Sheheree Bog (SAC 000382), Co. Kerry

Executive Summary

This survey, carried out in October 2012, aimed to assess the conservation status of habitats listed on Annex I of the European Habitats Directive (92/43EEC) on the high bog at Sheheree 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, Bog Woodland, Degraded Raised Bog and Depressions on peat substrates of the Rhynchosporion.

Active Raised Bog, including Bog Woodland, covers 4.06 ha (63.44%) of the high bog area. Central ecotope is absent from the site, and active flushes, most notably in the northeast corner of the high bog, comprise most of the high quality habitat. The active flushes are characterised by *Sphagnum* lawns, hummocks and hollows, and *Sphagnum* cover is in the range of 76-90% in some locations. Sub-central ecotope is widespread and comprises much of the central area of the high bog.

Degraded Raised Bog covers 2.34 ha (36.56%) of the high bog area. It is drier than Active Raised Bog and supports a lower density of *Sphagnum* mosses. It has a less developed micro-topography, while permanent pools and *Sphagnum* lawns are generally absent. Degraded Raised Bog at Sheheree Bog consists entirely of sub-marginal ecotope, which forms a narrow band around much of the high bog margin, except in the south, where it covers a more substantial area, and in the northeast, where active flush extends to the high bog margin.

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. The habitat was most common in sub-central ecotope in the southeast of the bog, and in sub-marginal ecotope on the east side of the high bog.

There is a *Betula pubescens*-dominated Bog Woodland, with a reasonably abundant bryophyte layer and a diverse *Sphagnum* species cover, in the northeast of the high bog. It covers only 0.04ha, and is surrounded by active flush.

The vegetation on the high bog at Sheheree Bog is quite unusual in that it is mostly dominated by tall *Calluna vulgaris*, *Myrica gale* and *Ulex gallii*, with *Molinia caerulea* also a fairly constant feature. With the exception being the small Bog Woodland, the rest of the vegetation could all justifiably have been mapped as flush.

Restoration works did not take place at the site between the period 2005-12, although there is no active turf cutting at the site, nor any recent history of such. There are no drains on the high bog, and the surrounding wet lagg is intact.

The current conservation objective for Sheheree Bog is to restore the area of Active Raised Bog and Bog Woodland 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 Bog Woodland is 0.04ha while that for Active Raised Bog is 5.59ha (which includes the area of Bog Woodland). The objective in relation to Structure and Functions (S&Fs) is that at least half of the Active Raised Bog area should be made up of the central ecotope and active flush (i.e. the wetter vegetation communities). These values have been set as Favourable Reference Values or FRVs until more site specific values can be set based on hydrological and topographical studies. The objective for Degraded Raised Bog is for the sub-marginal area to be restored to active peat forming communities as stated above and that no loss or degradation of any kind occurs. Although FRVs could not be established for the Rhynchosporion depressions, the objectives are to increase its extent and improve its quality to values associated with a favourable conservation status of Active Raised Bog. Therefore, the habitat's objectives are indirectly associated with Active Raised Bog objectives.

There has been no change in the area of Active Raised Bog (4.06ha) at Sheheree Bog in the 2005 to 2012 period, although the distribution of habitats has changed considerably as a result of improvement in mapping accuracy and/or the result of a more comprehensive survey in 2012. It is also probable that the original extent of Active Raised Bog in 1994 would have been close to the 2012 value (4.06ha).

Fernandez *et al*. (2005) measured the extent of Bog Woodland as 0.125ha, although this figure has been amended here to 0.04ha to match the current area of the woodland (table 8.1) This amendment is made to reflect the assumption that the 2005 survey included a significant amount of more open birch scrub in the woodland area. This scrub, which lies mostly to the north and northwest of the present woodland area, has been excluded here from the woodland, on the basis

that a minimum 30% canopy cover is one of the criteria used in the present survey for the recognition of Bog Woodland. This scrub is now included in flush **X**.

Sub-central ecotope is mapped now, as it was in 2005, as a single large area (**Sc1**), occupying a substantial part of the central high bog. Minor boundary changes, due to more comprehensive surveying, and also re-interpretation of vegetation, have resulted in a slightly smaller area.

Flush **X** is substantially larger now, due to more comprehensive surveying in 2012 which resulted in more accurate mapping, and also due to re-interpretation of vegetation, which included the re-classification of an open scrub area that was formerly mapped in the Bog Woodland, as active flush

Flush **Y** has seen minor boundary changes and is now slightly smaller. This change is the result of more comprehensive surveying in 2012 which resulted in more accurate mapping, and also the re-interpretation of vegetation.

The spread of *Rhododendron ponticum* is the most threatening current impact at the site. Peat cutting is not carried out at Sheheree Bog, and there is apparently no known history of it at the site. There are no drains on the high bog, and it is surrounded by an intact, wet lagg. No fire events have affected the bog in the reporting period.

Active Raised Bog has been given an overall **Unfavourable Bad–Stable** conservation status assessment. Habitat Area and quality have remained unchanged in the reporting period. However, current area value is below favourable reference values, whereas S&Fs are above reference value. Future Prospects are considered Unfavourable Bad-Stable as the few identifiable negative impacts have yet to be directly addressed.

Bog Woodland has been given a **Favourable–Stable** assessment.

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

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

A series of **recommendations** have been also given, these include: control of the invasive *Rhododendron ponticum*; further hydrological and topographical studies to ascertain the capacity of the high bog to support Active Raised Bog and thus estimate a more accurate favourable reference value; further botanical monitoring surveys on the high bog in order to assess change in habitat's conservation status; an assessment of the possible impact of run-off from mineral soil in the adjacent agricultural land, particularly as some of the surrounding area slopes quite steeply to the

bog margin. The issue of whether the old high bog drainage system is having any impact on the high bog habitats should be investigated.

Site identification

SAC Site Code	000382	**6" Sheet:**	KY 66
Grid Reference:	V 98 88	**1:50,000 Sheet:**	78
High Bog area (ha):	6.40ha [1]		
Dates of Visit:	09/10/12		
Townlands:	Ardagh, Sheheree, and Ballydrisheen.		

[1] The current extent of the high bog is 6.40ha, while that reported in 2004 was 6.54ha (Fernandez *et al*., 2005). This discrepancy is the result of more accurate mapping of the high bog edge by using the higher resolution 2010 aerial images compared to those used in 2004. The actual high bog extent in 2004 was 6.40ha (see tables 8.1 and 8.3 2004 (amended) figures).

Site location

Sheheree Bog is approximately 3km southeast of Killarney town in Co. Kerry. As the only significant raised bog in the area, it is relatively isolated and is at the extreme southwest of the range of raised bogs in Ireland. Moanveanlagh bog, beside Listowel town, is approximately 45km to the north of Sheheree Bog.

Sheheree Bog is bordered by small roads to the north, east and south and was accessed via the road that runs along the southern side. Access is moderately difficult due to the intact wet lagg that surrounds the bog.

Description of the survey

The survey was carried out in October 2012 and involved a vegetation survey of the high bog at Sheheree Bog and the recording of impacting activities affecting high bog vegetation. A similar survey was carried out in 2005 by Fernandez *et al*. (2005). High bog vegetation was described and mapped, based on raised bog ecotope vegetation community complexes developed by Kelly 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 photographical 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 Sheheree Bog was re-surveyed. Sections mapped as sub-marginal ecotope, sub-central ecotope, bog woodland and active flush in 2005 were surveyed in more detail. These are the areas where changes were likely to have occurred. Quadrats, which describe the micro-topographical features and indicator species, recorded in the 2005 project (Fernandez *et al*. 2005) were re-surveyed (see Appendix III). The size of quadrats was 4m x 4m for Active Raised Bog and 10 x 10m for Bog Woodland.

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

Sheheree Bog is a small oval-shaped raised bog, less than 0.5km long on its longest axis. The bog developed by succession from a lake similar to Ardagh Lough to the south, and is unique in an Irish context, in that it is the only raised bog completely surrounded by an intact wet lagg. The vegetation is also unusual in that it is mostly dominated by shrub species, with tall *Calluna vulgaris*, *Myrica gale* and *Ulex gallii* all common throughout the site. *Molinia caerulea* is also a constant feature of the vegetation. The bog has a relatively flat surface with minimal slopes to the margins, and has been classified as a ridge basin bog type (Kelly *et al*., 1995). This state-owned bog is also a National Nature Reserve, established in 1990.

