7120/7150
J01	Fire	H	-1	26.55ha	Inside High Bog	7110/7120/7150
I01	Invasive alien	L	-1	<0.1ha ³	Inside	7110/7120/7150

species					High Bog	
B01.02	Artificial planting on open ground (non-native trees)	L	-1	1ha	Inside High Bog	7110/7120/7150
B01.02	Artificial planting on open ground (non-native trees)	L	-1	13ha	Outside High Bog	7110/7120/7150
4.2	Restoring/Improving the hydrological regime	H	+1	9.418km ²	Inside High Bog	7110/7120/7150

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

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

² This figure includes blocked drains on high bog.

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

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

Peat cutting

Peat cutting was considered as no longer taking place at the site by Fernandez *et al.* (2005) in 2003. This activity has also not taken place at the site during the 2005-2010 period and thus no high bog was lost to cutting in this period. The loss of high bog from peat cutting is calculated using aerial photography. As aerial photography is not available post 2010, it cannot be ruled out that cutting may have taken place in additional locations in the 2011-2012 period. However, this is unlikely in the case of Fisherstown Bog as information from the NPWS indicates that no cutting took place from 2010 to 2012.

Drainage

High bog drainage

Table 6.2 shows that 9.4km of drains have been blocked on the high bog at Fisherstown Bog. These were blocked during restoration work that was carried out on the site in 2006. The blocked drains are located in two separate dense drainage networks, one in the north of the site that was inserted in 1992/93, and one in the west of the site that was inserted in 1994. Significant water losses through these drains were noted in previous surveys and although now blocked, they are still classed as reduced functional. This is because they are still considered to be impacting on high bog habitats and will continue to do so until they become completely in-filled.

The majority of drains in the high bog remain reduced functional (10.1km; 9.4 of which have been blocked).

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

Table 6.2 High bog drainage summary

Status	2004 (km) ¹	2012 (km)	Change
NB: functional	9.418	0.000	(-)9.418
NB: reduced functional	0.746	0.746	0.000
NB: non- functional	1.816	1.816	0.000
B: functional	0.000	0.000	0.000
B: reduced functional	0.000	9.418	(+)9.418
B: non- functional	0.000	0.000	0.000

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

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

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

Table 6.3 High bog drainage detail

Drain Name	Length (km)	2004 status	2012 status	Change	Comment
bA	0.447	NB: functional	B: reduced functional	Yes	Double drain
bAB	2.306	NB: functional	B: reduced functional	Yes	Drain complex
bB	0.389	NB: functional	B: reduced functional	Yes	Double drain
bC	0.423	NB: non-functional	NB: reduced functional	No	This drain was wrongly classified as non-functional in 2004
bD	0.524	NB: non-functional	NB: non- functional	No	
bE	0.145	NB: functional	B: reduced functional	Yes	
bF	0.250	NB: non-functional	NB: non- functional	No	
bG	0.527	NB: non-functional	NB: non- functional	No	
bJ	0.185	NB: non-functional	NB: non- functional	No	
bK	0.145	NB: functional	B: reduced functional	Yes	Northern section of drain bK
bK	0.330	NB: functional	NB: functional	No	
bN	4.618	NB: functional	B: reduced functional	Yes	Drain complex
bO	0.984	NB: functional	B: reduced functional	Yes	Drain complex
bO1	0.184	NB: functional	B: reduced functional	Yes	
bO2	0.200	NB: functional	B: reduced functional	Yes	
bR	0.235	NB: reduced functional	NB: reduced functional	No	Drain already present in 2004 but not mapped
bS	0.088	NB: reduced	NB: reduced	No	Drain already present

functional	functional	in 2004 but not mapped
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Bog margin drainage

The cutover areas were not surveyed for drains during 2012.

Fisherstown Bog is situated entirely in a wide low gradient floodplain of the River Shannon with the River Camlin running to the north, east and south of the site and the Shannon running 1.5km to the north-west of the site. In the north-east and south-east there is a natural gradation from bog to callows, moving down slope to the River Camlin. In these areas no peat cutting has taken place in the past and there are no major drains. There are drains on the cutover in the south-west, west and north-west of the site and these are draining the high bog and impacting on high bog habitats. Overall, however, there are few drains on the cutover on Fisherstown Bog.

Drainage maintenance on the adjacent agriculture land seems to have taken place (from analysis of 2010 AP) to the south of the high bog (400m length). These drains are on fields adjacent to the river and approx. 150m from high bog.

Since the site is surrounded by river, any dredging work carried out on these rivers locally may also impact on the high bog vegetation. However, detailed hydrological studies would be required to assess such a potential impact. (Kelly *et al.*, 1995) noted that the bog is susceptible to periodic flooding particularly around its edges although the dome is too high to be totally emerged in water. They also noted that although the bog lies in a groundwater discharge area it is quite separate from the aquifer below since thick confining clays underlie the bog and callows, and that the deeper regional groundwater is likely to flow under the floodplain via a confined aquifer and exfiltrate directly to the river which has cut deep into the clay.

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

Fire history

A fire, which occurred in March 2012, severely burned 26.55ha of the high bog (25.95%) on Fisherstown Bog. Much of this was in areas that had been classed as sub-central ecotope in 2005. Prior to this, there has been no evidence of fires on the high bog at Fisherstown Bog since before 1995.

Fire is considered to have a high importance/impact on high bog habitats.

Invasive species

Some scattered pines were reported in 2004 by Fernandez *et al.* (2005) in the western part of the high bog. These trees were recorded again during the 2012 survey but are not considered to be spreading.

Campylopus introflexus is frequent in the areas of the blocked drainage complexes.

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

Afforestation and forestry management

In the southern tip of the site, there is a 0.99ha *Pinus contorta* plantation on the high bog. This was planted in 1996. Its impact on the current area of Active Raised Bog is low due to its small size and distance from the ARB.

There is also 13ha of conifer plantation on the cutover to the south-west of the high bog. 11ha of this consists of a *Pinus contorta* plantation that was planted in 1996. This plantation, along with that on the high bog, is scheduled to be removed as part of the Coillte Life project (LIFE09 NAT/IE/000222) to restore raised bogs (Derwin, in prep.). Under this programme the drainage network associated with the plantation will also be blocked. These actions are expected to lead to a rise in water-levels in the area and thus will have a positive impact on the site. Felling and drain blocking had been scheduled for 2012, but has been postponed until 2013 (Derwin pers. comm.).

A small *Picea sitchensis* plantation lies to the south of the *Pinus contorta* plantation. This plantation is outside of Coillte ownership and thus not included in the Coillte Life project. However, its removal is also desirable.

Other impacting activities

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

Conservation activities

A Restoration Project took place in 2006 (Ryan, pers. comm.) when all of the drains in the two dense drainage networks on the high bog were blocked with peat dams. These drainage networks had been inserted into the high bog in 1992/93 (drainage complex bAB in the north of the site) and 1994 (drainage complex bN/bO in the west of the site). Significant water losses off the high bog were

recorded from these drains in previous surveys and as a consequence of 12-14 years of intense drainage, much of the active raised bog on Fisherstown Bog recorded by Kelly *et al.* (1995) in 1994 has been lost. However, the results of the 2012 survey showed that the drain blocking has led to the development (0.25ha) of ARB habitat (**Sc6**) to the north-east of drainage complex bN/bO and to the expansion (by 0.25ha) of ARB habitat (**Sc4**) to the south-east of the same drainage complex. However, this increase in area of ARB of 0.5ha adjacent to the blocked drainage complex is put into perspective when considered along with the fact that there has been a 50ha loss of ARB in the 18 years between the 1994 and 2012 surveys. In addition to the 0.5ha increase of ARB recorded in the vicinity of the blocked drainage complex bN/bO in 2012, further isolated patches of sub-central habitat were also recorded in this area as well as in the vicinity of the other blocked drainage network (bAB). However, these patches were considered too small and fragmented to map.

The quality of Degraded Raised Bog in the vicinity of the blocked drainage complexes has also shown an improvement since 2004 with a 1.5ha increase in the area of sub-marginal ecotope at the expense of marginal ecotope within drainage complex bO/bN and an increase of 4.2ha of marginal ecotope at the expense of bare peat within drainage complex bAb.

NPWS has also engaged in negotiation and agreements 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 peat cutting no longer takes place at Fisherstown Bog.

The site is also part of the Coillte Life project (LIFE09 NAT/IE/000222) to restore raised bogs. Under this programme, the *Pinus contorta* plantations on the high bog (1ha) and on the cutover in the south-west (11ha) are to be felled and the associated drainage networks blocked. These actions are expected to lead to a rise in water-levels in the area and thus will have a positive impact on the site. Felling and drain blocking had been scheduled for 2012, but has been postponed until 2013 (Derwin pers. comm.).

High bog drainage blocking is reported as positive management action under Restoring/Improving the hydrological regime (4.2) in table 6.1.

Conservation status assessment

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

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

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

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

Active Raised Bog (7110)

Area

Table 8.1 indicates a decrease (6.41ha) in the area of Active Raised Bog and there have also been changes in the distribution of the habitat. The former **Sc1**, **Sc2**, **Sc3** and **Sc5** are no longer present while **Sc6** has developed in an area that is re-wetting after drain blocking.

Sc1 is no longer present. This sub-central area was composed almost entirely of complex 9/7/10 in 2004, which was described at the time as being a mosaic of sub-marginal and sub-central. Using 2012, criteria, this area would be classed as sub-marginal and thus much of the loss of sub-central ecotope here can be attributed to vegetation re-interpretation. There was, however, a small area within **Sc1** where complex 9/7/10 + P dominated and this would still be classed as sub-central using 2012 criteria. This area was estimated to cover ca. 20% (3.5ha) of the area of **Sc1** in 2004. Thus although the entire 17.7ha of **Sc1** that was mapped in 2004 has been lost, only ca. 20% (3.5ha) of this loss is considered real and this loss is attributed largely to the fire of March 2012, but also, at least partially, to the ongoing drying out effects of the two dense drainage networks on the high bog, despite their being blocked in 2006.

