ASSESSMENT OF IMPACTS OF TURF CUTTING ON DESIGNATED RAISED BOGS

DOCUMENT 1 SUMMARY REPORT

A Report to the Research Section of National Parks & Wildlife Service

DEPARTMENT OF THE ENVIRONMENT, HERITAGE & LOCAL GOVERNMENT

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We also appreciate the contributions of the staff of the National Parks and Wildlife Service in Ely Place and contract staff in Hanover St for their professional advice and observations.

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Finally to all those unmaded who also collaborated in the completion of this project.

SUMMARY OF THE CONTENTS

The results and findings of the current project are presented in the following documents:

Document 1 - Summary Report

This report contains details of the project such as survey techniques, turf cutting impact assessment methodology, results and recommendations (e.g. turf cutting cessation options). This document also includes several appendices including maps (e.g. all designated raised bogs location map, turf cutting cessation options maps, etc), sites lists, summary tables, etc.

Appendix XX of the Summary Report contains a list of the 93 raised bogs where a turf cutting assessment was carried out. These are in order of site code number and list the CDs where the site report and associated data can be found.
A CD including the Summary Report and the National Distribution Maps is attached to this document.

Document 2 - Summary Report Tables

These contain summary tables for each of the 93 raised bogs where turf cutting was assessed. This contains summary data on the site - location, status, ecology, impacting activities (particularly turf cutting) and individual turf cutting plots cessation assessments.

Document 3 – Site Reports

These are detailed reports on 93 raised bogs, where priority habitats are present and turf cutting occurred in 2003, and therefore where an assessment of the impacts of turf cutting was considered necessary. They are arranged in order of the site code number and are listed in table 9.2 - Appendix IX. Paper copies of the maps produced are attached to each individual site report. These maps include Map 1: Ecotopes, drainage, turf cutting plots, sensitive margin and occasionally slopes. Additionally maps from previous surveys (Kelly *et al*. (1995) and Derwin & MacGowan (2000)) are also included where these contain information not collected during the current survey. A copy of the maps from the Raised Bog Monitoring Project (Fernandez *et al*., 2005) has been also attached for those sites where changes in vegetation quality or extent, in the period 1995-2004/5, were considered significant enough to influence the assessment of turf cutting impacts. In those sites where a re-interpretation of the Kelly *et al*. (1995) vegetation maps was considered necessary by Fernandez *et al*. (2005) these amended maps were also included. All the maps included a 6” map as a background.

Document 4 – Site Maps

An additional copy of the maps detailed in Document 3 is included in three volumes to facilitate the consultation and comparison of map data.

Document 5 – CDs

It consists of a box of CDs containing all the relevant site data. A total of 20 CDs have been produced for storing the assessment reports, the Arcview 3.2 GIS project, the summary table, oblique photos taken in 2003, ground photos (2003/4) and JPEG backups of the maps.

For easier access all the oblique digital photographs are included on additional CDs.

Document 6 – Oblique photos in slide format

121 sites were flown as part of this project’s aerial surveys and as a result a considerable number of oblique photos were taken. These photos were taken in two different formats: a) digital mentioned in the previous paragraph and b) slides. The slides are filed in boxes and submitted as part of this project. Appendix XIV contains a list of raised bogs sorted by site code, where slides were taken. This also contains the box number and slide numbers for each site.

EXECUTIVE SUMMARY

1. The main objectives of this project were to assess the impacts of turf cutting on all designated raised bogs (SACs and NHAs) and to develop appropriate responses to such impacts. An initial requirement was to develop a method which will distinguish the most sensitive areas, where turf cutting should be phased out as a matter of urgency, from those areas where domestic cutting could potentially be phased out over a longer period without causing significant damage to the ecology of the bogs. This in turn was used as the basis for developing a series of turf cutting cessation options for all the designated raised bogs.

2. Two agreements were reached between the Irish Government and the farmers and turf cutting associations in 1999 & 2004, in relation to the implementation of the Habitats Directive (92/43/EEC) and the cessation of turf cutting. As a result, commercial cutting is not longer allowed in designated sites (i.e. NHAs and SACs). In conjunction with these agreements, two turf cutting cessation schemes have been introduced. These have been relatively successful in relation to readily identifiable commercial operations, such as moss peat developments, but less successful for small scale commercial turf cutting. In relation to domestic cutting these cessation schemes are based on the voluntary purchasing of land and turbary rights from the owners. They appear to have had a very small impact on decreasing the intensity of domestic turf cutting and its negative effects on Habitat Directive raised bog priority habitats (i.e. Active Raised Bog and Bog Woodland).

3. The negative consequences of domestic cutting on raised bogs were confirmed by the Raised Bog Monitoring Project (Fernandez *et al*., 2005), which assessed the conservation status of a selection of designated raised bogs sites (covering almost 50% of the national resource). It was found that there has been a 36.80% decrease in extent of priority habitats on these bogs over a ten years period, and that 1% of the high bog area had been irreversibly lost. The conservation status of the Active Raised Bog habitat on these sites was assessed as “Unfavourable bad”. The situation in relation to the remaining sites is likely to be as bad if not worst and therefore, the results can be taken to be representative for the situation of all designated raised bogs. The major cause of the adverse impacts was considered to be domestic peat cutting, combined with the associated drainage and burning. Hence, this study confirmed the incompatibility of these activities with raised bog conservation. Under the terms of the Habitats Directive, Ireland is required to maintain the habitats listed in the Directive in favourable conservation status. Therefore, further deterioration would be opposed by the EU and possible economic sanctions may arise if favourable conservation status is not achieved.

4. The results of this project have shown that domestic turf cutting takes place at 117 of the 139 designated bogs. An increase of mechanization of domestic cutting has also been noted in the last few decades, which has made the exploitation of small to medium size bogs both economically profitable and has offset the decline in hand cutting. Mechanisation has been almost always been coupled by an intensification of the drainage of the cutover and high bog. The most widespread technique consists of mechanical cutting using Hopper machinery for fuel peat. The mechanisation of the cutting and the use of contractors to carry out this work makes it difficult in many cases to distinguish between domestic and semi-commercial cutting. It appears that while, the length of margin and thus numbers of cutters has reduced significantly in the last ten years, the intensity of cutting at the currently cut plots seems to be higher. It is important to note that an estimated 20000 turbary rights exist on all designated sites and that only a small proportion of those are currently cut.

5. A comprehensive turf cutting impact assessment was carried out at 93 bogs where priority habitats are present and cutting was recorded in 2003. 2660 turf cutting plots were currently cut in 2003 on these bogs and the average width of a turf cutting plot is 34m. The high bog margin was divided into sensitive and less sensitive areas with sensitive areas being define as those where cutting was likely to have negative effects on the priority habitat in the immediate to medium term. 37.68% of the high bog margin at these 93 bogs is deemed sensitive and 23.07% of this sensitive margin is currently cut. 75% of these bogs at least have one turf plot currently cut that requires immediate cessation based on the results of “Impact Potential assessment methodology” developed during this project.