Ecological Information

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

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

- Active Raised Bog (EU code 7110),
- Degraded Raised Bog (EU code 7120),
- Bog Woodland (EU code 91D0) and
- Depressions on peat substrates of the Rhynchosporion (EU code 7150).

Active Raised Bog (7110)

The current area of Active Raised Bog at Sheheree Bog is 4.06ha (63.44% of the high bog), which is 0.36ha greater than the area calculated in 1994 (table 8.1), although this change is attributed to more comprehensive surveying and accurate mapping in 2012, rather than a real change. Thus, indicating that the actual 1994 habitat extent was likely to be similar to the one reported in 2012. Furthermore, the comparison between the 2005 (amended) area value and current value (table 8.1) indicate no change in the area of Active Raised Bog in the new reporting period (2005-2012).

Active Raised Bog includes sub-central ecotope, active flushes and Bog Woodland.

Sub-central ecotope was found in a single location (**Sc1**) occupying much of the central part of the high bog. Two community complex types were recorded. Complex 10 is a very wet complex, consisting of low hummocks and hollows, lawns and pools. *Sphagnum* cover is the range of 76-90%, a large proportion of which is accounted for by *S. papillosum* in lawns and hummocks. Other common *Sphagnum* species recorded were *S. capillifolium* and *S. magellanicum*, while *S. fallax* and *S. palustre*, two typical flush species, were occasional. Other typical flush species included *Vaccinium oxycoccos* and *Aulacomnium palustre*. The vegetation in the complex, like that over much of the high bog, is partly characterised by *Molinia caerulea*, tall *Calluna vulgaris* (height range 31-40cm), *Myrica gale* and *Ulex gallii*, although *U. gallii* is not as widespread throughout this complex as *C. vulgaris* or *M. gale*.

Complex 7/10 consists of low hummocks and hollows, has very soft ground, and overall *Sphagnum* cover is 51-75%, although this is as high as 76-90% in places. The commonest *Sphagnum* species are *S. capillifolium*, *S. cuspidatum* and *S. papillosum*, while *S. fallax* and *S. palustre* are occasional. The shrub cover in complex 7/10 is higher than that of complex 10, with *Calluna vulgaris* cover of 34-50% (and height of 51-60cm) and *Myrica gale* cover of 11-25%. *Ulex gallii* is also present, though less frequent, and its distribution is somewhat concentrated near the margins of the sub-central ecotope, where it becomes transitional with the adjacent sub-marginal ecotope (complex 7). *Molinia caerulea*

was also present, as were a number of other typical flush species, such as *Vaccinium oxycoccos* and *Aulacomnium palustre*.

Two active peat forming flushes (X and Y) are present at Sheheree Bog. Flush X surrounds the Bog Woodland in the northeast corner of the high bog, and part of the flush includes an area of birch-dominated scrub that grades into the bog woodland. Only those parts of the wood/scrub with a minimum 30% canopy cover were considered as Bog Woodland, while the adjacent, more open scrub was mapped as part of flush X. Much of flush X is very wet and the overall *Sphagnum* cover, comprised largely of *S. fallax* in hollows and lawns, is 76-90%. The other common *Sphagnum* species here is *S. capillifolium*, which forms occasional low hummocks throughout the flush. *Molinia caerulea* has an overall cover of 11-25%, although only 4-10% in places, while the shrub species that characterise much of the sub-central and sub-marginal ecotopes at the site are less common here. *Calluna vulgaris* has an overall cover of 11-25% (and height range of 51-60cm), while the cover of *Myrica gale* is in the range of 4-10%. *Ulex gallii* is largely absent from this flush. *Rhododendron ponticum* is present and becomes frequent towards the margins of the high bog.

Flush **Y**, in the southeast corner of the high bog, is a small, very wet area that lies in a depression. The micro-topography consists of low hummocks and hollows, and total *Sphagnum* cover – comprised mostly of *S. capillifolium*, *S. papillosum* and *S. fallax*, is in the range 51-75%. *Molinia caerulea* tussocks cover 51-75% of the flush area, rising to 76-90% in some places, while other typical flush species include *Empetrum nigrum*, *Vaccinium oxycoccos* and *Aulacomnium palustre*. The shrub species that characterise much of the sub-central and sub-marginal ecotope vegetation are less abundant here – *Calluna vulgaris* cover is in the range of 11-25% (although height is 71-80cm) and *Myrica gale* cover is 1-4%.

Bog Woodland, although considered to be part of the Active Raised Bog, is described separately below.

Degraded Raised Bog (7120)

The current area of Degraded Raised Bog at Sheheree Bog is 2.34ha (36.56% of the high bog).

Degraded Raised Bog at the site is comprised entirely of sub-marginal ecotope, and a single community complex (complex 7). Sub-marginal ecotope typically features the most developed micro-topography within Degraded Raised Bog, with areas of well-developed Raised Bog flora, although permanent pools are usually absent. Such is the case at Sheheree Bog, and the micro-topography in complex 7 consists of low *Sphagnum* hummocks and hollows and abundant *Molinia caerulea* tussocks. The overall cover of *M. caerulea* in the complex is 34-50%, while tall (91-100cm)

Calluna vulgaris cover is 26-33%, and that of *Myrica gale* is 11-25%. Total *Sphagnum* cover, which is mostly comprised of *Sphagnum capillifolium*, *S. papillosum* and *S. cuspidatum*, is 26-33%. Thus, the vegetation is, like that of the sub-central ecotope at the site, quite typical of flush (in this case, inactive flush), and could justifiably have been mapped as such.

In the north-west of the site, *Ulex gallii* (26-33%) dominated the ecotope, along with *Calluna vulgaris* (26-33%), tussocks of *Molinia caerulea* (11-25%) and *Myrica gale* (4-10%). Parts of this appeared likely to be the lagg zone of the bog, or at least transitional between high bog vegetation and that of the lagg zone. Some of the species recorded here included *Succisa pratensis*, *Betula pubescens*, *Osmunda regalis*, *Typha latifolia* and *Alnus glutinosa*.

The invasive *Rhododendron ponticum* was more frequent in this complex towards the margins of the high bog.

Depressions on peat substrates of the Rhynchosporion (7150)

Rhynchosporion vegetation is widespread on Sheheree 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. It was most abundant at Sheheree Bog in sub-central ecotope, complex 10, and in sub-marginal ecotope, complex 7.

Typical plant species included *Rhynchospora alba*, *Sphagnum cuspidatum, S. magellanicum, S. papillosum*, *S. fallax*, *Menyanthes trifoliata* and *Eriophorum angustifolium*.

Bog Woodland

Bog Woodland is found at a single location, in the north-east corner of the high bog at Sheheree Bog (**Bw1**) and it covers just 0.04ha. The total combined area of woodland and scrub in this part of the site is somewhat greater than the 0.04ha of woodland, but only those parts with a minimum canopy cover of 30% were included in the woodland. The adjacent, more open birch-dominated scrub was included in flush **X**, which surrounds the Bog Woodland.

The Bog Woodland was dominated by *Betula pubescens*, while *Pinus sylvestris* formed a minor part of the woodland canopy. Median canopy height was 4m. The shrub layer consisted mostly of *Myrica gale* (c.10%) and smaller *Betula pubescens*, while *Molinia caerulea* tussocks, *Osmunda regalis*, tall *Calluna vulgaris* and *Juncus effusus* were also present. *Sphagnum fallax* and *S. palustre* formed the major part of the total *Sphagnum* cover, which was estimated as 30%, while *Polytrichum commune* and *Hylocomium splendens* were also present. Within the woodland, there was a lack of regenerating

Betula pubescens, a lack of diversity in the various size classes of *Betula*, and no significant dead wood component, although the extremely small size of the habitat may determine that it scarcely functions as typical woodland, thus potentially explaining the apparent shortcomings.