Sc2 is no longer present. This sub-central area was composed of two complexes in 2004 being dominated by 4/10 with some 9/7/10 in the south. As with **Sc1** above, complex 9/7/10 was described as a mosaic of sub-marginal and sub-central and would be classed as sub-marginal using 2012 criteria. Hence, it's 'loss' can be attributed to vegetation re-interpretation. Complex 4/10 was also

described as containing “patches dominated by *Nartheceum ossifragum*, which are inactive.” Thus although the entire 1.2ha of **Sc2** that was mapped in 2004 has been lost, only ca. 50% (0.6ha) of this loss is considered real and this loss is attributed largely to the fire of March 2012, but also, at least partially, to the ongoing drying out effects of the two dense drainage networks on the high bog, despite their being blocked in 2006.

Sc3 is no longer present. This sub-central area was composed entirely of complex 9/7/10 in 2004, which was described at the time as being a mosaic of sub-marginal and sub-central. Using 2012, criteria, this area would be classed as sub-marginal and thus the ‘loss’ of sub-central ecotope here can be attributed to vegetation re-interpretation. A number of sub-central points were taken in this area in 2012, but were considered too small to map. Thus, it is estimated that there was no real loss of sub-central ecotope in this area from 2004 to 2012.

Sc4 has expanded to the north. There have been slight changes along the entire boundary, but most of these are as a result of more comprehensive surveying and increased mapping accuracy in 2012. However, there appears to have been a real increase (0.25ha) in the north of **Sc4** attributed to rewetting caused by the blocking of drains in the drainage complex bN/bO.

Sc5 is no longer present. This area was mapped as complex 9/7/10 in 2004 and although other areas where this complex was mapped in 2004 would be interpreted as sub-marginal using 2012 criteria, it is thought that this area would still be interpreted as sub-central. This is because the *Sphagnum* cover in this area was described as being “more extensive” and the vegetation in general as being “a better example of sub-central ecotope”. Thus, it is estimated that there was a real loss of sub-central habitat of 2.81ha in this area and this loss is attributed to the fire of March 2012.

Sc6 is newly developed. This area is dominated by complex 10/6, which has developed since 2004 in an area that is rewetting adjacent to the blocked drainage complex bN/bO. These drains were blocked in 2006. Thus an increase of 0.25ha of sub-central is estimated to have occurred here.

Although flush **Z** is classed as an inactive flush, there are some narrow wet channels within it (too small to be mapped) that could be considered as Active Raised Bog. The inactive flush is largely dry and dominated by *Molinia caerulea* and *Eriophorum vaginatum* with a *Sphagnum* cover of ca. 20%, but the wet channels have a high *Sphagnum* cover (51-75%) dominated by *S. cuspidatum* and *S. fallax*. These wet channels were also recorded in 2004.

To summarise it is estimated that there has been an overall loss of 6.41ha of sub-central ecotope (see table 8.1) with a loss of 6.91ha within **Sc1**, **Sc2** and **Sc5**, but an increase of 0.5ha within **Sc4** and the newly developed **Sc6**. This loss is attributed largely to the fire of March 2012, but also, at least partially, to the ongoing drying out effects of the two dense drainage networks on the high bog,

despite their being blocked in 2006. The increases are considered to be due to localised re-wetting occurring immediately adjacent to the blocked drainage complexes brought about by the blocking of these drains.

The favourable reference value (FRV) for Area is considered to be the sum of Active Raised Bog (central, sub-central ecotopes) plus sub-marginal ecotope when the Habitats Directive came into force in 1994 (see table 8.4). Therefore, Active Raised Bog Area FRV is 76.06ha (based on 1994 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 (1.39ha) is 98.17% below the FRV. A current Area value more than 15% below FRV falls into the **Unfavourable Bad** assessment category.

A long term (1994-2012) trend indicates a dramatic reduction in the area of Active Raised Bog at the site (50.00ha) (see table 8.1). A more recent and short term trend analysis (8 years; 2004-2012) also indicates a decrease in the area (6.41ha) of Active Raised Bog. Therefore, the habitat Area is given a **Decreasing** trend assessment.

The Area of Active Raised Bog at Fisherstown 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 0.70ha (half of 1.39ha, the current area of Active Raised Bog). The current value is 0ha which is 100% below the FRV. Therefore S&Fs are given an **Unfavourable-Bad** assessment.

Central ecotope has not been recorded on Fisherstown Bog in 1994 (by Kelly *et al.*, 1995), 2004 (by Fernandez *et al.*, 1995) or in 2012. However, both the long term (1994-2012) and short term (8 years; 2004-2012) trend indicates a decrease in the area of sub-central ecotope of 50ha and 6.41ha respectively. Furthermore, the fire in March 2012 also damaged some of the Active Raised Bog habitat and therefore the S&Fs are given a **Declining** trend.

Only one quadrat (**Qsm3**; previously classed as **Qsc1**) was recorded on Fisherstown Bog in 2004. This quadrat was re-visited in 2012 and three additional quadrats were also recorded (**Qsc2**, **Qsm1** and **Qsm2**). Quadrats analysis can only be conducted on **Qsm3** and indicates the following:

Qsm3: This quadrat was previously classified as sub-central ecotope (Qsc1; complex 9/7/10), but is now classed as sub-marginal ecotope (complex 9/7 Burnt). The change in classification is most likely to be due to the fact that the area was burnt in March 2012. However, it should also be realised that the complex 9/7/10 recorded in 2004 was considered a 'borderline' complex and much of what was classified as sub-central complex 9/7/10 would be considered as sub-marginal complex 9/7 using 2012 criteria. On the hand, the quadrat recorded in 2004 was located within former Sc5, which was considered at the time to be the best example of complex 9/7/10 on the site comprising of a more extensive *Sphagnum* cover. Thus, the degradation of the vegetation within this quadrat is considered to be real, the cause of which is attributed to the fire. The *Sphagnum* cover within this quadrat has decreased dramatically from the 50% recorded in 2004 to <4% in 2012. However, burnt *Sphagnum* hummocks were recorded as 51-75% in 2012. The *Sphagnum* layer was comprised almost entirely of *S. capillifolium* in 2004 with an additional 4-10% cover of *S. subnitens*. Only *S. capillifolium* and *S. papillosum* were recorded in 2012. The height of the *Calluna vulgaris* was estimated at 41-60cm in 2004 while it was 0-10cm in 2012. *Cladonia portentosa* was recorded at <4% in 2004, but was absent in 2012 while *Narthecium ossifragum* was absent in 2004, but recorded at <4% in 2012. *Eriophorum vaginatum* was recorded at 25% cover in 2004 and was estimated to be 34-50% in 2012.

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

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

Future Prospects

The area of Active Raised Bog has decreased (by 6.4ha) even though one new area has developed and another expanded. These newly developed/expanding areas of ARB have improved as a result of localised re-wetting caused by restoration works; i.e. drain blocking. However, these gains have been countered by even greater losses of other sections of Active Raised Bog. The direct causes of these losses are largely attributed to the fire of March 2012, but also, at least partially, to the ongoing drying out effects of the two dense drainage networks on the high bog, despite their being blocked in 2006.

There is potential for restoration of the cutover along the north-west, west and south-west of the high bog. Some of this potential may be realised in the near future as the site is part of the Coillte Life project (LIFE09 NAT/IE/000222) to restore raised bogs. Under this programme, the *Pinus contorta* plantations on the high bog (1ha) and on the cutover in the south-west (11ha) are to be

removed and the associated drainage networks blocked. These actions are expected to lead to a rise in water-levels in the area and thus will have a positive impact on the site. Felling and drain blocking had been scheduled for 2012, but has been postponed until 2013 (Derwin pers. comm.). The management of regenerating conifers is also planned as part of the Coillte Life project.

A small *Picea sitchensis* plantation lies to the south of the *Pinus contorta* plantation. This plantation is outside of Coillte ownership and thus not included in the Coillte Life project. However, its removal is also desirable.

A hydrological investigation of the high bog, cutover and callows and the River Camlin in relation to cutover drainage (including those on agricultural land) and regional drainage works should also be carried out.

Habitat **Area** is currently 98.17% below FRV (see table 8.4). Although the area of ARB has decreased during the reporting period and its S&Fs declined, the two areas where ARB remains on the site have expanded during this time as a result of localised re-wetting adjacent to the blocked drainage networks. These areas within and adjacent to the two blocked dense drainage networks are likely to continue to expand in the future, as re-wetting continues. Thus an Increasing trend is expected in the following two reporting periods (12 years). Nevertheless the habitat Area is expected to remain more than 15% below FRV. Thus, habitat's **Area Future Prospects** are assessed as **Unfavourable Bad-Increasing**. Habitat's **S&Fs** are currently 100% below FRV (see table 8.4). An Improving trend is also foreseen, but the **S&Fs** are expected to be more than 25% below FRV in the following two reporting periods. Thus **S&Fs Future Prospects** are assessed as **Unfavourable Bad-Improving**. **The overall habitat's Future Prospects are Unfavourable Bad-Improving** (see table 8.5).

The overall conservation status of Active Raised Bog at Fisherstown 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	2004	2004 (amended)	2012	Change (2004-2012)	
	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	%
Sub-central	51.39	24.79	7.80	1.39	(-)6.41	(-)82.18
Total	51.39	24.79	7.80	1.39	(-)6.41	(-)82.18

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

Note: Table 8.1 includes 2004 figures and 2004 amended figures. The latter shows the ecotope area believed to be present in 2004 after surveying improvements in 2012. The comparison between 2004 (amended) and 2012 illustrates the actual changes in ecotope area in the 2004-2012 period. Any

change in ecotope area between the 2004 and the 2004 (amended) values is due to improvement in mapping accuracy and/or the result of a more comprehensive survey in 2012 (see table 8.2 for further detail).