6. Ten different turf cutting cessation options are explored and assessed within this report. Nine of these options are new and go from those proposing the immediate complete cessation of cutting at all sites to those where cessation at the individual plot level is considered. The remaining option is to continue with the current cessation policy. The first nine options assumed that cutting in designated sites will be phased out, at the latest, within 10 years of the 2004 Agreement (i.e. 2013). The option of immediate cessation of turf

cutting on all SACs and NHAs is recommended as the most appropriate from a nature conservation perspective. The phasing out approach proposed by other options or a continuation with current policy will involve further losses of priority habitat in the medium term and a permanent significant decrease of the potential to restore such habitats. Although this option will result in the highest short term economic cost, all the other options have similar or larger economic costs in the medium term.

7. Turf cutting has broken the link between the peat body and local topography, climate and local hydrology. The long term conservation of raised bogs requires that this link be re-established as far as possible. After the cessation of turf cutting it is essential to proceed to restore the hydrology of the bog. Unless urgent steps are taken to prevent further deterioration of the remaining examples of this priority habitat, Ireland is in danger of losing these invaluable habitats in the next few decades.

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ABBREVIATIONS AND ACRONYMS

AF	Active Flush
ARB	Active Raised Bog Habitat (7110)
C	Central Ecotope
DEHLG	Department of the Environment, Heritage and Local Government
DRB	Degraded Raised Bog Habitat (7120)
EIA	Environmental Impact Assessment
EU	European Union
F	Flush
FB	Facebank Ecotope
HB	High Bog
IF	Inactive Flush
IPS or IP	Impact potential score
M	Marginal ecotope
NA	Not Available
N/A	Not Applicable
NHA	Natural Heritage Area
NPWS	National Parks and Wildlife Service
OI	Ortho-rectified image
SAC	Special Area of Conservation
SC	Sub-central Ecotope
SG	Spread grounds
SM	Sub-marginal Ecotope

1. INTRODUCTION

A total of 127 sites are designated in Ireland for the conservation of 139 raised bogs. 74 sites are designated under national law (Wildlife Amendment Act, 2000) as Natural Heritage Areas (NHAs) and 53 as Special Areas of Conservation (SACs) under EU law (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, more commonly known as The Habitats Directive) which are implemented in Ireland under the Habitats Regulations 1997. Of the 139 raised bogs 64 are within SACs and 75 within NHAs (see Appendix I). All these raised bogs have been exploited for their peat resources for generations and this practice continues on 117 of them and rights to cut turf exist for most of the remaining sites.

The original area of raised bogs in the Republic of Ireland was approximately 310,000ha or 5% of the national area of 70,282km² (Hammond 1979). It has been estimated that the area of remaining high bog of conservation interest accounts for 18,000ha of this total, the remainder being cutover or small dried-out remnants (J. Ryan pers. comm., 2004). Currently, Active Raised Bog[1] and Bog Woodland, both of which are peat forming, are listed as priority habitats on Annex I of the Habitats Directive. Priority status is given to habitats and species that are threatened throughout the EU and of which the EU contains an important part of the global resource. Destruction of Active Raised Bog habitat in north-west Europe, combined with the high proportion (>50%) and relatively high quality of the EU resource of Oceanic Raised Bog remaining in the Republic of Ireland (Cross, 1990) means that Ireland has a special responsibility for its conservation at an international level. Furthermore, under the terms of the Directive, EU Member States are require to maintain the habitats listed in the Directive in favourable conservation status. Favourable conservation status for habitats means that its area, range and typical species complement are stable and that the environmental conditions it requires are being and will continue to be met. Turf cutting both domestic and commercial poses a serious threat to raised bog and particularly Active Raised Bog habitat discussed in more detail in sections 1.2.1 and 2.3.1**.** Thus, an assessment of the impacts arising from this activity on the raised bog habitats and the cessation of cutting when considered necessary is essential to achieve the primary objective of the Habitats Directive: maintain their favourable conservation status.

The Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment, commonly called the Environmental Impact Assessment (EIA) Directive was amended by Directive 97/11/EC. The original Directive was incorporated into Irish Law by the European Communities (Environmental Impact Assessment) Regulations in 1989 and the 1997 Amendments to the Directive by the European Communities (Environmental Impact Assessment) (Amendment) Regulations 1999. Peat extraction was included in the Annex II of the Directive, where EIA of projects is discretionary. Ireland voluntarily decided to make EIAs mandatory but only for areas greater than 50ha. However, according to the Directive further parameters should also be have been taken into account such as location of the impacting activity or accumulative effects of projects. It is worth noting that all peat exploitations activities above 50ha (and occasionally considerably below this figure) are of commercial nature. As a result, several commercial turf cutting operations covering less than 50ha were initiated on proposed SACs and NHAs without undergoing assessments. Attempts to control these activities via the legal system were unsuccessful. Complains were made to the Commission who successfully took Ireland to the European Court. Subsequent negotiations resulted in significant changes in Irish Law which should prevent such incidents in the future. As part of this process the Commission asked the European Court of Justice to impose a daily fine of €26100 in July 2003 for failure on applying the EIA Directive correctly. This case was withdrawn following the implementation of a program of measures agreed with the Commission. This involved a series of amendments to Irish legislation and the designation of all the remaining raised bogs of conservation importance as NHAs or SACs.

The relevant amendments to the regulations and other measures are as follows.

- Mandatory EIA for all peat extraction projects over 30ha
- Planning permission for all peat extraction projects over 10ha, linked to EIAs when required
- Powers to invoke EIA for peat extraction projects below 10ha in SACs and NHAS

The first two points refer to peat exploitation on all bogs, regardless of whether or not they are designated.

These new powers are specified in the European Communities (Environmental Impact Assessment) (Amendment) Regulations 2001 (S.I. No 538 of 2001) and the Local Government (Planning and Development) (Amendment)

[1] A comprehensive definition of some of the terminology used within this report is given in Chapter 6 - Glossary

Regulations,2001 (S.I. No 539 of 2001). The planning revisions were subsequently incorporated in the Planning and Development Regulations 2001 (S.I. No 600 of 2001).

In addition, after sites are designated as SACs and NHAs all turf cutting not covered by the planning laws above can be regulated. For SACs these powers are provided by the European Communities (Natural Habitats) Regulations, 1997 (S.I. No 94 of 1997) where Regulation 14 requires that notifiable activities, which include turf cutting, are subject to controls by the Minister of Environment, Heritage and Local Government. In relation to NHAs similar powers are provided under the section 20 of Wildlife Amendment Act (2000). In effect, this provides the Minister with the power to effectively prevent all domestic turf cutting on all designated sites as those who wish to cut turf must first seek Ministerial consent.