Detailed vegetation description of the high bog

A detailed description of high bog vegetation recorded during the 2012 survey of Sheheree 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 Sheheree 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
I01	Invasive alien species	L	-1	<1ha [1]	Inside High Bog	**7110/7120/7150/91D0**

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

[1] This figure is estimated and represents the extent of shrubs across entire high bog

Peat cutting

There has been no peat cutting at Sheheree Bog, and no high bog was lost to cutting during the reporting period. There are no recent records of peat cutting having taken place at the site. Kelly *et al*. (1995) noted the absence of peat cutting at the site, while Fernandez *et al*. (2005) similarly reported a lack of cutting, and noted the apparent intactness of the site. Also associated with the historic absence of peat cutting at the site are the absence of high bog drainage and the intactness of the surrounding wet lagg.

Drainage

High bog drainage

There are no obvious functional high bog drains at Sheheree Bog, nor were there any in the recent past (Fernandez *et al*., 2005). Kelly *et al*. (1995) noted the absence of drains, but also the presence of some vegetation patterns that may be indicative of infilled drains. Whether these are now having any effect on the hydrology and ecology of the site is unclear. This should be investigated.

Bog margin drainage

Due to the long term absence of peat cutting at the site, there are no known cutover areas, and, therefore, no cutover drains at Sheheree Bog. No evidence of drainage or drainage maintenance in adjacent agricultural land in the current reporting period was observed.

Fire history

No fire events have been reported on the high bog in the current reporting period and there was no evidence of recent fires observed during the field survey. Neither Kelly *et al*. (1995) or Fernandez *et al*. (2005) reported any evidence of fire events at the site.

Invasive species

The spread of *Rhododendron ponticum* on the high bog is one of the few discernible impacts at the site. It is notably more common and widespread along parts of the high bog margin, where it appears to be spreading from the adjacent lagg wood/scrub. It is also more common in the northern half of the high bog, particularly in the north and east of this area. It is as yet uncommon in the bog woodland, but is more frequent in the adjacent flush scrub.

It is unclear if it has become significantly more abundant or widespread since the survey by Fernandez *et al*. (2005), as it was described then as being frequent in the areas in which it is now also common, while several large and mature bushes were scattered over the rest of the bog. Kelly *et al*. (1995) referred to a site visit by wildlife rangers in 1993, during which the problematic spread of *R. ponticum* was noted.

The impact is considered to be of low importance in Active Raised Bog, Degraded Raised Bog, Rhynchosporion depressions and Bog Woodland.

Afforestation and forestry management

There are no forestry plantations on or adjacent to the high bog.

Other impacting activities

Kelly *et al*. (1995) identified fertiliser run-off from the steep slopes of the surrounding mineral soil as a likely threat to the vegetation of both the high bog and lagg zone. This is likely to remain the case as the slopes in question are still managed for the purposes of grazing. A number of other impacts were recorded in the site Natura 2000 Standard Data Form. These included mowing and cutting (code 102), fertilisation (code 120), grazing (code 140) and water pollution (code 701). However, an assessment of some of these potential impacts was outside the scope of the present survey, while others were not observed or recorded. No impact assessments have been carried out to evaluate the potential impact of these activities on the high bog habitats.

Conservation activities

Sheheree Bog is apparently unique among raised bogs in Ireland in having an intact lagg, and peat cutting has not taken place for at least a very long time, and indeed, has possibly never taken place to any significant extent. There are also no high bog drains. For these reasons, the typically prescribed raised bog restoration measures, such as drain blocking and cutover restoration, do not apply to the site. Furthermore, the bog is in state ownership and is a National Nature Reserve.

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

Although table 8.1 indicates no change in the area of Active Raised Bog in the current reporting period, the distribution of the habitat has changed somewhat, and the boundaries of individual Active Raised Bog areas have been modified, mostly as a result of more comprehensive surveying, and re-interpretation of vegetation.

The Bog Woodland area of 0.04ha is regarded as unchanged in the reporting period, although Fernandez *et al*. (2005) had mapped an area of 0.125ha. The 2005 figures have been amended to 0.04ha, to take account of the fact that the discrepancy in area between the two surveys is most likely due to differing interpretations of the woodland vegetation. In the present survey, only those parts of the larger wood/scrub area with a minimum canopy cover of 30% were included within the Bog Woodland area, while the adjacent, more open scrub was mapped within flush **X**. The greater Bog Woodland area mapped in 2005 (Fernandez *et al*.) is most likely due to the inclusion of some or all of the scrub, and therefore, no real change is thought to have taken place.

The present inclusion of some of the former Bog Woodland area has added to the area of flush **X**, as has the significant expansion of the mapped area to the north and northeast. These changes are all attributed to re-interpretation of vegetation, and also to the more comprehensive surveying in 2012, which resulted in more accurate mapping of habitats. Much of the area now included within flush **X** had been quite sparsely surveyed in 2005, with the result that the total flush area was likely to have been substantially underestimated.

Flush **Y** has seen some minor boundary changes and is now slightly smaller than was previously the case. This change is, at least partly, due to more comprehensive surveying in 2012 which resulted in more accurate mapping. Re-interpretation of vegetation may also have been a factor in the boundary amendments.

Sc1, which encompasses the entire sub-central ecotope at Sheheree Bog, has seen minor boundary changes and is now slightly smaller. This change is partly the result of more comprehensive surveying in 2012, which resulted in more accurate mapping. Re-interpretation of vegetation is also a factor, particularly as the mapped area of flush X has been significantly expanded through the incorporation of a substantial part of the former Sc1.

The favourable reference value (FRV) for area is considered to be the sum of Active Raised Bog (central, sub-central ecotopes, active flush and Bog Woodland) plus sub-marginal ecotope when the Habitats Directive came into force in 1994 (see table 8.4). Therefore, Active Raised Bog Area FRV is 5.59ha (based on 1994/5 Kelly *et al*. (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 (4.06ha) is 27.37% below the FRV. A current Area value more than 15% below FRV falls into the **Unfavourable Bad** assessment category.

Although a long term (1994/5-2012) trend indicates an increase in the area of Active Raised Bog at the site of 0.36ha (see table 8.1), these data are not directly comparable, due to the widely different survey methods used, and the increase is not regarded as indicative of real change. Furthermore, the actual extent of Active Raised Bog in 1994was likely to be similar to the current 2012 value, as previously mentioned in the report.

A more relevant and short term trend analysis (7 years; 2005-2012) indicates no change in the area of Active Raised Bog. Therefore, the habitat Area is given a **Stable** trend assessment.

The Area of Active Raised Bog at Sheheree Bog is assessed as Unfavourable Bad-Stable (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 2.01ha (half of 4.02ha, the current area of Active Raised Bog (excluding Bog Woodland)). The current value is 1.14ha which is 43.28% below the FRV. A current S&Fs value more than 25% below FRV falls into the **Unfavourable Bad** assessment category. Therefore S&Fs are given an **Unfavourable-Bad** assessment.

Although a long term trend (1994/5-2012) suggests an increase in the area of active flush, the data from these two surveys are not directly comparable, due to the widely different survey methods used. The comparison of 1994 and 2005 data shows no change, while the current short term data (7 years; 2005-2012) also indicates no change in the area of active flush (table 8.1). Therefore, the S&Fs are given a **Stable** trend.

Quadrat analysis (**Qaf1, Qsc2 and Qbw1**) indicates the following:

Qaf1: this quadrat, recorded in active flush **X** in 2012, was previously classified as sub-central ecotope (Qsc1, community complex 10/9), reflecting its location in the substantial tract of flush **X**

that was previously mapped as sub-central ecotope. The two quadrats were broadly similar, with total *Sphagnum* cover assessed as 76-90% in both cases, although the 2012 quadrat had a higher cover of pools and *Sphagnum* pools (both 34-50%), compared to 4-10% for both, in 2005. On the other hand, low hummocks and hollows had 34-50 and 11-20% cover, respectively, in 2005, while in 2012 low hummocks cover was 26-33%, and hollows were absent. *Vaccinium oxycoccos*, a typical flush species, was listed as a notable species in 2005 (and also in 2012), while other notable species in 2012 included *Aulacomnium palustre* and *Molinia caerulea*. The quadrat location is very close to the new flush/sub-central boundary. This may account for the different ecotope classifications used, as there is typically some degree of transition between ecotopes close to their boundaries.