Table 8.2 Assessment of changes in individual Active Raised Bog areas

Area	Quadrats	Trend	Comment	Quadrats analysis
Sc1	None	No longer present (decreasing)	<p>This SC area was composed almost entirely of complex 9/7/10 in 2004, which was described at the time as being a mosaic of SM and SC. Using 2012, criteria, this area would be classed as SM. There was, however, a small area within Sc1 where complex 9/7/10 + P dominated and this would still be classed as SC using 2012 criteria. This area was estimated to cover ca. 20% (3.5ha) of the area of Sc1 in 2004.</p> <p>Thus although the entire 17.7ha of SC that was mapped here in 2004 has been lost, only ca. 20% (3.5ha) of this loss is considered real and this loss is attributed largely to the fire of March 2012, but also, at least partially, to the ongoing drying out effects of the two dense drainage networks on the high bog, despite their being blocked in 2006.</p>	
Sc2	None	No longer present (decreasing)	<p>This SC area was composed of two complexes in 2004 being dominated by 4/10 with some 9/7/10 in the south.</p> <p>Complex 9/7/10 was described as a mosaic of SM and SC and would be classed as SM using 2012 criteria.</p> <p>Complex 4/10 was also described as containing "patches dominated by <i>Nartheicum ossifragum</i>, which are inactive."</p> <p>Thus although the entire 1.2ha of SC that was mapped here in 2004 has been lost, only ca. 50% (0.6ha) of this loss is considered real and this loss is attributed largely to the fire of March 2012, but also, at least partially, to the ongoing drying out effects of the two dense drainage networks on the high bog, despite their being blocked in 2006.</p>	
Sc3	None	No longer present (but stable)	<p>Sc3 was mapped as complex 9/7/10 in 2004 and described as a mosaic of SC and SM. Using 2012 criteria; it would be classed as SM. A number of SC points were taken in 2012, but were considered too small to map. Thus, it is estimated that there was no real loss of SC habitat in this area from 2004 to 2012.</p>	

Area	Quadrats	Trend	Comment	Quadrats analysis
Sc4	Qsc2	Increasing	Slight changes along the entire boundary. Most of these are as a result of more comprehensive surveying and increased mapping accuracy in 2012. However, there appears to have been a real increase (0.25ha) in the north of Sc4 attributed to rewetting caused by the blocking of drains in the drainage complex bN/bO.	Qsc2-New 2012 quadrat. The <i>Sphagnum</i> cover decreased dramatically from the 51-75% recorded in 2004 to <4% in 2012. However, burnt <i>Sphagnum</i> hummocks were recorded as 51-75% in 2012. There are other slight differences also caused by the March 2012 fire such as a decrease in the height of <i>Calluna vulgaris</i> from 41-60cm to 0-10cm and the absence of <i>Cladonia portentosa</i> in 2012.
Sc5	Qsm3	No longer present (decreasing)	Sc5 was mapped as complex 9/7/10 in 2004. Although other areas where this complex was mapped in 2004 would be interpreted as SM using 2012 criteria, this area would still be interpreted as SC. This is because the <i>Sphagnum</i> cover in this area was more extensive and the vegetation was described as being a better example of sub-central ecotope. Thus, it is estimated that there was a real loss of SC habitat of 2.81ha in this area and this loss is attributed to the fire of March 2012.	Qsm3 was previously named Qsc1. The <i>Sphagnum</i> cover decreased dramatically from the 51-75% recorded in 2004 to <4% in 2012. However, burnt <i>Sphagnum</i> hummocks were recorded as 51-75% in 2012. There are other slight differences also caused by the March 2012 fire such as a decrease in the height of <i>Calluna vulgaris</i> from 41-60cm to 0-10cm and the absence of <i>Cladonia portentosa</i> in 2012.
Sc6	None	Newly developed (increasing)	This area is dominated by complex 10/6, which has developed in an area that is rewetting adjacent to the blocked drainage complex bN/bO. Thus an increase of 0.25ha of SC is estimated to have occurred here.	
Z	None	Stable	This flush is mapped as inactive and was largely dry and inactive, but there were some wet channels with a high <i>Sphagnum</i> cover (51-75%) including <i>S. fallax</i> that could be considered as active. These wet channels were also recorded in 2004.	

Degraded Raised Bog (7120)

Area

The Degraded Raised Bog FRV for area is 26.37ha at Fisherstown Bog. This value corresponds with the difference between the current high bog area (102.43ha) and the Active Raised Bog FRV

(76.06ha) for area. Degraded Raised Bog is a particular habitat type, for which a FRV smaller than the current value, may be desirable in many sites. However any decrease in habitat area would only be considered positive, when it is the result of restoration to Active Raised Bog. Current habitat area is 283.16% 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 (6.41ha) in the area of Degraded Raised Bog. The increase is the result of the degradation of Active Raised Bog. No high bog has been lost to peat cutting. As a result the habitat is given an **Increasing** trend.

The Area of Degraded Raised Bog at Fisherstown 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 25.26ha (25% of 101.04ha, the current area of Degraded Raised Bog). The current marginal and face bank ecotopes area value (17.03ha) is 32.58% below 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 below 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). Table 8.3 shows that there has been an overall increase in the area of marginal ecotope of 2.7ha (30.96%). An increase in the area of marginal ecotope is usually seen as a negative. However, in this case, the increase is as a result of a combination of the following two cases. Firstly there was an increase of 4.2ha of marginal ecotope in the north-west of the site within the blocked drainage complex bAB. This was brought about by the re-vegetating of areas of bare peat (although this area is now classed as marginal ecotope, it should be realised that bare peat is still a large component). Secondly there was a decrease of marginal ecotope in the west of the site within the blocked drainage complex bN/bO. This was as a result of the expansion of sub-marginal ecotope brought about by re-wetting. Thus as both of these changes are positive, the S&Fs of Degraded Raised Bog is considered to be **Improving**.

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

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

Future Prospects

Although the area of Degraded Raised Bog has increased (by 6.41ha) as a result of the degradation of Active Raised Bog, the S&Fs of the Degraded Raised Bog has improved as a result of restoration works in the form of drain blocking. The areas within and adjacent to the two blocked dense drainage networks are likely to continue to improve in the future, as re-wetting expands. This combined with the fact that further restoration works are scheduled to take place in 2013 under the Coillte Life project (LIFE09 NAT/IE/000222) results in positive Future Prospects for Degraded Raised Bog at Fisherstown Bog.

Habitat **Area** is currently 101.04% above FRV (see table 8.4) and a Decreasing trend, as a result of expansion of Active Raised Bog) is expected in the following two reporting periods (12 years). Habitat Area is expected to remain more than 15% above FRV. Thus, habitat's **Area Future Prospects** are assessed as **Unfavourable Bad-Decreasing**. Habitat's **S&Fs** are currently 32.58% below FRV (see table 8.4). An Improving trend is foreseen in the following two reporting periods, **S&Fs** are expected to remain below FRV. Thus, habitat's **S&Fs Future Prospects** are assessed as **Favourable-Improving**.

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

Table 8.3 Changes in Degraded Raised Bog area

Inactive Ecotopes	1994/5¹	2004	2004 (amended)	2012	Change (2004-2012)	
	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	%
Sub-marginal	24.67	45.01	73.84	81.75	(+)7.91	(+)10.71
Marginal	14.67	17.79	8.72	11.42	(+)2.70	(+)30.96
Face bank	n/a	8.07	5.61	5.61	0.00	0.00
Inactive flush	n/a	1.57	1.27	1.27	0.00	0.00
Conifer plantation	n/a	1.00	0.99	0.99	0.00	0.00
Damaged (e.g. Bare peat)	11.27	4.20	4.20	0.00	(-)4.20	(-)100.00
Total	50.61	77.64	94.63	101.04	(+)6.41	(+)6.77

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

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

The overall conservation status of Degraded Raised Bog at Fisherstown Bog is assessed as Unfavourable Bad-Declining (see table 8.5), as an Increasing trend in Degraded Raised Bog habitat Area indicates drier conditions on the habitat and thus an overall negative conservation status. Nevertheless, habitat's Future Prospects are Favourable Improving as a result of the restoration works undertaken and the absence of major impacting activities. Thus, a more positive assessment is expected in the next reporting period.

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

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

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

The Area trend assessment is based on the variation on Active Raised Bog and sub-marginal ecotope within Degraded Raised Bog in the reporting period. The area of Active Raised Bog has decreased (by 6.41ha) in the reporting period. However, the area of sub-marginal ecotope has increased (7.91ha), both as a result of the degradation of sub-central ecotope (6.41ha) and the improvement of marginal ecotope (1.5ha). Thus, overall, there has been a 1.5ha increase in the combined area of ARB and sub-marginal ecotope, which equates to a 1.8% increase in these habitats since 2004. As result habitat Area is given an **Increasing** trend.

The habitat's Area Future Prospects status is equally based on the Active Raised Bog Area Future Prospects status assessment and the Area Future Prospects trend is based on the trend expected for Active Raised Bog and sub-marginal ecotope in the following two reporting periods. Impacting

activities such as drainage and forestry on adjacent land are threatening Active and Degraded Raised Bog. However, the positive impact of past restoration activities at this site (drain blocking) and the anticipated positive impact of planned restoration activities (forestry clearance and drain blocking) override these negative impacts. Therefore, the habitat's Area Future Prospects are given an **Unfavourable Bad-Increasing** 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-Declining** 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-Improving** assessment.

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

The conservation status of depressions on peat substrates of the Rhynchosporion at Killyconny 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 (ha) ¹	2012 value (ha) ²	% below target	FRV 2012 Target (ha) ³	2012 value (ha) ⁴	% below target
7110	76.06	1.39	98.17	0.70	0.00	100.00
¹ 1994/5 central, sub-central, active flush, bog woodland and sub-marginal ecotope area.						
² 2012 central, sub-central ecotope, active flush and bog woodland area.						
³ Half of the current central, sub-central ecotope and active flush area. The target is that the area of the highest vegetation quality (i.e. central ecotope and active flush) should be at least this figure.						
⁴ 2012 central ecotope and active flush area.						
	FRV Target (ha) ⁵	2012 value (ha) ⁶	% above target	FRV 2012 Target (ha) ⁷	2012 value (ha) ⁸	% below target
7120	26.37	101.04	283.16	25.26	17.03	32.58
⁵ Current high bog area minus 7110 area FRV.						
⁶ 2012 Degraded Raised Bog area.						
⁷ 25% of the current Degraded Raised Bog habitat area. The target is that the extent of marginal and face bank ecotopes should not be larger than 25% of the current Degraded Raised Bog habitat area.						
⁸ Current marginal and face bank ecotopes area.						

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

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

Table 8.5 Habitats conservation status assessments

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

Conclusions

Summary of impacting activities

- Peat cutting had already ceased at the site prior to the 2004 survey. However, although peat cutting is not currently taking place the associated negative impacts (i.e. open facebanks and high bog and cutover drainage) of past cutting continue to cause impact on the high bog habitats.
- 10.1km of drains on the high bog remain reduced functional. 9.4km of these form part of the two dense drainage networks that lie in the north-west and west of the site. These were excavated in 1992/3 and 1994 and blocked in 2006, and were thus fully functional for 12-14 years. Significant water losses through these drains were noted in previous surveys and although now blocked, they are still classed as reduced functional. This is because they are still considered to be impacting on high bog habitats and will continue to do so until they become completely in-filled. These drainage networks are likely to be the main reason for the dramatic loss of Active Raised Bog from 1994 to 2012.
- There are very few drains on the cutover in Fisherstown Bog, occurring mainly in the south-west, west and north-west of the site. However, these drains continue to impact on the high bog habitats. Maintenance works have been carried out in the reporting period on drains in agriculture land to the south of the high bog.