The current situation is that all commercial cutting in designated sites is now regulated and most of the larger operations, particularly the exploitation of moss peat, have now ceased. There would appear to be many small fuel peat commercial operations still in existence which have not been subject to practical control yet. No attempt has been made to prohibit domestic turf cutting by the use of legal powers mentioned above. Two voluntary turf cutting cessation schemes have been introduced since 1999 to buy out turbary rights in NHAs and SACs (see section 1.4).

The strategy for dealing with domestic turf cutting in NHAs has been to seek to identify sites which are particularly sensitive to turf cutting and associated activities. This was the initial impetus for carrying out the current project. It was intended that this work would identify NHAs where EIAs of projects below 30ha was warranted. This would allow the planning authorities to require such studies as appropriate. It was decided to expand the scope of the study to include SACs as well as NHAs so that the full impact of turf cutting would be dealt with under one project. It was proposed to base the project loosely on the model of the Strategic Environmental Impact Assessment (2001/42/EC) and to seek to ascertain the sensitivity of each site in terms of:

- The area of intact habitat
- The area being cut
- The sensitivity of the area to damage from further cutting without extending drainage
- The need for further drainage if activity is allowed to continue
- The number of domestic cutters
- The presence of industrial cutters
- The annual rate of cut and trends in activity levels and predictions of future level of activity
- The likely damage

This project was carried out by the Wetlands Unit of The National Parks and Wildlife Service. Five contract employees took part in this study: Dr Fiona MacGowan, Fernando Fernandez Valverde, Mairéad Farrell, William Crowley and Yvonne Croal. Maeve Fanning and Dr Anne-Marie McKee also collaborated in the production of site reports during 2004. The project was supervised by J. Ryan (National Parks and Wildlife Service). The project was initiated in May 2003 with Dr Fiona MacGowan as Team Leader. It was interrupted by the Raised Bog Monitoring Project 2004/5 (Fernandez *et al*. (2005) and was concluded in 2006 with Fernando Fernandez Valverde as Team Leader.

1.1. Objectives

The main objectives of this project were to assess the impacts of turf cutting on all designated raised bogs (SACs and NHAs) and to develop appropriate responses to such impacts. An initial requirement was to develop a method which will distinguish the most sensitive areas, where turf cutting should be phased out as a matter of urgency, from those areas where domestic cutting could potentially be phased out over a longer period without causing significant damage to the ecology of the bogs. This in turn was used as the basis for developing a series of turf cutting cessation options for all the designated raised bogs (see Chapter 4).

This work was carried out in two phases. Phase 1 identified the methods to be used for carrying out the impact assessments both for the overall designated raised bog resources and specific site impacts. As a result a preliminary assessment of the number of potential sensitive areas was carried out and this is part of the basis for

prioritising work for Phase 2 (see Appendix V). Dr Fiona MacGowan undertook this phase under the supervision of J. Ryan (National Parks and Wildlife Service).

Phase 2 corresponds to this project and has involved more detailed assessment of available data of all sites assessed in Phase 1, site inspections and further data collection to make more detailed sites specific recommendations. Overall to provide a more detailed overview of the impacts of turf cutting on the designated sites in order to establish a prioritising program to phase out this activity.

The main tasks of this project were as follows:

- Development of field based turf cutting impact assessment criteria, as well as the design and testing of an Impact Assessment Form.
- Refine the methodology to assess the impact of turf cutting on the designated sites and particularly on priority habitats (Active Raised Bog habitat and Bog Woodland).
- Survey those designated sites that were not previously surveyed to identify and describe vegetation, hydrology and turf cutting activities.
- Survey and description of turf cutting in all designated sites.
- Digitise the high bog vegetation, hydrological features (i.e. drainage) and turf cutting plots by site.
- Produce individual site reports assessing the impact of turf cutting on the site and particularly on priority habitats and identifying the most sensitive areas where the phasing out of turf cutting is priority.
- Produce a summary report detailing both the overall impacts of turf cutting on the designated sites and habitats and examine turf cutting cessation options to minimise those impacts.

As a result of the project the following documents have been produced:

Document 1 - Summary Report

This report contains details of the project such as survey techniques, turf cutting impact assessment methodology, results and recommendations (e.g. turf cutting cessation options). This document also includes several appendices including maps (e.g. all designated raised bogs location map, turf cutting cessation options maps, etc), sites lists, summary tables, etc.

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1.2. Lowland raised bogs

It has been considered appropriate to include a brief description of lowland raised bogs accompanied by information on their national geographical distribution, main habitats on a raised bog listed in the EU Habitats Directive and raised bog hydrology to aid to understand the impacts of turf cutting on this threatened ecosystem.

1.2.1. Description (derived from Morgan-Jones *et al*.(2005) and Schouten (2002).

Raised bogs develop primarily in lowland areas with underlying low permeability deposits and high local groundwater tables, such as the head of estuaries, along river floodplains and in topographical depressions. The water-logging that occurs in these areas provides anaerobic conditions that slow down the decomposition of plant material that in turn lead to an accumulation of peat. A typical intact lowland raised bog can be differentiated into a raised dome of peat (known as the *mire expanse*), circumscribed by the *rand* (the drier edge slope of the mire expanse) and surrounded by the *lagg* (the wet interface between bog and hinterland), (see figure 1.1).

The bog dome is primarily rainwater fed (an ombrotrophic mire) and isolated from the local groundwater table. This gives rise to acidic conditions deficient in plant nutrients and in turn supports a distinctive suite of vegetation types, which although low in overall diversity, support specialised plant assemblages dominated by a range of mosses of the genus *Sphagnum*. The mire expanse may support a patterned micro-topography of pools, hummocks and lawns that provide a range of water regimes supporting different species assemblages. Plant species are often zoned according to the variety of niche habitats formed by this microtopography.

The mire expanse is described as having a diplotelmic structure and is divided into a thin, active, more permeable upper layer: the *acrotelm*, and a thicker, anoxic layer with low permeability below: the *catotelm*. The *catotelm* represents the main body of the peat. The *acrotelm* forms the Active Raised Bog habitat. The *lagg* may include a *lagg* stream and collects surface run-off from the bog and groundwater flow (or seepage) from both the bog and surrounding mineral soils. The lagg normally bears fen vegetation, and can be contiguous with other wetland areas.

Figure 1.1 below shows a schematic cross section and plan view of an intact raised bog.