Qsc2: Qsc2 is a new quadrat, and there are, therefore, no 2005 data for the purposes of comparison with the 2012 quadrat. The quadrat was recorded near the southern boundary of Sc1, in community complex 7/10. Total *Sphagnum* cover is 51-75%, comprised mostly of *S. cuspidatum* (in hollows), *S. capillifolium* and *S. papillosum*. Pools are absent, and the micro-topography consists of high hummocks, low hummocks and hollows. The abundance of *Calluna vulgaris* (34-50% cover) and presence of *Aulacomnium palustre* are indicators of the flushed-type conditions that are common throughout the site.

Qbw1: The different methods employed in 2005 and 2012 limit the usefulness in comparing the quadrats. However, data indicate a greater range of *Betula* size classes present in 2005. Total *Sphagnum* cover in 2012 (consisting mostly of *S. fallax* and *S. palustre*) was 30%, while in 2005 the cover values of individual *Sphagnum* species consisted of: *S. fallax* (recorded as *S. recurvum*) 30%, *S. palustre* 5-10%, *S. capillifolium* 20% and S. cuspidatum 5%. Species present in *2005* that were not found in 2012 include *Potentilla erecta*, *Carex rostrata* and *Vaccinium oxycoccos*.

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

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

Future Prospects

Although the habitat Area and S&Fs are both substantially below FRVs, and are therefore assessed as Unfavourable Bad, the recent trend in both is for no change and they are given a Stable trend. This reflects, to some degree at least, the relative lack of negative impacts at the site. Turf cutting has not taken place for at least a very long time, and has possibly never been practiced at Sheheree Bog. As a consequence, there are no high bog, or marginal, drains and the site, uniquely among

Irish raised bogs, has an intact surrounding lagg. Only the spread of invasive species, in the form of *Rhododendron ponticum*, is recorded here as a significant impact, although the possible effects of run-off from the adjacent agricultural mineral soils have yet to be assessed. However, the lack of any remediation works (in this case, control of invasive species) and the unlikelihood of any imminent improvement in habitat quality means that a favourable assessment would not be appropriate.

Habitat **Area** is currently 27.37% below FRV (see table 8.4) and a Stable trend is foreseen. The habitat Area is expected to be remain more than 15% below FRV in the following two reporting periods (12 years). Thus, habitat's **Area Future Prospects** are assessed as **Unfavourable Bad-Stable**. Habitat's **S&Fs** are currently 43.29% below FRV (see table 8.4) and a Stable trend is also foreseen. Therefore S&Fs are expected to more than 25% below FRV in the following two reporting periods. Thus, **S&Fs Future Prospects** are assessed as **Unfavourable Bad-Stable**.

The overall habitat's Future Prospects are Unfavourable Bad-Stable (see table 8.5).

In the absence of any obvious potential remediation measures that could substantially improve the current habitat quality, it is highly unlikely that the current FRV can be achieved. Based on potential future hydrological/topographical studies the FRV may be revised, so that the current habitat condition may then be sufficient for a Favourable assessment.

There is no potential for restoration of cutover as there are no known cutover areas at the site margins. The issue of whether the old high bog drainage system is having any impact on the high bog habitats should be investigated and the blocking of this drainage undertaken if deemed necessary. Restoration potential is, therefore, quite limited, and should probably initially focus on the removal of the invasive *Rhododendron ponticum*. An assessment of the potential effects of fertiliser run-off and water pollution from the adjacent agricultural land should also be considered.

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

Table 8.1 Changes in Active Raised Bog area

Active Ecotopes	1994[1]	2005	2005 (amended)	2012	Change (2005-2012)	
	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	%
Sub-central	3.29	3.61	2.88	2.88	0.00	0.00
Active flush	0.37	0.37	1.14	1.14	0.00	0.00
Bog Woodland[2]	0.04	0.04	0.04	0.04	0.00	0.00
Total	**3.70**	**4.02**	**4.06**	**4.06**	**0.00**	**0.00**

[1]These 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. More recent data gathered during the 2012 survey indicates that the actual extent of Active Raised Bog in 1994 was likely to be similar to the 2012 value (4.06ha) which was the result of more comprehensive surveying and thus accurate mapping in 2012.

[2] Bog Woodland area has been amended to include only that part of the larger woodland/scrub area where canopy cover is a minimum of 30%. The larger area estimated in 1994 and 2005 has been amended to equal the current area, on the assumption that the earlier surveys incorporated a significant amount of the adjacent more open birch scrub into the woodland area.

Note: Table 8.1 includes 2004/5 figures and 2005 amended figures. The latter shows the ecotope area believed to be present in 2005 after surveying improvements in 2012. The comparison between 2005 (amended) and 2012 illustrates the actual changes in ecotope area in the 2005-2012 period. Any change in ecotope area between the 2005 and the 2005 (amended) values is due to improvement in mapping accuracy and/or the result of a more comprehensive survey in 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	Qsc2	Stable	Slight changes in boundary (slightly smaller). This change is the result of more comprehensive surveying in 2012 which resulted in more accurate mapping, and also re-interpretation of vegetation.	Qsc2 is a new quadrat and there are, therefore, no data with which it may be compared
BW1	Qbw1	Stable	Slight changes in boundary (slightly smaller). This change is the result of re-interpretation of vegetation and also more comprehensive surveying in 2012 which resulted in more accurate mapping.	The different methods employed limit the usefulness in comparing the 2005 and 2012 quadrats. However, data indicate a greater range of *Betula* size classes present in 2005, and a lack of old trees/dead wood in 2012.
X	Qaf1	Stable	Slight changes in boundary (substantially larger). This change is the result of re-interpretation of vegetation and also more comprehensive surveying in 2012 which resulted in more accurate mapping.	Quadrat Qaf1 was the former Qsc1. Classified as flush in 2012, but as sub-central ecotope in 2005. The 2005 data has reference to a flush species, while proximity to ecotope boundary may account for different classification. Quadrats broadly similar; *Sphagnum* lawn cover greater in 2012; cover of hollows and low hummocks greater in 2005.
Y	None	Stable	Slight changes in boundary (slightly smaller). This change is the result of more comprehensive surveying in 2011 which resulted in more accurate mapping and re-interpretation of vegetation.	

Degraded Raised Bog (7120)

Area

The Degraded Raised Bog FRV for Area is 0.81ha at Sheheree Bog. This value corresponds with the difference between the current high bog area (6.40ha) and the Active Raised Bog FRV (5.59ha) 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 188.89% bigger than FRV. A current habitat Area value more than 15% above FRV falls into the Unfavourable Bad assessment category. Therefore the habitat Area is given an **Unfavourable Bad** assessment (see table 8.5).

Table 8.3 shows no change in the areas of sub-marginal and marginal ecotope in the reporting period. Marginal ecotope was not recorded in the present survey and Degraded Raised Bog was composed entirely of sub-marginal ecotope. Although a narrow strip of marginal ecotope, amounting to 0.82ha, was mapped along the western margin of the high bog in 2005 (Fernandez *et al.*), this figure has been amended to 0.0ha (Table 8.3) on the assumption that a difference in interpretation, and also more comprehensive surveying in 2012, account for this difference. No ecotope mapping points were recorded in this strip of marginal ecotope in 2005, and its inclusion may, therefore, be largely due to conjecture. The more comprehensive surveying and mapping exercise employed in 2012 has resulted in modifications to the sub-marginal ecotope boundary. In addition to the re-classification of the former marginal ecotope as sub-marginal, other boundary refinements include the sub-marginal area expanding substantially in the southern end of the high bog. These changes are all attributed to more comprehensive surveying, and re-classification of vegetation, rather than to any genuine changes in habitat quality at the site.

Table 8.3 indicates that there has been no change in the area of Degraded Raised Bog. As a result the habitat is given a **Stable** trend.

The Area of Degraded Raised Bog at Sheheree Bog is assessed as Unfavourable Bad-Stable (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 0.59ha (25% of 2.34ha, the current area of Degraded Raised Bog). The current marginal and face

bank ecotopes area value is 0.00ha (see Table 8.4) and therefore S&Fs are given a **Favourable** assessment.