- A fire, which occurred in March 2012, severely burned 26.55ha of the high bog (25.95%) on Fisherstown Bog.
- A 1ha *Pinus contorta* plantation is present on the southern top of the high bog as well as a further 13ha of conifer plantation (*Pinus contorta* and *Picea sitchensis*) on the cutover in the south-west of the high bog. These plantations have a negative impact on high bog habitats. However, the high bog plantation and 11ha of the cutover plantation are scheduled to be felled with their associated drains blocked in 2013 as part of the Coillte Life project.

Changes in active peat forming areas

- Overall there has been a 6.41ha loss of Active Raised Bog from 2004 to 2012. This is the sum of losses of sub-central ecotope (6.91ha) and the expansion/development of new areas of sub-central ecotope (0.5ha).
- **Sc1, Sc2, Sc3** and **Sc5** are no longer present. However, some of this is due to vegetation re-interpretation. Complex 9/7/10 was considered to be a mosaic of sub-marginal and sub-central ecotope in 2004 and dominated **Sc3**, most of **Sc1** and parts of **Sc2**. Thus, the losses here were considered to be due to vegetation re-interpretation and hence were not classed as real losses on the ground. On the other hand, the loss of **Sc5**, and parts of **Sc2** and **Sc1** were considered real, and attributed largely to the fire of March 2012, but also, at least partially, to the ongoing drying out effects of the two dense drainage networks on the high bog, despite their being blocked in 2006.
- **Sc4** has expanded and **Sc6** is newly developed. Both these increases have occurred in an area that is rewetting adjacent to the drainage complex in the west that was blocked in 2006.

Other changes

- There have been no other significant changes in the high bog vegetation.

Quadrats analysis

- Quadrat **Qsm3**: Quadrat classified as sub-central in 2004, but now sub-marginal largely due to the fire of March 2012. A dramatic decrease in *Sphagnum* cover was recorded although burnt hummocks are still present.

Restoration works

- The two dense drainage networks in the west and north-west of the high bog associated with past peat exploitation were blocked in 2006. These works have lead to localised re-wetting and the development of new areas of Active Raised Bog.

- The site is part of the Coillte Life project to restore raised bogs. Under this programme, the *Pinus contorta* plantations on the high bog (1ha) and on the cutover in the south-west (11ha) are to be felled and the associated drainage networks blocked. These actions are expected to lead to a rise in water-levels in the area and are scheduled for 2013.

Summary of conservation status

- **Active Raised Bog** has been given an **Unfavourable Bad-Declining** conservation status at Fisherstown Bog. Habitat Area has decreased and the quality declined in the reporting period. Both values are also below the FRVs. However, the two areas where ARB remains on the site have expanded during this time as a result of localised re-wetting adjacent to the blocked drainage networks. These areas within and adjacent to the two blocked dense drainage networks are likely to continue to improve in the future, as re-wetting expands. This combined with the fact that further restoration works are scheduled to take place in 2013 results in an **Unfavourable Bad-Improving** assessment of the Future Prospects.
- **Degraded Raised Bog** has been given an **Unfavourable Bad-Declining** conservation status at Fisherstown Bog. Habitat Area has increased at the expense of Active Raised Bog. However, the Structure & Functions have improved as areas within the blocked dense drainage networks re-wet. Habitat Area is above the FRV. An Increasing trend in Degraded Raised Bog habitat Area indicates drier conditions on the habitat and thus an overall negative conservation status. Nevertheless, habitat's Future Prospects are **Unfavourable Bad-Improving** as a result of the restoration works undertaken and the absence of major impacting activities. Thus, a more positive assessment is expected in the next reporting period.
- **Depressions on peat substrates of the Rhynchosporion** has been given an **Unfavourable Bad-Declining** conservation status at Fisherstown Bog. Habitat Area has increased slightly and quality (S&Fs) declined in the reporting period. However, Future Prospects are considered **Unfavourable Bad-Improving** due to past and planned restoration works.

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

Recommendations

- **Restoration works** including the removal of the 1ha conifer plantation on the high bog and the 13ha conifer plantation on the cutover in the south west. The blocking of associated drains is also recommended. These actions (conifer felling and drain blocking) are planned

to be carried out as part of the Coillte Life Project in 2013 on the high bog and 11ha of the cutover plantation. The other 2ha of conifer plantation should also be removed.

- **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 and cutover in order to assess change in habitat's conservation status and the success of the restoration works.
- **Ongoing monitoring and management of restoration works** is to be carried out as part of Coillte's LIFE-funded raised bog restoration project. This includes monitoring of walrags and removal of regenerating conifers. Management and monitoring should continue after the Coillte Life project has ended.
- **A hydrological investigation** of the high bog, cutover and callows and the River Camlin in relation to cutover drainage (including those on agricultural land) and regional drainage works should also be carried out. This may also help locate any other suitable areas of cutover where further restoration works could be carried out.

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Appendix I Detailed vegetation description of the high bog

Active Raised Bog (7110)

Central Ecotope Complex

No central complexes recorded on Fisherstown Bog.

Sub-Central Ecotope Complexes

COMPLEX 10/6

- **Location:** this community complex dominates **Sc6** and the northern section of **Sc4**, and is also found in small patches occurring parallel to and within the blocked drainage complex bN/bO.
- **Ground:** soft to very soft
- **Physical indicators:** absent
- **Calluna height:** 21-30cm
- **Cladonia cover:** <4%
- **Macro-topography:** depression (bounded on one side by the drain embankment)
- **Pools:** absent (*Sphagnum cuspidatum* dominates in pool-like depressions)
- **Sphagnum cover:** 76-90% (51-75% in places)
- **Narthecium cover:** 11-25%
- **Micro- topography:** Low hummocks/hollows
- **Tussocks:** *Trichophorum germanicum* (4-10%)
- **Degradation or regeneration evidence:** Sc6 appears to be an area of re-wetting after drain blocking,
- **Species cover:** *Eriophorum vaginatum* (4-10%), *Calluna vulgaris* (11-25%), *Narthecium ossifragum* (11-25%), *Erica tetralix* (4-10%), *Rhynchospora alba* (<4%), *Trichophorum germanicum* (4-10%), *Andromeda polifolia* (<1%), *Drosera rotundifolia* (<1%), *Sphagnum capillifolium* (H; 26-33%), *S. magellanicum* (H & HI; 11-25%), *S. papillosum* (H & HI; 4-10%), *S. cuspidatum* (HI; 11-25%).
- **Additional comments:** This complex is also found in small patches to the north of Sc4 and along the blocked drain bO1 where active raised bog appears to be developing as a result of drain blocking. In these areas *Eriophorum vaginatum*, *Sphagnum cuspidatum* and *Trichophorum germanicum* dominate the vegetation.

COMPLEX 10/4

- **Location:** this community complex dominates **Sc4** and is also found in isolated patches within the blocked drainage complex bN/bO and adjacent to the blocked drainage complex bAB .
- **Ground:** soft to very soft
- **Physical indicators:** absent
- **Calluna height:** 21-30cm
- **Cladonia cover:** 11-25%
- **Macro-topography:** flat (possibly a slight depression)
- **Pools:** 4-10%
- **Sphagnum cover:** 34-50% (higher in places)
- **Narthecium cover:** 4-10% (11-25% in places)
- **Micro- topography:** low hummocks/hollows and pools (and scattered tall hummocks)
- **Tussocks:** *Eriophorum vaginatum*
- **Degradation or regeneration evidence:** Sc4 appears to be expanding to the north-west as a result of drain blocking and the isolated patches where this complex was recorded within the drainage complexes is also evidence of re-wetting as a result of drain blocking.
- **Species cover:** *Eriophorum vaginatum* (26-33%), *E. angustifolium* (<4%), *Calluna vulgaris* (26-33%), *Narthecium ossifragum* (4-10%), *Rhynchospora alba* (4-10%; higher in places), *Trichophorum germanicum* (<4%), *Andromeda polifolia* (<1%), *Drosera anglica* (<1%), *Menyanthes trifoliata* (<1%), *Vaccinium oxycoccos* (<1%), *Sphagnum capillifolium* (H; 11-25%), *S. tenellum* (H; <4%), *S. fuscum* (H; <4%), *S. austinii* (H; <4%), *S. papillosum* (H & L; 26-33%), *S. magellanicum* (L; <4%), *S. cuspidatum* (P; <4%; 4-10% in places).
- **Additional comments:** Towards the south of **Sc4**, the cover of *Rhynchospora alba* decreases and the pool cover increases so that the complex becomes more of a 9/7 + P. Towards the north the cover of *Narthecium ossifragum* increases so that the complex grades into 10/6.

This complex is also found in small patches to the north of Sc4 along the blocked drain bO1 where active raised bog appears to be developing as a result of drain blocking. In these areas *Eriophorum vaginatum*, *Sphagnum cuspidatum* and *S. papillosum* dominate the vegetation.

This complex also occurs to the east of the drain bA, where *Rhynchospora alba* occurs at 26-33% and *Narthecium ossifragum* at 4-10%. At least some of these areas, however, are likely to have formed as a result of peat excavation works carried out in order to build dams along drain complex bA/bB.