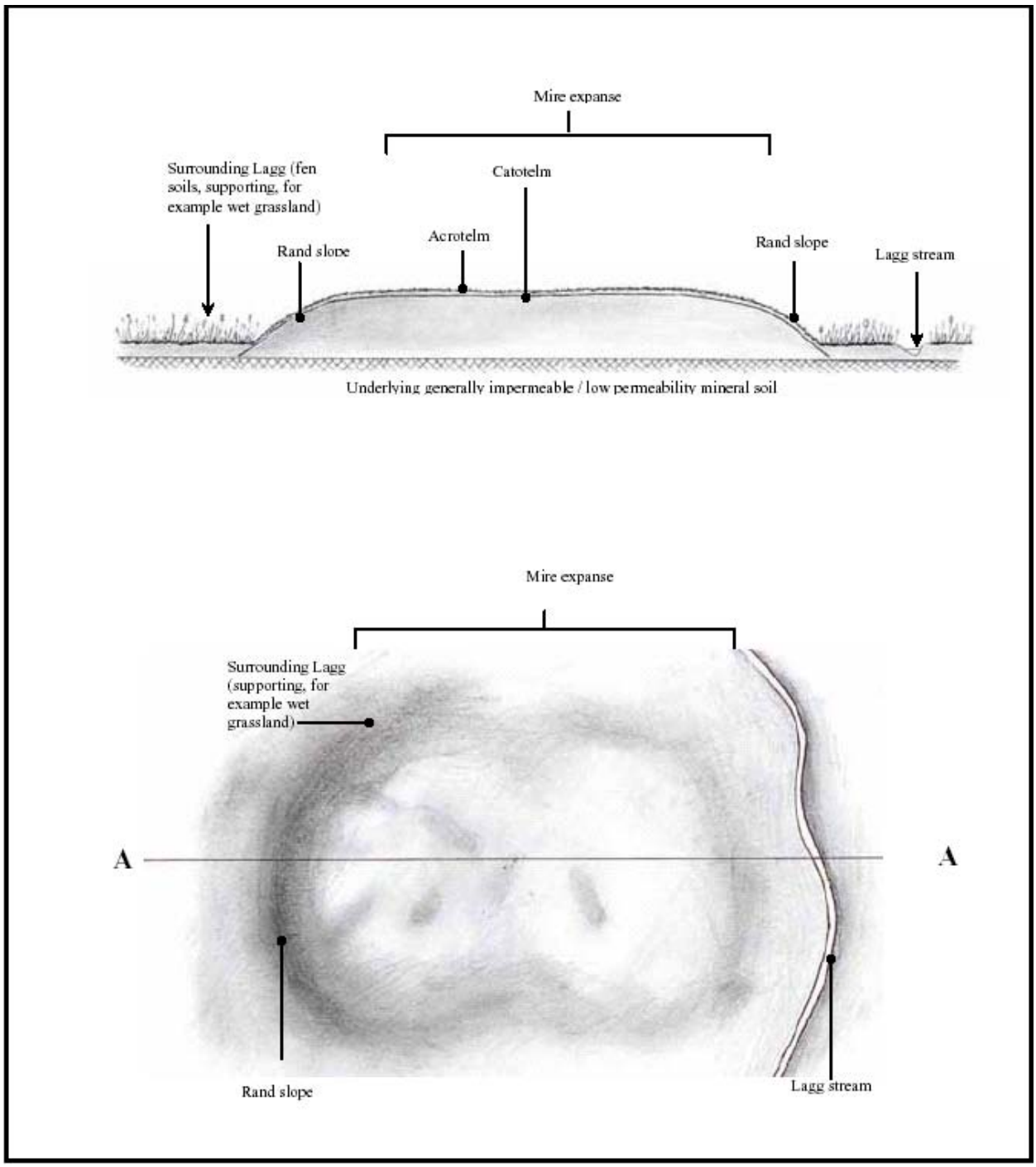


Figure 1.1. Schematic cross section and plan view of an intact Raised Bog (derived from Morgan-Jones *et al*., 2005).

All raised bog sites in Ireland have been damaged or degraded to some extent. This has largely occurred due to peat extraction and agricultural improvement, together with the associated drainage and burning that accompanies these land-uses.

Degraded and damaged raised bog sites look very different to their intact counterparts. Degraded and damaged raised bog sites typically have a network of drains and ditches on and surrounding the site and the natural characteristics of the lagg are generally severely affected. Water tables are lowered, consequently causing drying out and shrinkage of the whole bog and significant reductions in the area of the active peat-forming layer or acrotelm. The acrotelm may be absent altogether where it has been totally removed by peat cutting or degraded by drainage. The absence of the acrotelm and associated natural vegetation generally contribute to increased run-off from the peat bog.

Drainage, agricultural improvement and peat cutting therefore disrupt the diplotelmic structure of the peat bog and leave the remaining uncut remnants of peat in isolation from the wetland habitats that developed with them. The water environment is affected with lower water tables and increased surface water flow away from the remaining peat bog site. Figure 1.2 below shows a schematic cross section and plan view of a degraded and damaged raised bog. Note that the term cut face illustrated in this figure corresponds to the term face-bank used within this report.