Table 8.3 shows no change in the area of marginal ecotope, while face bank has been absent from the site during this time, and may, therefore, also be regarded as unchanged. S&Fs trend is assessed based on actual changes within marginal and face banks ecotope (e.g. decreases due to rewetting processes or increases as a result of further drying out). Thus, the DRB's S&Fs at Sheheree Bog are given a **Stable** trend.

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 Sheheree Bog are assessed as Favourable-Stable (see table 8.5).

Future Prospects

Degraded Raised Bog has remained unchanged in area and quality in the reporting period, not least because peat cutting and associated drainage are absent from the site. The only significant impact recorded in the present survey was the presence of invasive species, in the form of *Rhododendron ponticum*. Other possible negative impacts, such as run-off from adjacent agricultural fields, could not be quantified in the present exercise.

Habitat **Area** is currently 188.89% above FRV (see table 8.4) and a Stable trend is expected in the following two reporting periods (12 years). As a result habitat Area is expected to remain more than 15% above FRV. Thus, habitat's **Area Future Prospects** are assessed as **Unfavourable Bad-Stable**. However, in the absence of any major impacting activities and with no obvious potential remediation measures that could substantially improve the current habitat quality, it is highly unlikely that the current FRV can be achieved. Based on potential future hydrological/topographical studies the FRV may be revised, so that the current habitat condition may then be sufficient for a Favourable assessment.

Habitat's **S&Fs** are currently 100% below FRV (see table 8.4), which in the case of DRB is taken as positive. A Stable 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-Stable**.

The overall habitat's Future Prospects are Unfavourable Bad-Stable (see table 8.5).

Table 8.3 Changes in Degraded Raised Bog area

Inactive Ecotopes	1994[1]	2005	2005 (amended)	2012	Change (2005-2012)	
	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	%
Sub-marginal	1.89	1.70	2.34	2.34	0.00	0.00
Marginal	0.96	0.82	0.00	0.00	0.00	0.00
Total	**2.85**	**2.52**	**2.34**	**2.34**	**0.00**	**0.00**

[1]These 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 2005 figures and 2005 amended figures. The latter shows the ecotope area believed to be present in 2005 after surveying improvements in 2012. The comparison between 2005 (amended) and 2012 illustrates the actual changes in ecotope area in the 2005-2012 period. Any change in ecotope area between the 2005 and the 2005 (amended) values is due to improvement in mapping accuracy and/or the result of a more comprehensive survey in 2012.

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

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 areas of Active Raised Bog and sub-marginal ecotope have remained unchanged in the reporting period. As result habitat Area is given a **Stable** trend.

The habitat's Area Future Prospects status is equally based on the Active Raised Bog Area Future Prospects status assessment and the Area Future Prospects trend is based on the trend expected for

Active Raised Bog and sub-marginal ecotope in the following two reporting periods. Most of the typical impacting activities recorded on raised bogs, such as peat cutting and drainage, do not apply to Sheheree Bog, and the spread of invasive species was the only significant impact recorded in the present survey. Although Kelly *et al*. (1995) referred to the presence of open water bodies at the northern edge of the site up until the 1950's, the present absence of which may be indicative of drying out processes on the bog, no decline was discernible in the present reporting period. Therefore, the habitat's Area Future Prospects are given an **Unfavourable Bad-Stable** assessment.

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

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

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

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

Bog Woodland (91D0)

Area

The favourable reference value (FRV) for area is 0.04ha at Sheheree Bog. The FRV corresponds with the area of this habitat present when the Habitats Directive came into force in 1994 (see table 8.4) and therefore the Kelly *et al*. (1995) value. The current area is 0.04ha, and therefore equal to FRV. A current habitat area value greater than or, 0-5% below, FRV falls into the **Favourable** assessment category.

Kelly *et al*. (1995) did map a greater area of Bog Woodland (0.125ha), although that figure was amended here to equal to current habitat extent (table 8.1), as the discrepancy is thought to be the result of more comprehensive surveying and accurate mapping, and the application in 2012 of a 30% minimum canopy cover as a necessary criterion for the recognition of Bog Woodland.

The area of Bog Woodland has not changed in the reporting period (see table 8.1) and the habitat Area is given a **Stable** trend assessment.

The Area of Bog Woodland at Sheheree Bog is assessed as Favourable-Stable (see table 8.5).

Structure & Functions

The FRV for S&Fs assessment is based on the monitoring stops assessment in 2012 (see Appendix III). A single monitoring stop was carried out, as the very small size of the habitat (0.04ha) dictated that it was not possible to record more than one. The monitoring stop passed on the combined positive, negative indicator species and structural data assessment. However, it failed at *Betula pubescens* dbh distribution, overall old trees and dead wood, and *Betula pubescens* regeneration level, and thus failed the overall assessment criteria. This would ordinarily indicate an Unfavourable S&Fs assessment. However, the Bog Woodland appeared in many respects to be in good condition, with wet ground, a high ground cover of bryophytes (50%), including *Sphagnum* cover of 30%, and a species composition and structure that satisfy the assessment criteria. In view of this, and in the absence of any recorded significant impacts that could explain the failed monitoring stop criteria, the habitat's S&Fs are given a **Favourable-Stable** assessment.

The failed monitoring stop criteria may be at least partly explained by the extremely small extent of the habitat, as this may determine that it scarcely functions as woodland.

The Structure & Functions of Bog Woodland at Sheheree Bog are assessed as Favourable-Stable (see table 8.5).

Future Prospects

Most of the commonly occurring raised bog impacts such as turf cutting and drainage do not apply to Sheheree Bog, and it is unique among Irish raised bogs in having an intact lagg zone and no history of turf cutting. The only significant impact recorded at the site is the spread of *Rhododendron ponticum*, and the Bog Woodland has so far been largely unaffected by this. The Bog Woodland is entirely surrounded by active flush **X**, much of which is among the wettest habitat at the site, and there are no indications of changing hydrological conditions that may be negatively affecting the habitat.

Although the monitoring stop carried out in the habitat failed on a number of criteria, such as *Betula pubescens* dbh distribution, old trees and dead wood diversity, and *Betula pubescens* regeneration, it may be that the size of the area is such that it scarcely functions as a typical woodland, and the failed criteria, therefore, may not be an indication of inherently poor condition.

Habitat **Area** is currently equal to the FRV (see table 8.4) and a Stable trend is foreseen in the following two reporting periods (12 years). Thus, habitat's **Area Future Prospects** are assessed as **Favourable-Stable**. Habitat's **S&Fs** have been given a **Favourable-Stable** assessment and a Stable trend is also foreseen. Thus, **S&Fs Future Prospects** are assessed as **Favourable-Stable**.

Therefore, the Future Prospects for Bog Woodland are considered Favourable-Stable (see table 8.5).

The overall conservation status of Bog Woodland at Sheheree Bog is assessed as Favourable-Stable (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	5.59	4.06	27.37	2.01	1.14	43.28

[1] 1994 sub-central, active flush, bog woodland and sub-marginal ecotope area.

[2] 2012 sub-central ecotope, active flush and bog woodland area.

[3] Half of the current 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	0.81	2.34	188.89	0.59	0.00	100.00

[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.

	FRV Target (ha)	2012 value (ha)	% below target	FRV Target (ha)	2012 value (ha)	% change
91D0	0.04	0.04	0.00	na	na	na

na: not applicable

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–Stable.**
- **Degraded Raised Bog is assessed as being Unfavourable Bad–Stable.**
- **Rhynchosporion depressions is assessed as being Favourable–Stable.**
- **Bog Woodland is assessed as being Unfavourable Bad–Stable.**

Table 8.5 Habitats conservation status assessments

Habitat	Area Assessment	Structure & Functions Assessment	Future Prospects Assessment	Overall Assessment
7110	Unfavourable	Unfavourable Bad-	Unfavourable Bad-	Unfavourable Bad-

	Bad-Stable	Stable	Stable	Stable
7120	Unfavourable Bad-Stable	Favourable -Stable	Unfavourable Bad-Stable	Unfavourable Bad-Stable
7150	Unfavourable Bad-Stable	Unfavourable Bad-Stable	Unfavourable Bad-Stable	Unfavourable Bad-Stable
91D0	Favourable-Stable	Favourable-Stable	Favourable-Stable	Favourable-Stable

Conclusions

Summary of impacting activities

- Peat cutting has not taken place for at least a very long time, and has possibly never taken place at the site. The potential impact from an old high bog drainage system is unknown. There are not cutover drains at the site.
- No fire events have damaged the high bog in the reporting period, and there have been no reports of any significant fires in the recent past.
- *Rhododendron ponticum* is common and widespread along parts of the high bog margin, where it appears to be spreading from the adjacent lagg woodland and scrub. It is also more common in the northern half of the high bog, particularly in the north and east of this area. It is as yet uncommon in the bog woodland, but is more frequent in the adjacent flush scrub.