Quadrat **Qsc1** was recorded within this complex. This quadrat was recorded in the best quality habitat of Sc4 where there was a 76-90% cover of *Sphagnum* with lawns and low hummocks of

S. papillosum occurring at ca. 34-50% cover. However, the cover of *S. cuspidatum* was still only 4-10% in this area.

COMPLEX 10/6 (B) BURNT

- **Location:** this complex occurs in small patches towards the west of the former Sc1. This has not been mapped as sub-central ecotope in 2012 as there are only scattered patches of this sub-central complex in the area with sub-marginal vegetation (Complex 9/7/6 B) predominating.
- **Ground:** soft to very soft
- **Physical indicators:** burnt; bare peat 11-25%; burnt *Sphagnum* hummocks 26-33%
- **Calluna height:** <10cm
- **Cladonia cover:** absent
- **Macro-topography:** gentle slope to the drains and the high bog margin
- **Pools:** absent
- **Sphagnum cover:** 26-33%; this is very variable with localized patches 51-75% & others 4-10% and does NOT include the burnt *Sphagnum* layer
- **Narthecium cover:** 26-33% (11-25% in places)
- **Micro- topography:** low hummocks/hollows and flats (burnt high hummocks)
- **Tussocks:** absent
- **Degradation or regeneration evidence:** burnt but *Sphagnum* is regenerating
- **Species cover:** *Eriophorum vaginatum* (4-10%), *E. angustifolium* (4-10%), *Calluna vulgaris* (11-25%), *Narthecium ossifragum* (26-33%), *Rhynchospora alba* (<4%), *Trichophorum germanicum* (<4%), *Andromeda polifolia* (<1%), *Drosera anglica* (<1%), *Sphagnum capillifolium* (H; <4%), *S. fuscum* (H; <4%), *S. austinii* (H; <4%), *S. papillosum* (H & Hl; 11-25%), *S. magellanicum* (Hl; <4%), *S. cuspidatum* (Hl; 4-10%).
- **Additional comments:** burnt in March 2012.

COMPLEX 9/7/10

- **Location:** small patches within former Sc3. This has not been mapped as sub-central ecotope in 2012 as there are only scattered patches of this sub-central complex in the area with sub-marginal vegetation (Complex 9/7) predominating.
- **Ground:** soft to very soft
- **Physical indicators:** absent
- **Calluna height:** 31-40cm
- **Cladonia cover:** 34-50% (51-75% in places)

- **Macro-topography:** gentle slope
- **Pools:** absent
- ***Sphagnum* cover:** 34-50%
- ***Narthecium* cover:** 4-10%
- **Micro- topography:** high and low hummocks/hollows
- **Tussocks:** *Eriophorum vaginatum* (26-33%)
- **Degradation or regeneration evidence:** possibly degrading as Sc3 was mapped as a much larger area in 2004. However, the mapping difference is likely to be due to vegetation interpretation as it was considered to be a mosaic of sub-central and sub-marginal in 2004. The description from 2004 states that the difference between this complex and the surrounding sub-marginal areas is slight with the sub-central having slightly higher *Sphagnum* cover (40-50%).
- **Species cover:** *Eriophorum vaginatum* (26-33%), *Calluna vulgaris* (34-50%), *Narthecium ossifragum* (4-10%), *Rhynchospora alba* (<4%), *Carex panicea* (<4%), *Sphagnum capillifolium* (H; 11-25%), *S. magellanicum* (H & HI; 4-10%), *S. papillosum* (H & HI; 11-25%), *S. cuspidatum* (HI; 4-10%); *Leucobryum glaucum* (<4%).
- **Additional comments:** there are indications of slight flushing as evidenced by the presence of *Dactylorhiza* sp. and *Vaccinium oxycoccos*. This complex is a borderline sub-marginal/sub-central complex and is thus difficult to map. A few sub-central points were taken where this complex occurred, but no area was mapped as sub-central. This is because the difference between this complex and the sub-marginal complex (9/7) are very subtle and the sub-marginal complex was considered to predominate.

Active flushes

No active flushes recorded on Fisherstown Bog.

Degraded Raised Bog (7120)

Sub-Marginal Ecotope Complexes

COMPLEX 9/7

- **Location:** this community complex dominates the southwest section of high bog, but was also found to the northeast of drains bAB and north of flush Z
- **Ground:** soft to very soft
- **Physical indicators:** absent

- **Calluna height:** 21-30cm
- **Cladonia cover:** 11-25%
- **Macro-topography:** flat
- **Pools:** absent
- **Sphagnum cover:** 34-50%
- **Narthecium cover:** <4%
- **Micro- topography:** Low hummocks/hollows
- **Tussocks:** absent
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Eriophorum vaginatum* (26-33%), *E. angustifolium* (<4%), *Calluna vulgaris* (26-33%), *Erica tetralix* (<4%), *Narthecium ossifragum* (<4%), *Rhynchospora alba* (<4%), *Trichophorum germanicum* (<4%), *Andromeda polifolia* (<1%), *Drosera rotundifolia* (<1%), *Sphagnum capillifolium* (H; 26-33%), *S. magellanicum* (Hl; <4%), *S. papillosum* (Hl; <4%), *S. tenellum* (Hl; <4%), *S. cuspidatum* (Hl; <4%), *S. fuscum* (H; <4%); *Racomitrium lanuginosum* (<1%).
- **Additional comments:** this complex is a 'borderline' complex with some characteristics of sub-central ecotope.

COMPLEX 9/7 (B) BURNT

- **Location:** former Sc5 and parts of the west of former Sc1
- **Ground:** soft to very soft
- **Physical indicators:** burnt; bare peat 4-10%; burnt *Sphagnum* hummocks 51-75%
- **Calluna height:** <10cm
- **Cladonia cover:** absent
- **Macro-topography:** flat
- **Pools:** absent
- **Sphagnum cover:** 4-10%; burnt *Sphagnum* hummocks 51-75%
- **Narthecium cover:** <4%
- **Micro- topography:** Low hummocks/hollows and flats (burnt large hummocks)
- **Tussocks:** *Eriophorum vaginatum* (23-33%)
- **Degradation or regeneration evidence:** Formerly mapped as sub-central but severely burnt in 2012.
- **Species cover:** *Eriophorum vaginatum* (26-33%), *E. angustifolium* (<4%), *Calluna vulgaris* (11-25%), *Narthecium ossifragum* (<4%), *Andromeda polifolia* (<1%), *Drosera rotundifolia* (<1%), *Sphagnum capillifolium* (H; <4%), *S. magellanicum* (Hl; <4%), *S. papillosum* (H & Hl; 4-10%), *S. austinii* (H;

<4%), *S. cuspidatum* (Hl; <4%), *S. fuscum* (H: <4%); *S. subnitens* (H: <4%); *Leucobryum glaucum* (<4%).

- **Additional comments:** the high cover of burnt *Sphagnum* here indicates that this complex would have supported sub-central ecotope before the fire of March 2012. The 2004 description of this area (then Sc5) describes it as follows “*Eriophorum vaginatum* (40-60%) and *Calluna vulgaris* (5-10%); this area may be slightly flushed. The *Sphagnum* cover is more extensive (than in the then Sc1) and the vegetation is a better example of sub-central ecotope.”

COMPLEX 9/7/4

- **Location:** parts of former Sc1 and to the north of Sc4
- **Ground:** soft to very soft
- **Physical indicators:** absent
- **Calluna height:** 21-30cm
- **Cladonia cover:** 11-25% (4-10% in places)
- **Macro-topography:** gentle slope
- **Pools:** absent
- **Sphagnum cover:** 26-33% (34-50% in places)
- **Narthecium cover:** <4% (4-10% in places)
- **Micro- topography:** Low hummocks/hollows
- **Tussocks:** absent
- **Degradation or regeneration evidence:** possibly degrading as this area was classed as sub-central complex 9/7/10 in 2004/05. However, the mapping difference is likely to be due to vegetation interpretation as it was considered to be a mosaic of sub-central and sub-marginal in 2004.
- **Species cover:** *Eriophorum vaginatum* (26-33%), *E. angustifolium* (<4%), *Calluna vulgaris* (34-50%), *Rhynchospora alba* (11-25%), *Erica tetralix* (<4%), *Narthecium ossifragum* (<4%), *Andromeda polifolia* (<1%), *Drosera rotundifolia* (<1%), *Sphagnum capillifolium* (H; 11-25%), *S. magellanicum* (Hl; <4%), *S. papillosum* (H & Hl; 4-10%), *S. tenellum* (Hl; <4%), *S. cuspidatum* (Hl; <4%), *S. austinii* (H: <4%)
- **Additional comments:** The *Sphagnum* cover in this area is described in 2004 as occurring at 50-60% cover and also as 40% indicating that this area may be degrading. However, the 2004 description of this area also describes it as “a mosaic of sub-central and sub-marginal patches, with a predominance of the sub-central”. Thus, although this area is mapped as sub-marginal ecotope in 2012, the decline/degradation of sub-central vegetation is not as great as what the

ecotope maps indicate since much of the area mapped as sub-central in 2004 would be mapped as sub-marginal using the 2012 survey criteria.

This complex is also present north of Sc4 where *Rhynchospora alba* (11-25%) dominates in areas that appear to have formerly been pools. These 'pool' areas have a patchy *Sphagnum* cover with *S. papillosum*, *S. magellanicum* and *S. cuspidatum* all present at low cover values with the overall *Sphagnum* cover in the area being 26-33%. *Pleurozia purpurea* was also recorded here close to the blocked drains as well as occasional active hummocks of *Sphagnum austinii*.

COMPLEX 9/7/6

- **Location:** over much of the high bog including parts of former Sc1, Sc2 and Sc3 and to the north of Sc4
- **Ground:** soft
- **Physical indicators:** absent
- **Calluna height:** 21-30cm
- **Cladonia cover:** 11-25%
- **Macro-topography:** flat (gentle slope in places)
- **Pools:** absent
- **Sphagnum cover:** 26-33% (11-25% in places)
- **Narthecium cover:** 11-25% (4-10% in places)
- **Micro- topography:** Low hummocks/hollows
- **Tussocks:** *Trichophorum germanicum* (4-10%) in places
- **Degradation or regeneration evidence:** possibly degrading as parts of this complex were classed as sub-central complex 9/7/10 in 2004. However, the mapping difference is likely to be due to vegetation interpretation as it was considered to be a mosaic of sub-central and sub-marginal in 2004.
- **Species cover:** *Eriophorum vaginatum* (11-25%), *E. angustifolium* (<4%), *Calluna vulgaris* (26-33%), *Narthecium ossifragum* (11-25%), *Erica tetralix* (4-10%), *Rhynchospora alba* (<4%), *Trichophorum germanicum* (<4%), *Andromeda polifolia* (<1%), *Drosera rotundifolia* (<1%), *Sphagnum capillifolium* (H; 11-25%), *S. magellanicum* (HI; <4%), *S. tenellum* (HI; <4%), *S. cuspidatum* (HI; <4%), *S. fuscum* (H; <4%); *Racomitrium lanuginosum* (<1%).