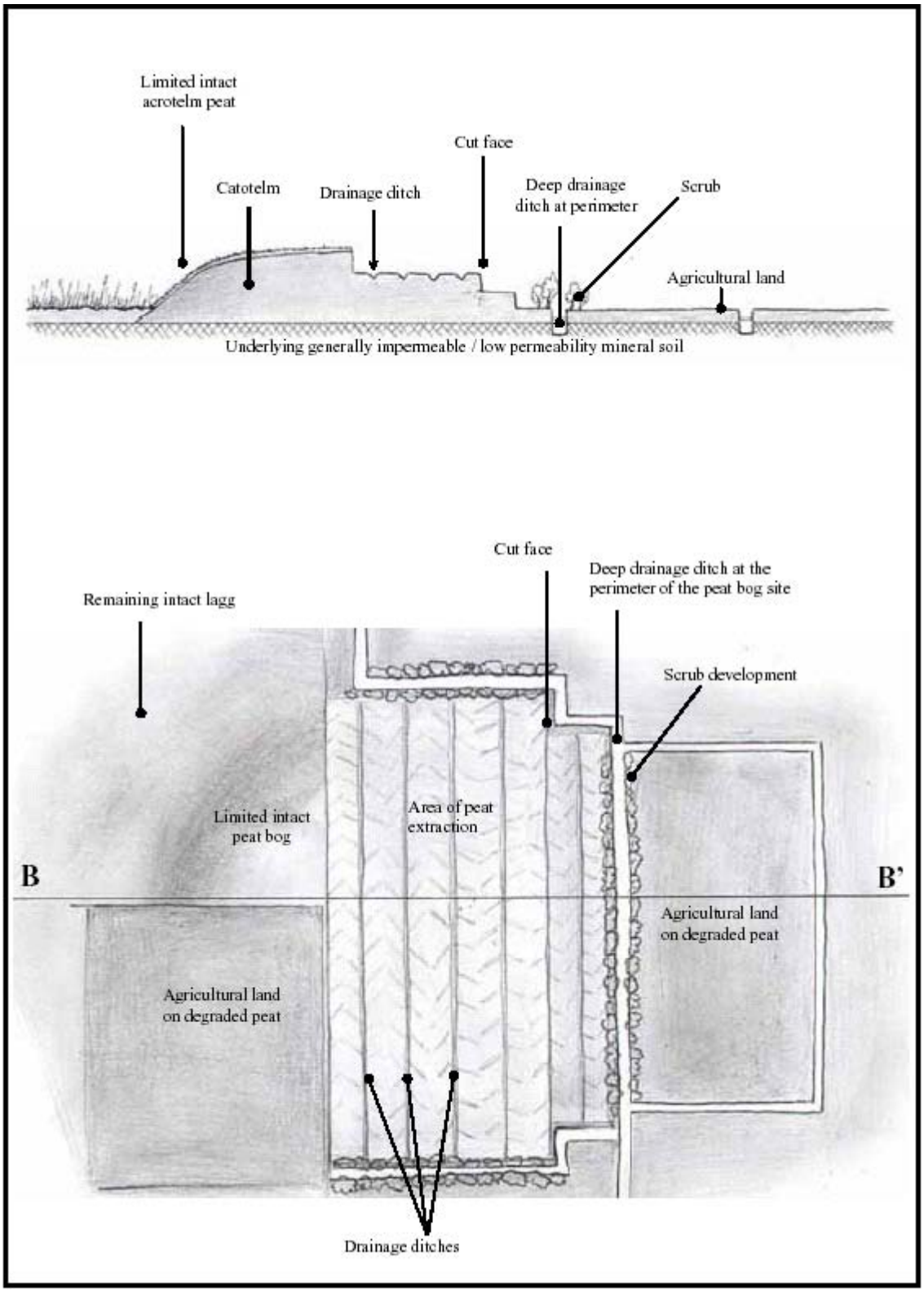


Figure 1.2. Schematic cross section and plan view of a degraded Raised Bog (derived from Morgan-Jones *et al*., 2005).

1.2.2. Geographical distribution

Raised bogs are more abundant in the lowlands of central and mid-west Ireland. In Ireland raised bogs are confined to areas with an annual rainfall below 1250 mm (Hammond, 1984). In areas of high rainfall are replaced by blanket bogs. They occur principally in land below 130m. They are most extensive and abundant where the limestone plain is covered by a variable thickness of undulating glacial drift which originally provided suitable basins for the development of lakes and/or fens, which in turn acted as precursors to the bogs. The eastern and southern boundary of their distribution is not very clear as the bogs which would have occurred in these areas were relatively small and have been cut away entirely. In the west, except for one site on the east of shore L. Corrib, the boundary of the raised bogs is associated with the band of much thinner drift in south Galway and Mayo, where limestone is close to the surface. Extensive cutting in the past has largely destroyed the transition zone between raised and blanket bog (Cross, 1990). Raised bogs occurred throughout the lowlands of Northern Ireland but currently only scattered small remnants are present, with the greatest concentrations occurring in the west and in the northeast.

1.2.3. Hydrology

The hydrology of bogs is rather complex and it is not the intention of this section to discuss the subject in detail. A full discussion of bog hydrology is given by Schouten (2002) and Heggeler *et al.* (2005). This description is confined to the implications of turf cutting and drainage on the mire hydrological balance.

Peat soils are mainly formed of water, organic matter and small amount of mineral material. According to Schouten (2002) the volume of water in undisturbed peat varies in the range of 88 to 97%. They are characterized by high local ground water levels which are higher than in the surroundings mineral soils. Some of the most important characteristics of raised bogs are the small seasonal fluctuation of the ground water level, large water storage capacity of the peat (3+ times that of the mineral soils), seasonal variations in the surface level and capacity of intact surfaces to regulate the rate of water loss.

Peat cutting causes a local lowering of the ground –water table and thus an increased drainage of the remaining peat along the newly formed margin (the face bank). As a result of the water loss, the peat shrinks because of its very high water content. The higher the water content the greater the potential for shrinkage. As the peat shrinks the bog surface in the area subsides. The subsidence caused is largest at the newly formed margin (i.e. face-bank). Initially, the slope of the bog surface begins to increase in a narrow zone along the margin. In a bog, an increased surface slope means an increased hydraulic gradient and this results in a quicker discharge if water from the bog and, consequently, an intensified drainage of the more inward parts of the bogs which in turn begin to subside, and so on. In this way the man-induced subsidence caused by the turf cutting gradually expands into the bog. This vertical subsidence may be up to several meters depending on the original thickness of the peat, its water content and the drainage depth (Schouten, 2002). Much more rapid and extensive subsidence can be caused if the underlying mineral soils are drained, with subsidence extending 600m into a bog within ten years (Heggeler *et al*., 2005).

The *acrotelm* layer (the spongy, upper, living layer of the bog), through which most of the water leaving the bog discharges, is gradually destroyed by decay when water levels fall due to drainage and subsidence (Schouten, 2002). As the acrotelm decreases in thickness and area, run off rates increase and the bog dries out even more rapidly. The loss of the acrotelm is equivalent to the loss of Active Raised Bog habitat as this habitat is define by the presence of a functioning acrotelm. Similar impacts can be caused by burning which when severe can physically destroy the acrotelm layer. Fires on raised bogs are frequently associated with turf cutting and land reclamation activities. Fires can cause very extensive damage to raised bogs, burning large areas as no effective measures are taken to control them.

According to Morgan-Jones *et al*. (2005) a “hydrological protection zone” is needed between the wet raised peat bog and the drained agriculture land that often surrounds them to maintain suitable hydrological conditions within the site itself. Such zone would have historically existed as the lagg fen zone, but have been lost, over the years to agriculture encroachment, peat cutting. Unmodified lagg zones are almost none existent in Ireland today and cutting and drainage continue modifying these margins and the hydrological functions needed to conserve the special features of the raised bogs.