Changes in active peat forming areas

- Although figures indicate no real change in the total area of Active Raised Bog, nor in any of the individual Active Raised Bog areas, the more comprehensive surveying carried out in 2012, and re-interpretation of vegetation in some of the Active Raised Bog areas, has resulted in several boundary modifications. The area of Bog Woodland has been amended to include only that part of the larger woodland/scrub area where canopy cover is a minimum of 30%. The larger area estimated in 1994/2005 has (0.125ha) been amended to equal the current area (0.04ha), on the assumption that the earlier survey incorporated a significant amount of the adjacent more open birch scrub into the woodland area and not losses took place in the 1994-2012 period.
- Flush **X**, which surrounds the Bog Woodland, is now substantially larger, partly due to the incorporation of some birch scrub that was formerly included in the Bog Woodland, and also because of the addition of a considerable area to the north and northeast of the old

flush boundary, brought about by more comprehensive surveying. Flush **Y**, in the southeast of the site, is now slightly smaller, due to minor boundary changes brought about by more comprehensive surveying. **Sc1**, which incorporates all of the sub-central ecotope at the site, has also seen boundary changes, and is now slightly smaller, due to the more comprehensive surveying in 2012 which resulted in more accurate mapping.

- No new peat forming areas were described at the site.

Other changes

- A narrow strip of marginal ecotope, mapped on the western margin of the high bog in 2005, has now been incorporated into sub-marginal ecotope, and marginal ecotope is now absent from the bog. This area was very sparsely surveyed in 2005 and the change is attributed to more comprehensive surveying in 2012, rather than a real change in habitat quality.

Quadrats analysis

- Quadrat **Qaf1** was formerly classified as Qsc1, although the 2005 quadrat includes a reference to a common flush species. The quadrat location is also close to the sub-central/flush **X** boundary, where there would typically be some habitat somewhat transitional in character between the two ecotopes. The quadrats were otherwise broadly similar, with the same range of overall *Sphagnum* cover. Differences included the greater cover of *Sphagnum* lawns in 2012, and greater cover of hollows and low hummocks in 2005.
- **Qbw1**: The different methods employed in the two surveys limits the usefulness in comparing the 2005 and 2012 quadrats, although the data show a greater range of *Betula* size classes and higher total *Sphagnum* cover in 2005. The differences may be due to a discrepancy in quadrat location, as the areas of woodland mapped in the two surveys were substantially different, and the extent of woodland mapped in the present survey dictated that potential quadrat locations were greatly restricted.

Restoration works

- No restoration works have been undertaken at the site. The need for the blocking of old high bog drainage system should be investigated. Control of invasive species currently holds the most obvious potential for site improvements.

Summary of conservation status

- **Active Raised Bog** has been given an **Unfavourable Bad-Stable** conservation status at Sheheree Bog. Habitat Area and quality have remained unchanged in the reporting period.

However both values are below the FRVs. Future Prospects are considered **Unfavourable Bad-Stable** as no imminent decline or increase/improvement in the habitat is expected, and measures to address negative impacts such as the spread of *Rhododendron ponticum* have not been taken.

- **Bog Woodland** has been given a **Favourable-Stable** conservation status at Sheheree Bog. Habitat Area has not changed in the reporting period, is equal to FRV and assessed as **Favourable-Stable**. Habitat's S&Fs are considered **Favourable-Stable**. Although a number of features in the single monitoring carried out failed to reach the minimum pass criteria, there were no obvious indications of negative impacts that were adversely affecting the woodland. Future Prospects are considered **Favourable-Stable** as there are no known negative impacts that are likely to adversely affect the habitat in the future.
- **Degraded Raised Bog** has been given an **Unfavourable Bad-Stable** conservation status at Sheheree Bog. Habitat Area and quality have remained unchanged. Habitat Area is above the FRV, while S&Fs are equal to FRV (both marginal and face bank ecotope are absent from the site). Future Prospects are considered **Unfavourable Bad-Stable**.
- **Depressions on peat substrates of the Rhynchosporion** has been given an **Unfavourable Bad-Stable** conservation status at Sheheree Bog. Habitat Area and quality (S&Fs) are considered to be unchanged in the reporting period, and Future Prospects are also considered **Unfavourable Bad-Stable** as there are no significant impacts threatening the habitat.

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

Recommendations

- **Control of the invasive *Rhododendron ponticum*** as it may be spreading throughout the site.
- **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. This may be particularly important at this site, as there are currently no known major impacting activities, indicating that the current FRVs may be too high. The issue of whether the old high bog drainage system is having any impact on the high bog habitats should be investigated.

- **Further botanical monitoring surveys** on the high bog in order to assess change in habitat's conservation status.
- **An assessment of the possible impact of run-off** from mineral soil in the adjacent agricultural land is desirable, particularly as some of the surrounding area slopes quite steeply to the bog margin.

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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 Sheheree Bog.

Sub-Central Ecotope Complexes

COMPLEX 10

- **Location**: to the south and northwest of flush X
- **Ground**: very soft
- **Physical indicators**: absent
- ***Calluna* height**: 31-40cm
- ***Cladonia* cover**: 1-4%
- **Macro-topography**: flat
- **Pools**: 4-10% (but more like *Sphagnum*-filled depressions or lawns)
- ***Sphagnum* cover**: 76-90%
- ***Narthecium* cover**: 1-4%
- **Micro-topography**: hummocks/hollows, lawns and pools
- **Tussocks**: absent
- **Degradation or regeneration evidence**: absent
- **Species cover**: *Calluna vulgaris* (11-25%), *Erica tetralix* (5-10%), *Eriophorum angustifolium* (5-10%), *E. vaginatum* (5-10%), *Myrica gale* (26-33%), *Molinia caerulea* (5-10%), *Rhynchospora alba* (1-4%), *Menyanthes trifoliata* (1-4%), *Vaccinium oxycoccos* (1-4%), *Aulacomnium palustre* (4-10%), *Sphagnum capillifolium* (H; 4-10%), *S. papillosum* (H/L; 51-75%), *S. magellanicum* (H/L; 4-10%), *S. palustre* (H; 1-4%), *S. austinii* (H; 1-4%), *S. cuspidatum* (P; 4-10%), *S. fallax* (H; 1-4%), *Ulex gallii* (1-4%).
- **Additional comments:** This sub-central complex was characterised by *Sphagnum* cover of up to 90%, the greater part of which was comprised of lawns and hummocks of *S. papillosum*. Shrub cover – mostly consisting of tall *Calluna vulgaris*, *Myrica gale* and *Ulex gallii* – was lower here than in complex 7/10.