Additional comments: *Carex panicea*, which appears to be largely absent from the much of this bog becomes quite frequent in parts of this complex in the south of the high bog. *Pleurozia purpurea* is also present in these areas. Towards the margins of the high bog in the south, the

cover of *Rhynchospora alba* and *Trichophorum germanicum* increases and that of *Eriophorum vaginatum* decreases.

COMPLEX 9/7/6 (B) BURNT

- **Location:** over much of the high bog including parts of former Sc1
- **Ground:** soft
- **Physical indicators:** burnt; bare peat 4-10%; burnt *Sphagnum* hummocks 34-50%
- ***Calluna* height:** <10cm
- ***Cladonia* cover:** <4%
- **Macro-topography:** flat
- **Pools:** absent
- ***Sphagnum* cover:** 11-25%
- ***Narthecium* cover:** 11-25%
- **Micro- topography:** Low hummocks/hollows & flats (burnt large hummocks)
- **Tussocks:** absent
- **Degradation or regeneration evidence:** burnt; parts of this complex supported sub-central ecotope complex 9/7/10 in 2004. However, the mapping difference is likely to be due to vegetation interpretation as it was considered to be a mosaic of sub-central and sub-marginal in 2004.
- **Species cover:** *Eriophorum vaginatum* (11-25%), *Calluna vulgaris* (26-33%), *Narthecium ossifragum* (11-25%), *Rhynchospora alba* (4-10%), *Andromeda polifolia* (<1%), *Drosera rotundifolia* (<1%), *Sphagnum capillifolium* (H; 11-25%), *S. magellanicum* (HI; <4%), *S. tenellum* (HI; <4%), *S. cuspidatum* (HI; <4%), *S. papillosum* (H; <4%).
- **Additional comments:** none

COMPLEX 9/7/2

- **Location:** along western and eastern high bog margin
- **Ground:** soft
- **Physical indicators:** absent
- ***Calluna* height:** 21-30cm
- ***Cladonia* cover:** 11-25%
- **Macro-topography:** gentle slope towards the high bog margin
- **Pools:** absent
- ***Sphagnum* cover:** 11-25%

- **Narthecium cover:** <4% (4-10% in places)
- **Micro- topography:** Low hummocks/hollows
- **Tussocks:** *Trichophorum germanicum* (4-10%)
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Eriophorum vaginatum* (11-25%), *E. angustifolium* (<4%), *Calluna vulgaris* (34-50%), *Trichophorum germanicum* (4-10%), *Narthecium ossifragum* (<4%), *Rhynchospora alba* (<4%), *Andromeda polifolia* (<1%), *Drosera rotundifolia* (<1%), *Sphagnum capillifolium* (H; 11-25%), *S. papillosum* (Hl; <4%), *S. tenellum* (Hl; <4%), *S. cuspidatum* (Hl; <4%).
- **Additional comments:** None.

COMPLEX 4/6(B) BURNT

- **Location:** formerly Sc2
- **Ground:** firm to soft
- **Physical indicators:** burnt; bare peat 4-10%; burnt *Sphagnum* hummocks 34-50%
- **Calluna height:** <10cm
- **Cladonia cover:** <4%
- **Macro-topography:** flat
- **Pools:** absent
- **Sphagnum cover:** 11-25% (26-33% in places)
- **Narthecium cover:** 26-33%
- **Micro- topography:** Low hummocks/hollows and algal hollows
- **Tussocks:** absent
- **Degradation or regeneration evidence:** burnt (was sub-central ecotope complex 4/10 and 9/7/10 in 2004)
- **Species cover:** *Rhynchospora alba* (26-33%), *Narthecium ossifragum* (26-33%), *Calluna vulgaris* (11-25%), *Eriophorum vaginatum* (<4%), *E. angustifolium* (<4%), *Trichophorum germanicum* (<4%), *Andromeda polifolia* (<1%), *Drosera rotundifolia* (<1%), *Sphagnum capillifolium* (H; 11-25%), *S. papillosum* (H; 4-10%), *S. tenellum* (H; <4%), *S. cuspidatum* (Hl; <4%), *Dicranum scoparium* (<1%), *Leucobryum glaucum* (<1%).
- **Additional comments:** none

COMPLEX 9/3/2

- **Location:** towards the southwest of the high bog (southeast of Sc3)
- **Ground:** firm to soft

- **Physical indicators:** absent
- **Calluna height:** 21-30cm
- **Cladonia cover:** 34-50%
- **Macro-topography:** gentle slope towards the high bog margin
- **Pools:** absent
- **Sphagnum cover:** 26-33%
- **Narthecium cover:** 4-10%
- **Micro- topography:** Low hummocks/hollows and flats
- **Tussocks:** *Trichophorum germanicum* (4-10%)
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Eriophorum vaginatum* (11-25%), *Calluna vulgaris* (11-25%), *Erica tetralix* (4-10%), *Carex panicea* (26-33%), *Trichophorum germanicum*(4-10%), *Narthecium ossifragum* (4-10%), *Rhynchospora alba* (<4%), *Andromeda polifolia* (<1%), *Drosera rotundifolia* (<1%), *Sphagnum capillifolium* (H; 4-10%), *S. papillosum* (H & HI; 11-25%), *S. tenellum* (HI; <4%), *S. cuspidatum* (HI; <4%), *S. magellanicum* (HI; <4%), *S. fuscum* (H; <4%); *Leucobryum glaucum* (<4%).
- **Additional comments:** None.

COMPLEX 4/6

- **Location:** within the blocked drainage complex bN
- **Ground:** firm to very soft
- **Physical indicators:** bare peat, but higher in localized patches; *Campylopus introflexus* (<4%)
- **Calluna height:** 21-30cm
- **Cladonia cover:** 4-10%
- **Macro-topography:** steep (sometimes gentle) slope towards the high bog margin and towards the north-eastern end of the drainage complex
- **Pools:** <4%
- **Sphagnum cover:** 26-33% but very variable as low as <4% in localized patches and as high as 51-75% in other patches
- **Narthecium cover:** 11-25%
- **Micro- topography:** Low hummocks/hollows and flats
- **Tussocks:** *Trichophorum germanicum* (4-10%)
- **Degradation or regeneration evidence:** *Sphagnum* regenerating in places particularly close to the drains and in areas where peat was excavated in order to build peat dams

- **Species cover:** *Narthecium ossifragum* (11-25%), *Rhynchospora alba* (11-25%), *Calluna vulgaris* (26-33%), *Eriophorum vaginatum* (4-10%), *E. angustifolium* (<4%), *Trichophorum germanicum* (4-10%), *Erica tetralix* (<4%), *Andromeda polifolia* (<1%), *Drosera rotundifolia* (<1%), *Sphagnum capillifolium* (H; 4-10%), *S. papillosum* (H & HI; 4-10%), *S. tenellum* (HI; <4%), *S. cuspidatum* (HI; 4-10%), *S. denticulatum* (HI; <4%), *S. magellanicum* (HI; <4%), *S. palustre* (HI; <4%).
- **Additional comments:** this complex is very variable due to the presence of the blocked drainage complex bN. It is essentially a mosaic of different complexes and of different ecotopes with marginal, sub-marginal and sub-central vegetation all occurring side by side and interconnected with each other. Areas that have been excavated for peat dams are often sub-central dominated by *Eriophorum vaginatum*, *E. angustifolium*, *Rhynchospora alba* and *Sphagnum cuspidatum* (sometimes with a *Sphagnum* cover of 76-90% in a very localised area). However, these are often found alongside marginal ecotope areas that have a low *Sphagnum* cover (<4%) and large amounts of bare peat (26-33%) as well as *Campylopus introflexus*, *Trichophorum germanicum*, *Calluna vulgaris* and *Narthecium ossifragum*.

COMPLEX 6/4/2

- **Location:** northwest and northeast of high bog
- **Ground:** firm to soft
- **Physical indicators:** run-off channels
- **Calluna height:** 21-30cm
- **Cladonia cover:** 34-50% (11-25% in places)
- **Macro-topography:** gentle (sometimes steep) slope towards the high bog margin
- **Pools:** absent
- **Sphagnum cover:** 11-25%
- **Narthecium cover:** 11-25%
- **Micro- topography:** Low hummocks/hollows and 'pool-like' depressions
- **Tussocks:** *Trichophorum germanicum* (4-10%)
- **Degradation or regeneration evidence:** *Sphagnum* regenerating in places particularly close to the drains and in areas where peat was excavated in order to build peat dams
- **Species cover:** *Narthecium ossifragum* (11-25%), *Rhynchospora alba* (11-25%), *Calluna vulgaris* (26-33%), *Eriophorum vaginatum* (4-10%), *E. angustifolium* (<4%), *Trichophorum germanicum* (4-10%), *Erica tetralix* (4-10%), *Andromeda polifolia* (<1%), *Drosera rotundifolia* (<1%), *Sphagnum capillifolium* (H; 4-10%), *S. papillosum* (H & HI; 4-10%), *S. tenellum* (HI; <4%), *S. cuspidatum* (HI; 4-10%), *S. magellanicum* (HI; <4%).

- **Additional comments:** *Rhynchospora alba* dominates in 'pool-like' depressions with little or no *Sphagnum* (sometimes a patchy cover of *S. cuspidatum* is present) and algal hollows occur at 4-10% cover.

COMPLEX 6/9A (B) BURNT

- **Location:** northeast of Sc6
- **Ground:** firm
- **Physical indicators:** burnt; bare peat 11-25%; burnt *Sphagnum* hummocks 26-33%
- ***Calluna* height:** <10cm
- ***Cladonia* cover:** <4%
- **Macro-topography:** steep slope towards the high bog margin
- **Pools:** absent
- ***Sphagnum* cover:** 11-25%
- ***Narthecium* cover:** 26-33%
- **Micro-topography:** Low hummocks/hollows
- **Tussocks:** absent
- **Degradation or regeneration evidence:** burnt
- **Species cover:** *Calluna vulgaris* (11-25%), *Eriophorum vaginatum* (<4%), *E. angustifolium* (4-10%), *Narthecium ossifragum* (26-33%), *Rhynchospora alba* (<4%), *Andromeda polifolia* (<1%), *Drosera rotundifolia* (<1%), *Sphagnum capillifolium* (H; 4-10%), *S. papillosum* (H; 4-10%), *S. tenellum* (H; <4%), *S. cuspidatum* (H; <4%).
- **Additional comments:** this complex is also found in the northern lobe of the site where *Eriophorum vaginatum* is 4-10%. *Trichophorum germanicum* becomes more frequent (4-10%) towards the high bog margin.