1.2.4. Main raised bog habitats listed in Annex I of the Habitats Directive

The Habitats Directive is one of the most important legal documents for the conservation of natural habitats and of wild fauna and flora within the European Member States. Four habitats present on Irish raised bogs are listed in

the Directive and provide the justification for designating raised bog SACs. A brief description of these habitats is included within this section:

Active Raised Bog (ARB) (Habitat code 7110) is listed as a priority habitat in Annex I of the EU Habitats Directive and is described as "still supporting a significant area of vegetation that is normally peat-forming" (EC, 1996). This habitat occurs in the wetter, quaking areas of the bog mainly in the centre of intact high bog. Active raised bogs are characterised by a high *Sphagnum* cover. This includes active *Sphagnum*-growing flushes, and Sub-central and Central Ecotopes. The division of the high bog vegetation into ecotopes is derived from Kelly (1993) and Schouten (2002). The description of vegetation ecotopes is given in Chapter 2 (section 2.2.2.1).

Raised bogs may also contain soaks and wet or dry flushed areas where the supply of nutrients over time is increased through concentrated surface flows, or where there are links with ground water or the underlying mineral substratum (Fosssitt, 2000). These flushes are usually characterised by the presence of *Molinia caerulea* and/or *Myrica gale* with occasional *Phragmites australis. Sphagnum recurvum* is found on the more mineral rich wet flushes and is considered an indicator of active peat formation.

Trees are rarely present on the surface of intact high bog, but can occur in these flushed areas, forming the rare habitat of Bog Woodland. **Bog Woodland (Habitat code 91D0)** is listed as a priority habitat in Annex I of the Habitats Directive and is described as "coniferous and broad-leaved forests on a humid to wet peaty substrate, with the water level permanently high and even higher than the surrounding water table". In Ireland either *Betula pubescens* or *Pinus sylvestris* dominate stands that may be of interest (EC, 1996). This habitat type does not include the drier Birch woodland found on cutover bog.

Depressions on peat substrates of the *Rhynchosporion* (7150) is listed in Annex I of the Habitats Directive as "Highly constant pioneer communities of humid exposed peat…….of blanket bogs or raised bogs" (EC, 1996). This habitat occurs on the high bog in areas dominated by *Rhynchospora alba* or *R. fusca* on wet areas at the margins of pools and *Sphagnum* lawns and in humid erosion channels on the bog margin.

Degraded Raised Bog still capable of regeneration – DRB (7120) is a listed habitat in Annex I of the Habitats Directive and described as "raised bogs where there has been disruption (usually anthropogenic) to the natural hydrology of the peat body, leading to surface desiccation and/ or species change or loss……sites judged to be still capable of regeneration will include those areas where the hydrology can be repaired and where, with appropriate rehabilitation management, there is a reasonable expectation of re-establishing vegetation with peat-forming capability within 30 years" (EC, 1996). Degraded raised bogs are therefore considered to be areas of high bog where active peat formation has ceased, but with proper management, may be restored in the foreseeable future. This habitat occurs on the drier sections of high bog, mainly at the margins, but can occur throughout the whole bog if its hydrology has been severely damage by drainage and burning. Degraded raised bog can also occur on cutover, where there is re-wetting and regeneration of raised bog species. Cutover that consists largely of bare peat or is dominated by agricultural grasses or closed canopy woodlands is not considered to qualify as degraded raised bog habitat (EC, 1996).

Both **Active Raised Bog** and **Bog Woodland** (also peat forming) have been used as the main indicators to assess the impact of turf cutting on the raised bog ecosystems. Both are priority habitats at European level and are particular vulnerable to be impacted due to their more exacting hydrological requirements.

1.3. Survey history

Since the early 1980s various surveys have been carried out by National Parks and Wildlife Service (NPWS) to identify and protect the most important sites for raised bog ecosystem in the Republic of Ireland. Raised bog sites were surveyed and given quality ratings by NPWS during a national survey from 1983-87. In total 141 raised bogs were identified as being of conservation importance (Cross, 1990). As part of the Natural Heritage Area (NHA) survey in 1993 and 1994, site boundaries were surveyed for most of these raised bogs. The Raised Bog Restoration Project (Kelly, Doak & Dromey, 1995) carried out a comprehensive ecological and hydrological surveys on a total of 45 raised bogs. Based on the results of this survey 31 raised bogs SACs were proposed which included 36 raised bogs. Clara bog and Raheenmore bog were also included in this project as both had been previously surveyed by Kelly (1993). A further 28 were similarly surveyed as part of the second Raised Bog Restoration Project (Derwin & MacGowan, 2000). As a result of both projects comprehensive reports were written for each site and a series of maps (i.e. vegetation, drainage, hydrochemistry, slopes and land-use) were prepared for each site.

A NPWS project in 2002 considered 105 non-SAC raised bogs, for assessment as raised bog NHAs or SACs (Derwin *et al*., 2002). A further 26 sites were assessed following recommendation from other sources (NGOs) and 5 new sites were identified by NPWS during this survey as requiring assessment.

The Raised Bog Monitoring Project (Fernandez *et al*. 2005) resurveyed those sites previously surveyed by Kelly *et al*. (1995) in order to assess the conservation status of Habitats Directive annexed habitats (see section 1.2.4.).

A total of 118 raised bog sites were surveyed in 2003/6 as part of phase 2 of this project and detailed vegetation, drainage and turf cutting activity descriptions were produced. Maps of vegetation, slopes, drainage and turf cutting plots location were also produced.

All these different sources have been used as part of phase 2 of this project to assess the impact of turf cutting on the designated sites.

1.4. Turf cutting cessation schemes 1999 and 2004

The Minister for Arts, Heritage, Gaeltacht and the Islands, Sile de Valera TD, and the Minister of State at her Department, Eamon O Cuiv TD, following a series of consultations with representatives of the farm organisations and turf cutters, announced on the 3rd of February 1999 detailed arrangements for the cessation of turf cutting on SAC raised bogs.

It was agreed that cuttings for industrial and commercial purpose in these bogs must cease before the 1999 cutting season. However, in exceptional cases, to protect employment the Minister might agree to allow cutting in 1999 where the operator has already entered into a formal agreement with her Department that they will transfer operations to a non-SAC site and will cease operations within the SAC at an early date. Compensation was negotiated for these cases.

In relation to domestic turf cutting, it was considered that “the damage caused by an individual in a year is small in most situations” (but see section 1.5 below). This was despite the fact that there are many more domestic cutters than industrial and commercial operations. The Ministers decided to allow domestic cutters to continue cutting for a period of up to ten years (i.e. until 2008) to reduce the social and economic impacts that an immediate cessation of cutting would cause on small communities. It was intended, in line with the requirements of the Habitats Regulations and the Wildlife Act (see section 1 above), that the location and amount of turf cut would be based on a permit to be issued by the Department which will specified the amount of turf and the methods to be used. Essential they were to be allowed to cut only for their own domestic use and only in the less sensitive areas of the bog. The use of called 'sausage machines' was no longer permitted within SACs, for either domestic or commercial purposes. The Minister also announced a “Turf cutting cessation scheme” for cutters cutting within SACs, to provide an incentive for domestic cutters to cease cutting permanently.