COMPLEX 7/10

- **Location**: south and west parts of **Sc1**
- **Ground**: soft to very soft
- **Physical indicators**: absent
- ***Calluna* height**: 51-60cm
- ***Cladonia* cover**: 1-4%
- **Macro-topography**: gentle slope
- **Pools**: absent
- ***Sphagnum* cover**: 51-75% (76-90% in places)
- ***Narthecium* cover**: <4%
- **Micro-topography**: Low hummocks/hollows
- **Tussocks**: absent
- **Degradation or regeneration evidence**: absent
- **Species cover**: *Calluna vulgaris* (34-50%), *Erica tetralix* (11-25%), *Eriophorum angustifolium* (<4%), *E. vaginatum* (<4%), *Carex panicea* (<4%), *Rhynchospora alba* (<4%), *Trichophorum germanicum* (<4%), *Vaccinium oxycoccos* (<4%), *Aulacomnium palustre* (<4%), *Myrica gale* (11-25%), *Ulex gallii* (5-10%), *Molinia caerulea* (4-10%), *Sphagnum capillifolium* (H; 11-25%), *S. papillosum* (H; 26-33%), *S. palustre* (H; <4%), *S. cuspidatum* (Hl; 11-25%), *S. fallax* (Hl; 4-10%).
- **Additional comments:** *Ulex gallii* occurred within this complex towards the eastern margin and towards the north-western margin of this complex. Where it occurred at higher cover values (c. >10-20%) the *Sphagnum* cover was generally lower (26-33%) and the complex was considered as sub-marginal complex 7. *Molinia caerulea* was also more abundant in the sub-marginal complex.
    - Complex variants: Much of the high bog vegetation at Sheheree Bog is characterised by the presence of *Molinia caerulea*, *Myrica gale*, *Ulex gallii*, and tall *Calluna vulgaris*. The ubiquitous presence of tall *C. vulgaris* in complex 7/10 is implicit in the complex name, while variations in the complex name were used to indicate differences in the relative abundances of the other species throughout the complex. The most common complex variants used here were 7/10+Mol+Myr+Ulex; 7/10+Myr+Mol; 7/10+Myr and 7/10+Mol+Ulex.

Quadrat **Qsc2** was recorded within this complex.

Active flushes

FLUSH FX

- **Location**: in the north-east of the site, surrounding the bog woodland
- **Ground**: soft
- **Physical indicators**: absent
- ***Calluna* height**: 51-60cm
- ***Cladonia* cover**: absent
- **Macro-topography**: flat
- **Pools**: absent
- ***Sphagnum* cover**: 76-90%
- ***Narthecium* cover**: absent (<4% in places)
- **Micro-topography**: hummocks/hollows and lawns
- **Tussocks**: *Molinia caerulea* 11-25% (4-10% in places)
- **Degradation or regeneration evidence**: absent
- **Species cover**: *Pinus sylvestris* (4-10%), *Betula pubescens* (4-10%), *Calluna vulgaris* (11-25%), *Erica tetralix* (1-4%), *Eriophorum angustifolium* (1-4%), *E. vaginatum* (4-10%), *Menyanthes trifoliata* (1-4%), *Pleurozium schreberi* (4-10%), *Hylocomium splendens* (4-10%), *Myrica gale* (4-10%), *Rhododendron ponticum* (4-10%), *Vaccinium oxycoccos* (<4%), *Aulacomnium palustre* (4-10%), *Sphagnum capillifolium* (H; 11-25%), *S. fallax* (H/Hl; 51-75).
- **Additional comments:** *Rhododendron ponticum* was more frequent towards the margins of the high bog.

  Quadrat **Qaf1** was recorded within this complex.

FLUSH FY

- **Location**: in the south-east of the site
- **Ground**: very soft and wet
- **Physical indicators**: absent
- ***Calluna* height**: 71-80cm
- ***Cladonia* cover**: absent
- **Macro-topography**: depression
- **Pools**: absent
- ***Sphagnum* cover**: 51-75%
- ***Narthecium* cover**: absent
- **Micro-topography**: Tussocks
- **Tussocks**: *Molinia caerulea* 51-75% (76-90% in places)
- **Degradation or regeneration evidence**: absent

- **Species cover**: *Pinus sylvestris* (< 4m; 1-4%), *Betula pubescens* (< 4m; 11-25%), *Calluna vulgaris* (11-25%), *Erica tetralix* (1-4%), *Eriophorum angustifolium* (1-4%), *E. vaginatum* (1-4%), *Hylocomium splendens* (4-10%), *Myrica gale* (1-4%), *Osmunda regalis* (<1-4%), *Juncus effusus* (1-4%), *Rhododendron ponticum* (1-4%), *Empetrum nigrum* (1-4%), *Vaccinium oxycoccos* (1-4%), *Aulacomnium palustre* (1-4%), *Sphagnum capillifolium* (H; 26-33%), *S. papillosum* (H; 11-25%), *S. fallax* (H/Hl; 4-10).
- **Additional comments:** This flush was in a slight depression, possibly indicating an area of very old cutover, although no such cutovers have been positively identified at the site.

Degraded Raised Bog (7120)

Sub-Marginal Ecotope Complexes

COMPLEX 7

- **Location**: eastern and southern parts of the high bog
- **Ground**: soft
- **Physical indicators**: absent
- ***Calluna* height**: 91-100cm
- ***Cladonia* cover**: <4%
- **Macro-topography**: flat
- **Pools**: absent
- ***Sphagnum* cover**: 26-33%
- ***Narthecium* cover**: <4%
- **Micro-topography**: hummocks/hollows
- **Tussocks**: *Molinia caerulea* 34-50% (51-75% in places)
- **Degradation or regeneration evidence**: absent
- **Species cover**: *Molinia caerulea* (34-50%), *Calluna vulgaris* (26-33%), *Erica tetralix* (5-10%), *Myrica gale* (11-25%), *Eriophorum vaginatum* (1-4%), *E. angustifolium* (1-4%), *Narthecium ossifragum* (1-4%), *Pinus sylvestris* (1-4%), *Betula pubescens* (1-4%), *Rhynchospora alba* (1-4%), *Vaccinium oxycoccos* (1-4%), *Succisa pratensis* (1-4%), *Potentilla erecta* (1-4%), *Racomitrium lanuginosum* (1-4%), *Hylocomium splendens* (1-4%), *Dicranum scoparium* (1-4%), *Hypnum jutlandicum* (5-10%), *Thuidium tamariscinum* (1-4%), *Sphagnum capillifolium* (H; 11-25%), *S. papillosum* (H; 5-10%), *S. cuspidatum* (Hl; 1-4%).
- **Additional comments:** *Rhododendron ponticum* was more frequent towards the margins of the high bog. Where this complex occurred in the north-west of the site, *Ulex gallii* (26-33%)

dominated along with *Calluna vulgaris* (26-33%), tussocks of *Molinia caerulea* (11-25%) and *Myrica gale* (4-10%). In this area the vegetation became wet and flush-like at the high bog margin and there was an increase in cover of *Sphagnum cuspidatum*. This is likely to be the lagg zone of the bog although some parts were possibly very old regenerating cutover. *Molinia caerulea* (34-50%) dominated in these areas along with *Myrica gale* (26-33%). Other species recorded include *Succisa pratensis*, *Betula pubescens*, *Osmunda regalis*, *Typha latifolia* and *Alnus glutinosa*. All of the Degraded Raised Bog (DRB) mapped at Sheheree Bog was comprised of this sub-marginal 7 complex.

- Complex variants: As was the case with the sub-central complex 7/10, variations in the complex name were used to denote differences in the relative abundances of the shrub species (and *Molinia caerulea*) that were common throughout the high bog. Those used with complex 7 included; 7+Mol+Myr+Ulex; 7+Myr+Mol and 7+Mol+Ulex. The ubiquitous presence of tall *C. vulgaris* in complex 7 is implicit in the complex name.

Marginal Ecotope Complexes

No marginal complexes recorded on Sheheree Bog.

Inactive flushes

No inactive flushes recorded on Sheheree Bog.

Face bank Complexes

COMPLEX 1

No facebank complexes recorded at Sheheree Bog

Bog Woodland (91D0)

Bog Woodland BW1

Bog Woodland at Sheheree occupied a small area in the north-east corner of the site, surrounded by an active flush (flush X) that also extends to the north-east margin of the bog. Only an area of approximately 25m x 12m had a canopy cover of ≥30% - the minimum value at which the habitat is recognised as woodland under the parameters used in the current survey. Much of this area was dominated by *Betula pubescens*, while *Pinus sylvestris* also formed part of the woodland canopy. The shrub layer mostly consisted of *Myrica gale* (c.10%) and smaller *Betula pubescens*, while *Molinia*

caerulea tussocks, *Osmunda regalis*, tall *Calluna vulgaris* and *Juncus effusus* were also present. *Sphagnum fallax* and *S. palustre* formed the major part of the total *Sphagnum* cover, which was estimated as 30%.