Marginal Ecotope Complexes

COMPLEX 2/4

- **Location:** within drain complex bO
- **Ground:** firm
- **Physical indicators:** bare peat 11-25%
- ***Calluna* height:** 21-30cm
- ***Cladonia* cover:** 4-10%
- **Macro-topography:** steep slope

- **Pools:** absent (but present alongside dams)
- **Sphagnum cover:** 4-10% (11-25% in places)
- **Narthecium cover:** <4% (4-10% in places)
- **Micro- topography:** low hummocks/flats and run-off channels
- **Tussocks:** *Trichophorum germanicum* (11-25%).
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Eriophorum vaginatum* (4-10%), *E. angustifolium* (<4%), *Calluna vulgaris* (11-25%), *Narthecium ossifragum* (<4%), *Rhynchospora alba* (11-25%), *Trichophorum germanicum* (11-25%), *Sphagnum capillifolium* (H; 4-10%), *S. papillosum* (HI; 4-10%), *S. tenellum* (HI; <4%), *S. cuspidatum* (HI; <4%).
- **Additional comments:** there are some scattered *Pinus* and *Betula* present within this complex that are mostly between 1.0-2.0m in height.

COMPLEX 9 + BP BARE PEAT

- **Location:** within drain complex bA and bB
- **Ground:** soft
- **Physical indicators:** bare peat 11-25% (26-33% in places)
- **Calluna height:** 31-40cm
- **Cladonia cover:** <4%
- **Macro-topography:** flat (gentle in places) slope towards the high bog margin
- **Pools:** absent
- **Sphagnum cover:** 4-10% (11-25% in places)
- **Narthecium cover:** <4%
- **Micro- topography:** low hummocks/ hollows
- **Tussocks:** *Eriophorum vaginatum* (34-50%)
- **Degradation or regeneration evidence:** absent
- **Species cover:** *Eriophorum vaginatum* (34-50%), *E. angustifolium* (<4%), *Calluna vulgaris* (4-10%), *Narthecium ossifragum* (<4%), *Rhynchospora alba* (4-10%), *Trichophorum germanicum* (<4%), *Sphagnum capillifolium* (H; 4-10%), *S. papillosum* (HI; 4-10%), *S. tenellum* (HI; <4%), *S. cuspidatum* (HI; <4%), *S. magellanicum* (HI; <4%).
- **Additional comments:** none.

Inactive flushes

FLUSH Y

- **Location:** along old drain
- **Ground:** soft
- **Physical indicators:** absent
- **Calluna height:** 41-50cm
- **Cladonia cover:** 4-10%
- **Macro-topography:** gentle slope towards the high bog margin
- **Pools:** absent
- **Sphagnum cover:** 11-25%
- **Narthecium cover:** absent
- **Micro- topography:** n/a
- **Tussocks:** *Molinia caerulea*
- **Degradation or regeneration evidence:** burnt
- **Species cover:** *Molinia caerulea* (51-75%), *Calluna vulgaris* (26-33%), *Eriophorum vaginatum* (<4%), *Erica tetralix* (<4%), *Myrica gale* (4-10%), *Andromeda polifolia* (<4%), *Sphagnum capillifolium* (H; 4-10%), *S. papillosum* (H; 4-10%).
- **Additional comments:** This flush is largely dry and inactive, though there are some areas along the central axis that could be considered active.

FLUSH Z

- **Location:**
- **Ground:** firm to soft (very soft in places)
- **Physical indicators:** bare peat 11-25% (<4% in places)
- **Calluna height:** <10cm
- **Cladonia cover:** <4%
- **Macro-topography:** gentle slope towards the high bog margin (steep in places)
- **Pools:** absent
- **Sphagnum cover:** 11-25% (51-75% in places)
- **Narthecium cover:** 4-10%
- **Micro- topography:** N/A
- **Tussocks:** *Eriophorum vaginatum* (11-25%)
- **Degradation or regeneration evidence:** partially burnt
- **Species cover:** *Molinia caerulea* (34-50%); *Eriophorum vaginatum* (26-33%), *E. angustifolium* (<4%), *Calluna vulgaris* (4-10%), *Narthecium ossifragum* (4-10%), *Trichophorum germanicum* (<4%),

Potentilla erecta (<4%); *Vaccinium oxycoccos* (<1%); *Dactylorhiza* sp. (<1%); *Polytrichum* sp. (<1%); *Sphagnum capillifolium* (H; 4-10%), *S. papillosum* (HI; 4-10%), *S. magellanicum* (HI; <4%), *S. fallax* (HI; <4%), *S. palustre* (HI; <4%), *S. cuspidatum* (HI; <4%).

- **Additional comments:** This flush is largely dry and inactive, though there are some wet channels with an excellent *Sphagnum* cover (51-75%) including *S. fallax* and *S. palustre* that could be considered active.

Face bank Complexes

COMPLEX 1

- **Location:** this complex was found along the bog margin
- **Ground:** firm
- **Physical indicators:** bare peat (51-75%); *Campylopus introflexus* (4-10%)
- **Calluna height:** <10cm
- **Cladonia cover:** absent
- **Macro-topography:** steep slope
- **Pools:** absent
- **Sphagnum cover:** absent
- **Narthecium cover:** <4%
- **Micro- topography:** n/a
- **Tussocks:** absent
- **Degradation or regeneration evidence:** burnt
- **Species cover:** *Eriophorum vaginatum* (<4%), *Calluna vulgaris* (26-33%), *Narthecium ossifragum* (4-10%), *Trichophorum germanicum* (<4%).
- **Additional comments:** none

Depressions on peat substrates of the Rhynchosporion (7150)

The habitat occurs at Fisherstown Bog in both Active and Degraded Raised Bog, but it is only occasional found on degraded habitat. Only *Rhynchospora alba* was recorded within the 2012 survey at this site.

R. alba is found in all ecotopes in Fisherstown Bog, such as: sub-central ecotope (10/4); sub-marginal ecotope (9/7/4; 4/6; 6/4/2) and marginal ecotope (2/4).

The species becomes very frequent within complexes in the area of the blocked drainage complex bN/bO.

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 *Nartheceum ossifragum* dominated hollows in sub-marginal and marginal ecotope complexes. *R. alba* was also recorded in more degraded areas of the bog such as run-off channels in steep slope sections at the edge of the high bog.

Appendix II Photographical records

Photograph Number	Aspect	Type	Feature	Date
P0296	NE	Overview	Qsm1	03/09/2012
P0297	NE	Overview	Qsm2	04/09/2012
P0298	NE	Overview	Qsm3 (previously Qsc1)	04/09/2012
P0301	NE	Overview	Qsc2	06/09/2012

Appendix III Quadrats

Ecotope type	Sub-central	Sub-marginal	Sub-marginal	Sub-marginal
Complex Name	9/7/10	9/7rb	9/7/6	9/7/6(B)
Quadrat Name	Qsc1	Qsm3	Qsm1	Qsm2
Eastiing	207442	207446.03	207724.69	207520.83
Northing	277071	277073.26	277335.32	277227.85
Date	05/10/2004	04/09/2012	03/09/2012	04/09/2012
Firmness	firm-soft	Soft	Soft	Firm
Burnt	No	Severe	No	Severe
Algae in hollows %	Absent	Absent	Absent	Absent
Algae in pools %	Absent	Absent	Absent	Absent
Bare peat %	Absent	4-10	Absent	Absent
High hummocks %	34-50	Absent	Absent	Absent
Low hummocks %	4-10	Absent	11-25	Absent
Hollows %	11-25	11-25	Absent	11-25
Lawns %	Absent	Absent	Absent	Absent
Pools %	Absent	Absent	Absent	Absent
Pool type	Absent	Absent	Absent	Absent
S.austinii hum type	na	Absent	Absent	Relic
S.austinii hum %	na	Absent	Absent	1-3 (several indiv)
S.austinii height(cm)	na	Absent	Absent	11-20
S.fusum hum type	na	Absent	Absent	Absent
S.fusum hum %	na	Absent	Absent	Absent
S.fusum height(cm)	na	Absent	Absent	Absent
Leucobryum glaucum	na	Absent	Absent	Present
Trichophorum type	Absent	Absent	Absent	Absent
Trichophorum %	Absent	Absent	Absent	4-10
S.magellanicum %	na	Absent	Absent	1-3 (few indiv)