This first scheme was introduced in April 1999 and the last payment was made in January 2004. Under this scheme the Department of Environment, Heritage and Local Government purchased land and turbary plots in raised bog SACs at the following rates: Freehold: €1659.66 per acre / Turbary: €1396.71 per acre and Fee simple: € 253.95 per acre. Under this scheme 374 plots out of 492 applications were acquired within a five years period. It was decided that the permit system was impractical and it was never implemented. With one exception, turf cutting was effectively allowed to continue even in the most sensitive areas of the bog. Overall in terms of reducing the impacts of domestic cutting on SACs, this scheme had only a very slight effect.

A new scheme was introduced in July 2004 and this applies to raised bogs within either NHAs or SACs (see Appendix XXI). This new scheme not only changed the rates the Department paid but also the way in which the scheme operated. The new rates are as follows: Freehold: €3500 first acre or part thereof €3000 each subsequent acre / Turbary: €2975 first acre or part thereof €2550 each subsequent acre and Fee simple €525 first acre or part thereof €450 each subsequent acre. There is also an additional payment of €6000 conditional on a vendor selling all plots of bog/turbary they may owned within a designated area. This latter payment declines by €600 every year. The Department has received 1350 applications from July 2004 to the end of February 2006. The average currently being received is 30 application per week. Because of the complex legal process involved in land transfers only 10 sales have been fully completed to date. It is expected that between 300 to 400 acquisitions will be completed per year in the next few years. It is probable that with the reduction in incentive payments the number of applicants will decline over the next few years. NPWS staff have the impression that a very high percentage of the acquired plots were not being cut for some time before their sale. At current rates it will take decades to acquire the turbary plots of those who are willing to sell. No compulsory purchase mechanism is currently available to speed up and complete

the process. The permit system proposed originally under the first turbary cessation scheme, but never implemented, did not form part of this new scheme. A commitment was made that "save in exceptional circumstances", people will be allowed to continue domestic cutting on their plots for up to ten years. The implication is that cutting could be banned in the most sensitive areas. We are not aware of any examples of any situations where this has occurred to date, although this situation may change after the production of this report. Unless there is a radical change in relation to allowing cutting to continue in sensitive areas, we consider that the current cutting cessation policy is likely to have a relatively small impact on the negative effects of current cutting on raised bog priority habitats. Under these circumstances these impacts will continue to severely reduce the area and quality of priority habitats for the foreseeable future.

A new agreement between the Government and the Farming Organisation on review of the implementation of the EU Habitats Regulations (1997) was reached in 2004. This agreement is complemented by the second "Turf cutting cessation scheme" detailed in the previous paragraph. Under this agreement, save in exceptional circumstances, people will be allowed to continue domestic cutting on their plots for up to 10 years (i.e. 2013). In addition, after the 10 years period the Department will review whether there are particular circumstances in which domestic turf cutting can continue on raised bogs without damaging the bogs. In the particular case of those sites designated in 1997 (31 raised bogs in 31 SACs), for which the derogation of domestic cutting in the year 2008 was proposed in the previous agreement (1999), the cessation of all cutting would be reviewed in 2008. This agreement would appear to create serious difficulties for reducing impacts from turf cutting on raised bog priority habitats.

1.5. Designated raised bogs conservation status assessment

Monitoring of the conservation status of all habitats (listed in Annex I) and species (listed in Annex II, IV and V) of the Habitats Directive is an obligation for all the states members arising from Article 11 of the Directive. National Parks and Wildlife Service (NPWS) carried out in 2004/5 a study on the conservation status of the following habitats: Active Raised Bog (7110), Bog woodland (91D0), Degraded Raised Bog still capable of natural regeneration (7120) and Depressions on peat substrates of the Rhynchosporion (7150) as part of the implementation of the Habitats Directive (94/43 ECC). This study is known as the Raised Bog Monitoring Project (Fernandez *et al*. 2005).

A total of 48 designated raised bogs, either SACs or NHAs, which were described and mapped ten years previously and thus represented a baseline against which change could be measured, were selected and surveyed as part of this study. These sites also represented the natural range of this ecosystem present in Ireland.

This study has shown that the extent of active peat forming, priority habitats (Active Raised Bog habitat and Bog Woodland) has declined by 36.80% (580.61ha) in the period 1995-2004/5 and that the overall conservation status of Active Raised bog habitat is 'Unfavourable bad'. It also indicated that the extent of Degraded Raised Bog has increased at the expense of Active Raised Bog. Indeed the future prospects of Degraded Raised Bog habitat were poor and thus the overall habitat conservation status was deemed 'Unfavourable inadequate'. This is particularly due to the fact that peat cutting is directly diminishing the extent of the latter habitat.

The study confirms that peat cutting combined with drainage and burning are the most negatively impacting activities on the raised bogs surveyed. In addition, it was also found that these activities area highly interrelated.

Peat cutting was found at 40 of the 48 sites surveyed. Although the common trend has been a reduction in the length of margin actively cut, and thus the number of cutters. This has been accompanied by an intensification of the amount of peat extracted due to changes in techniques (e.g. hand cutting replaced by mechanical cutting). This has involved an increase in the amount of peat extracted and thus the negative effects associated with this activity.

High bog drainage was recorded in 46 out of 48 raised bogs surveyed. This activity was considered to have a high negative influence on the high bog habitats at 21 raised bogs. In several cases high bog drainage is considered as the main reasons for the decline in the Active Raised Bog habitat extent. Cutover drainage was considered to have a high negative influence on the high bog at 29 raised bogs.

Burning was recorded at 24 of the 48 raised bogs surveyed in the period 1995-2004/5. According to this study this activity is more likely to occur in those raised bogs where extensive peat cutting takes place. It was considered the main reason for decline in Active Raised Bog habitat at 5 raised bogs.

To summarise, the Raised Bog Monitoring Project surveyed 48 raised bogs that represent almost 50% (app. 8,000 ha) of the national resource of the raised bog ecosystem. The results of this study, which could be extrapolated to

the other 50% remaining designated raised bogs in the country, revealed that the conservation status of the Active Raised Bog habitat is 'Unfavourable bad' and for the Degraded Raised Bog habitat 'Unfavourable inadequate'. These highly negative results, particularly in relation to Active Raised Bog (priority habitat under the Habitats Directive), are directly related to peat cutting and its associated activities (i.e. drainage and burning).

Because of the unexpectedly severe impacts on priority habitats revealed by the Raised Bog Monitoring Project. Its results were incorporated into an extensive revision of the earlier assessments and conclusions of turf cutting impacts as part of phase 2 of this project (2005/06).