The woodland showed signs of poor condition, indicated by a lack of regenerating *Betula pubescens* and other native trees, and a lack of diversity in the size classes of *Betula*. It may be however, that such a small area can scarcely function as woodland, in which case such apparently negative attributes are to be expected.

Quadrat **QBW1** was recorded in this complex

Depressions on peat substrates of the Rhynchosporion (7150)

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

R. alba is found in all ecotopes in Sheheree Bog, such as: active flush; sub-central ecotope (10; 7/10) and sub-marginal ecotope (7), although it is not common in any of these.

The species becomes most frequent within complexes 10 (sub-central) and 7 (sub-marginal).

The species is always found associated with wet features such as *Sphagnum* pools, *Sphagnum* lawns and hollows, along with *Sphagnum magellanicum*, *S. papillosum* and *S. cuspidatum*.

Appendix II Photographical records

Photograph Number	Aspect	Type	Feature	Date
DSCF3585	NE	Overview	Qbw1	09/10/2012
09102012120	NE	Overview	Qsc1	09/10/2012
DSCF3586	NE	Overview	Qsc2	09/10/2012

Appendix III Quadrats

Ecotope type	**Sub-central**	**Active flush**	**Sub-central**
Complex Name	**10/9**		**7/10**
Quadrat Name	Qsc1	Qaf1	Qsc2
Easting	98430	98431.272	98494.578
Northing	88688	88688.401	88500.492
Date	21/03/2005	09/10/2012	09/10/2012
Firmness	very soft	Very soft	Soft
Burnt	No	No	No
Algae in hollows %	Absent	Absent	Absent
Algae in pools %	Absent	Absent	Absent
Bare peat %	Absent	Absent	Absent
High hummocks %	na	Absent	11-25
Low hummocks %	34-50	26-33	11-25
Hollows %	11-20	Absent	26-33
Lawns %	4-10	34-50	Absent
Pools %	4-10	4-10	Absent
Pool type	na	Interconnecting	Absent
S.austinii hum type	Absent	Absent	Absent
S.austinii hum %	Absent	Absent	Absent
S.austinii height(cm)	Absent	Absent	Absent
S.fuscum hum type	Absent	Absent	Absent

Ecotope type	**Sub-central**	**Active flush**	**Sub-central**
Complex Name	**10/9**		**7/10**
S.fuscum hum %	Absent	Absent	Absent
S.fuscum height(cm)	Absent	Absent	Absent
Leucobryum glaucum	Absent	Absent	Absent
Trichophorum type	Absent	Absent	Tussocks
Trichophorum %	Absent	Absent	1-3 (many indiv)
S.magellanicum %	4-10	Absent	Absent
S.cuspidatum %	4-10	26-33	26-33
S.papillosum %	4-10	11-25	11-25
S.denticulatum %	Absent	Absent	Absent
S.capillifolium%	4-10	4-10	11-25
S.tenellum %	na	Absent	1-3 (many indiv)
S.subnitens %	na	Absent	Absent
R.fusca %	Absent	Absent	Absent
R.alba %	Absent	Absent	Absent
N.ossifragum %	Absent	Absent	1-3 (several indiv)
Sphag pools %	4-10	4-10	Absent
Dominant pool Sphag	S.cuspidatum	S.cuspidatum	
Sphag lawns %	4-10	34-50	Absent
Sphag humm %	34-50	26-33	26-33
Sphag holl %	11-20	4-10	26-33
Total Sphag %	76-90	76-90	51-75
Hummocks indicators	Absent	Absent	Absent
Cladonia portent	4-10	Absent	4-10

Ecotope type	**Sub-central**	**Active flush**	**Sub-central**
Complex Name	**10/9**		**7/10**
%			
Other Cladonia sp	na	none	
C. panicea %	na	Absent	1-3 (few indiv)
Calluna cover %	1-3 (many indiv)	4-10	34-50
Calluna height(cm)	11-20	21-30	31-40
Other Notable Species	*S. recurvum* (40%) *V. oxycoccos*	*S. fallax* (c. 40%); *Aulacomnium palustre*; *Betula pubescens* (1 sapling); *Vaccinium oxycoccos*; *Molinia caerulea*	*Aulacomnium palustre*
Other comment		similar to last time; former Qsc1	

Note: Data for those 2005 quadrats re-surveyed in 2012 is given to the right of the original 2005 quadrat data in table above. Not all quadrats reported in 2005 were re-surveyed in 2012. Nonetheless, all 2005 quadrat data is given above. Additional quadrats were recorded where necessary. Some 2005 quadrats may have been classified under a different ecotope category in 2012; further detail is given within the report.

91D0 Bog woodland: Assessment sheet All Saints Bog

Site name	Sheheree	Recorders	KC/WC	Photo no.s	DSCF3585
Stop Number	1	Date	9/10/2012	Grid ref	E 98427.88 / N 88635.37

Positive indicator species	✓	Negative indicator species	% Cover
Trees and woody species		*Pteridium aquilinum*	0
Betula pubescens	✓	*Rubus* agg.	0
Salix aurita	-	*Rhododendron ponticum*	0
Salix atrocinerea	-	Non-native conifer species	0
Dwarf shrubs, herbs & ferns		List:	
Dryopteris dilatata	-		
D. carthusiana.	-		
Carex rostrata	-		
Juncus effusus	✓		
Molinia caerulea	✓		
Vaccinium oxycoccos	-		
Empetrum nigrum	-		
Vaccinium myrtillus	✓		
Epilobium palustre	-	Others	0
Calluna vulgaris	✓	List:	
Potentilla erecta	-		
Mosses			
Polytrichum commune	✓		
Sphagnum fimbriatum	-		
Sphagnum fallax	✓		
Sphagnum palustre	✓		
Hylocomium splendens	-		
Aulacomnium palustre	✓		
Pass = *Betula pubescens*, *Sphagnum* species plus ≥5 of the other species	Pass	Pass = Negative indicator species <10%	Pass

Structural data	Result	Stop level	Passes
Median canopy height >4m	P (4m)	≥7 passes = pass	
Total canopy cover >30% of plot	P (30%)	<7 passes = fail	
Betula pubescens >50% of canopy	P (90%)		
Dwarf shrub layer cover <50%	P (35%)	**Result=9**	Pass
Calluna cover <40%	P (5%)		
% *Sphagnum* cover (pass = ≥25%)	P (30%)		
% Bryophyte cover (pass = ≥50%)	P (50%)		

Note: *Pinus sylvestris* <5%

Target tree species dbh	✓	Old trees & dead wood (any species)	Result

Betula pubescens 5-10 cm 10-20 cm >20 cm	 ✓	No. of old/senescing trees or dead stems >10cm No. of standing dead trees >10cm No. of fallen dead trees/branches >10cm	0 1 0
Pass = Over all stops each size class represented	Fail	Pass = 1+ old/senescing trees (or dead stems) in >25% of stops and 4+ standing dead or fallen dead in total number of stops	Fail
Betula pubescens regeneration	0		
Pass = ≥1 sapling >1m in all stops	Fail		

Appendix IV Survey maps

98300 000000

Qaf1

X

Qbw1

Bw1

Sc1

Qsc2

Y

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Raised Bog Monitoring & Assessment Survey 2013

Map 1: Ecotopes Map and Quadrats

Ecology and Environmental Consultants Ireland Ltd.

Sheheree SAC (000382)
Co. Kerry

1:2,000

N

0 25 50 100 150 200 Meters

Legend

- Quadrat

Ecotope type

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

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Raised Bog Monitoring & Assessment Survey 2013

Map 2: Vegetation community complexes

Ecology and Environmental Consultants Ireland Ltd.

Sheheree SAC (000382)
Co. Kerry

1:2,000

N

0 25 50 100 150 200 Meters

Legend

Ecotope type

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

Boundary type

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

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Raised Bog Monitoring & Assessment Survey 2013

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

Ecology and Environmental Consultants Ireland Ltd.

Sheheree SAC (000382)
Co. Kerry

1:2,000

N

0 25 50 100 150 200 Meters

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