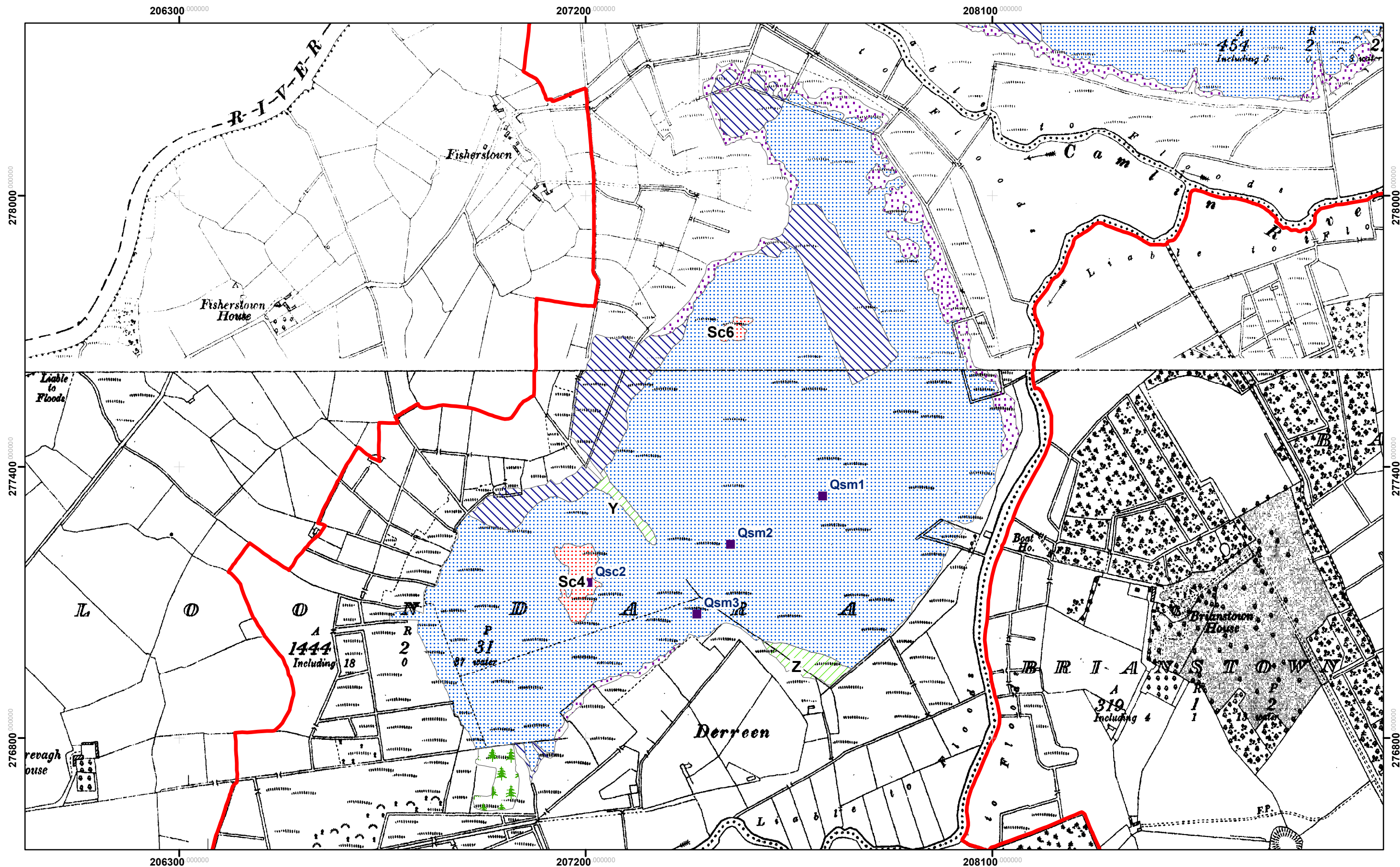
Ecotope type	Sub-central	Sub-marginal	Sub-marginal	Sub-marginal
Complex Name	9/7/10	9/7rb	9/7/6	9/7/6(B)
S.cuspidatum %	na	Absent	Absent	Absent
S.papillosum %	na	1-3 (few indiv)	1-3 (many indiv)	4-10
S.denticulatum %	na	Absent	Absent	Absent
S.capillifolium%	34-50	1-3 (few indiv)	Absent	1-3 (many indiv)
S.tenellum %	na	Absent	26-33	Absent
S.subnitens %	4-10	Absent	Absent	Absent
R.fusca %	na	Absent	Absent	Absent
R.alba %	na	Absent	1-3 (several indiv)	1-3 (few indiv)
N.ossifragum %	Absent	1-3 (few indiv)	Absent	11-25
Sphag pools %	Absent	Absent	Absent	Absent
Dominant pool Sphag	na			
Sphag lawns %	Absent	Absent	Absent	Absent
Sphag humm %	34-50	Absent	26-33	Absent
Sphag holl %	4-10	Absent	Absent	Absent
Total Sphag %	51-75	1-3 (few indiv)	26-33	4-10
Hummocks indicators	Na	Absent	Absent	S.austinii
Cladonia portent %	1-3 (many indiv)	Absent	11-25	Absent
Other Cladonia sp	Na			
C. panicea %	Na	Absent	Absent	Absent
Calluna cover %	11-25	11-25	34-50	26-33
Calluna height(cm)	41-60	0-10	21-30	11-20
Other NotableSpecies			s. fusc adj to quad	
Other comment	Eriophorum vag 25%	burnt Sphagnum hummocks 51-75% Eriophorum vag 34-50%;previously Qsc1		burnt Sphagnum hummocks 34-50%

Ecotope type	Sub-central
Complex Name	10/4
Quadrat Name	Qsc2
Easting	207204.98
Northing	277142.93
Date	06/09/2012
Firmness	Very soft
Burnt	No
Algae in hollows %	Absent
Algae in pools %	Absent
Bare peat %	Absent
High hummocks %	Absent
Low hummocks %	34-50
Hollows %	Absent
Lawns %	26-33
Pools %	4-10
Pool type	Regular
S.austinii hum type	Absent
S.austinii hum %	Absent
S.austinii height(cm)	Absent
S.fuscum hum type	Absent
S.fuscum hum %	Absent
S.fuscum height(cm)	Absent
Leucobryum glaucum	Absent
Trichophorum type	Flats
Trichophorum %	1-3 (few indiv)
S.magellanicum %	1-3 (many indiv)
S.cuspidatum %	4-10
S.papillosum %	34-50

Ecotope type	Sub-central
Complex Name	10/4
S.denticulatum %	Absent
S.capillifolium%	11-25
S.tenellum %	1-3 (many indiv)
S.subnitens %	Absent
R.fusca %	Absent
R.alba %	11-25
N.ossifragum %	1-3 (many indiv)
Sphag pools %	4-10
Dominant pool Sphag	S.cuspidatum
Sphag lawns %	26-33
Sphag humm %	26-33
Sphag holl %	Absent
Total Sphag %	76-90
Hummocks indicators	Absent
Cladonia portent %	11-25
Other Cladonia sp	
C. panicea %	Absent
Calluna cover %	11-25
Calluna height(cm)	11-20
Other Notable Species	Menyanthes Drosera anglica V. oxycoccus
Other comment	active S. austinii adt to quad.

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

Appendix IV Survey maps

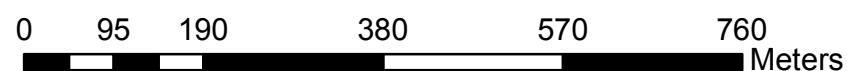


Raised Bog Monitoring & Assessment Survey 2013 **Map 1: Ecotopes Map and Quadrats**

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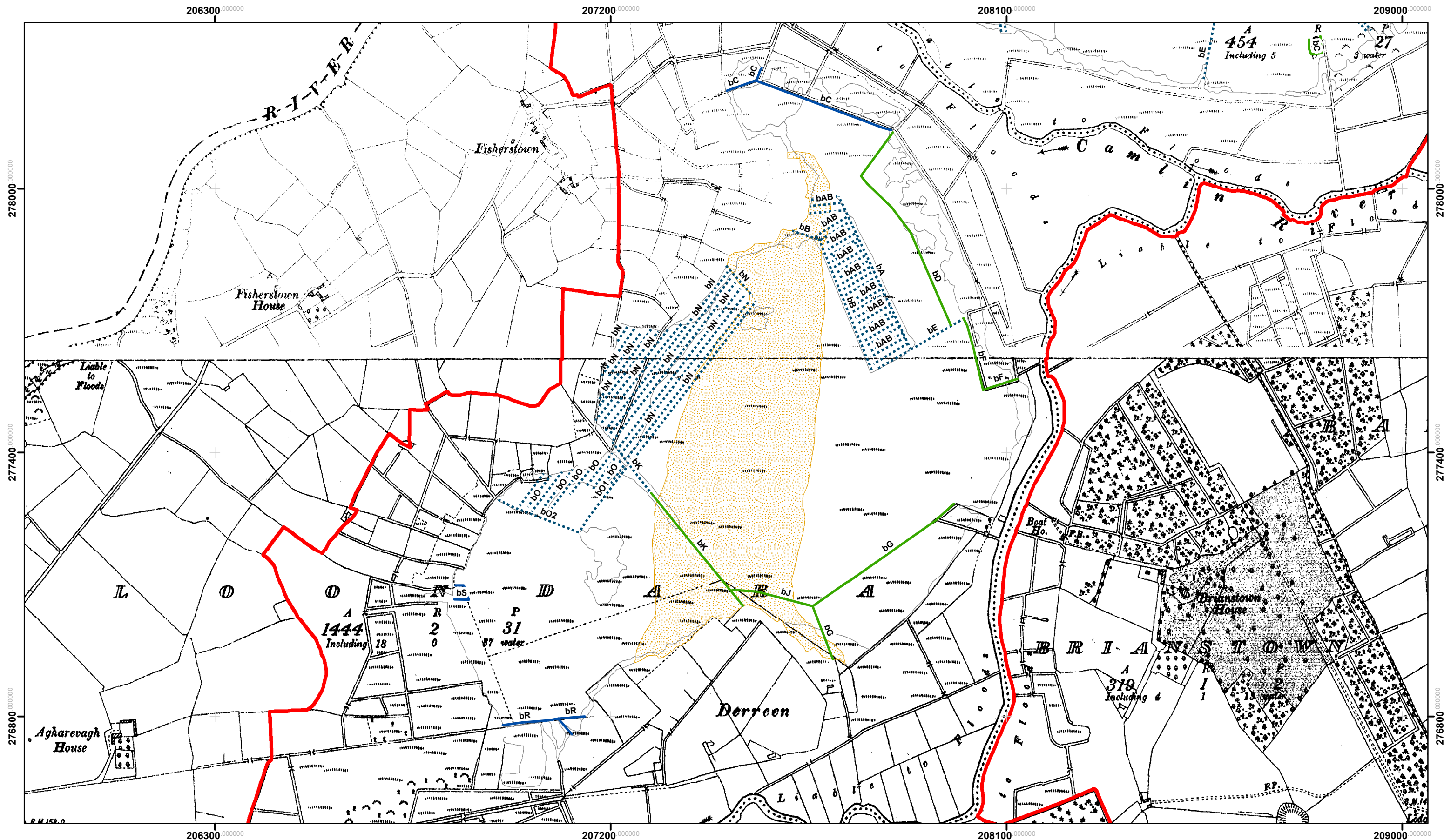
Fisherstown SAC (001818) **Co. Longford/Co. Roscommon**

1:8,000



Legend

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



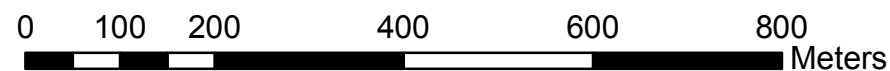
Raised Bog Monitoring & Assessment Survey 2013 **Map 3: Impacts (High bog drainage; Turf cutting; Fire events)**

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Fisherstown SAC (001818) **Co. Longford/Co. Roscommon**

1:8,000



Legend

High Bog drainage

Blocked:non-functional

Blocked:reduced functional

Not blocked:functional

Not blocked:non-functional

Not blocked:reduced functional

Burnt high bog (2004/05-12/13)

High bog cutaway (2004/05-10)

SAC