2. METHODOLOGY

2.1. Preliminary work

The "Assessment of impacts of turf cutting on designated Raised Bogs" project has been carried out in two phases. Phase 1 was finalised in 2003. It consisted of a desktop survey whose main objectives were to identify the methods and criteria to be used for carrying out the impact assessments, to produce a preliminary desk-based impact assessment of all designated sites and finally produce an interim report. This report provided preliminary statistics on the extent of turf cutting as well as identifying areas to be surveyed in Phase 2 (see Appendix V).

Information from the National Parks and Wildlife Service files on all SACs and NHAs was collated in order to come up with an assessment of the impacts of turf cutting on these sites. This assessment covered all NHAs and candidate SACs sites designated for raised bog. It ascertained the sensitivity of each site to turf cutting in terms of:

- Possible presence of priority habitat (Active Raised Bog and Bog Woodland)
- The area being cut (length of margin)
- The sensitivity of areas to damage from further cutting

This information was particularly useful for those raised bogs where detailed vegetation maps did not exist and where vegetation surveys were required to identify areas where priority habitats could be present. It has also been used to identify bogs where cutting had taken place preceding the aerial or ground surveys and its approximate location.

Phase 1 also involved the refinement of turf cutting impact assessment methodology through visits to several sites led by Jim Ryan (NPWS). It also included the compilation of information necessary for Phase 2, both for the production of site packs and site report assessments. The different sources of information available were:

- Site synopses – brief descriptions of the sites base on previous surveys.
- Natura 2000 Forms – the formal description of SACs provided to the EU.
- Ortho-rectified images 1995 (B&W) and 2000 (colour) digital version.
- Kelly, L., Doak, M. and Dromey, M. (1995) *Raised Bog Restoration Project* reports and maps. The 1994-95 survey produced a comprehensive description and maps of vegetation, drainage, landuse and slopes for 48 bogs.
- Derwin and MacGowan (2000) *Raised Bog Restoration Project* reports and maps. A similar but less detailed report than the above on 28 bogs.
- Derwin *et al*. (2002). *Raised Bog Natural Heritage Areas (NHA) Project*. A desktop study which collated all the information on 105 non-SAC bogs, specially information collected in the initial 1980's surveys of raised bogs. The Access database produced as a result of this project was particularly useful.
- 6" NHA and SAC boundary maps.

Copies of these different sources were produced and stored within site packs for consultation during the project.

In addition, during the 2005/06 revision extensive use was made of the *Raised Bog Monitoring Project* results (Fernandez *et al*., 2005).

2.2. Surveys

An objective of Phase 2 of the project was to verify and update through a mixture of aerial and field surveys the results of Phase 1. In assessing turf cutting, a critical piece of information was the distance between the currently cut turf plots and the priority habitats (Active Raised Bog: central and sub-central ecotopes, active peat forming flushes and Bog Woodland). In order to determine this distance, precise information on the exact location of vegetation boundaries and turf cutting operations were essential. Due to the large size of many of the sites, access difficulties and time restrictions it was decided to carry out an initial aerial survey of the whole perimeter of a selection of sites. Ideally all cutting both old and current should have been included in the survey, but it was decided because of time constraints to restrict it to cutting occurring within the last five years.

2.2.1. Aerial surveys

121 sites out of the 127 were chosen for aerial survey. The remaining bogs were not flown because it was known that they were not currently being cut or that priority habitats was not present. The main objectives of this aerial survey were to eliminate sites without current cutting and gather information on the location and extent of the current cutting. Aerial survey involved two team members flying the sites in a small plane. One member of the team photographed the site using both a digital camera and slide film. The other team member used the Ordnance Survey aerial photographs of the site together with the 6" maps in order to highlight any cutting activity noted while flying. Vegetation survey proved too difficult to do from the air, as enough detail was not evident. Recent burning patterns, however, were evident from the air and were recorded. A list of sites flown is given in Appendix III.

Current cutting was not present at 12 sites: Killyconny SAC 006, Carrowbehy SAC 597, Derrinea SAC 604, Firville SAC 647, Garriskill SAC 679, Drumalough East SAC 2338, Brown Bog SAC 2346, Tullaghanrock SAC 2354, Ballygar NHA 229, Cangort Bog NHA 890, Lough Kinale NHA 985 and Loughanilloon NHA 1020.

2.2.2. Field surveys

Field surveys (either vegetation surveys or turf cutting assessment surveys) were carried out at 118 raised bogs in 111 NHAs or SACs. 21 raised bogs of the 139 bogs were not surveyed in 2003 (table 7.4- Appendix VII). This is because either their vegetation had been surveyed in detail previously and priority habitat was not present or where it was turf cutting was not present in 2003 (aerial survey results). No priority habitats were present at one site: (Cloonmore - Clonfellly NHA 247). At three bogs (Cangort Bog NHA 890, Lough Kinale NHA 985 and Loughanilloon Bog NHA 1020) ground surveys were not undertaken as no turf cutting was found during the aerial survey. The occurrence of priority habitats on these three sites remains uncertain because of the lack detailed vegetation maps (see Table 2.3 Appendix II).

2.2.2.1. Vegetation survey

Vegetation surveys were required in order to assess whether a site contained priority habitat at 58 raised bogs in 58 sites (see Table 7.1-Appendix VII). These surveys required field visits of varying duration depending on the size, terrain and complexity of each site (approx. 1-2 days per site). The high bog was walked using hard copies of the 2000 Ordnance Survey aerial images to provide assistance with the identification of vegetation boundaries. The surveys were frequently carried out using Handheld GPS systems to make the mapping of boundaries more accurate.

The primary aim of the vegetation survey was to identify the boundary between Active and Degraded Raised Bog as defined in the Interpretation Manual of the Habitat Directive (2003). This was achieved in the following way: Active and Degraded raised bog habitats (see section 1.3.4) are divided into a series of **community complexes** that are characterised by a series of **vegetation communities** (see Appendix VIII). These complexes are then amalgamated into a series of **ecotopes** with different physical characteristic using the approach outlined by Schouten (2002) derived from Kelly (1993). An **ecotope** is formally defined as the abiotic environment or habitat of a particular biotic system (Kulcher 1967; Whittaker *et al*. 1973). A summarised description of the high bog vegetation ecotopes is included in table 2.1 below. The identification of each ecotope was based on the vegetation Key developed during Phase 1 and included in Appendix VIII.

Time constraints in Phase 2 meant that a detailed survey of vegetation communities complexes was impractical, and only ecotopes were mapped. Draft maps produced in the field and modified in the office. 81 raised bogs have been surveyed either by Kelly *et al*. (1995), Derwin & MacGowan (2000) or other ecologists (see Appendix I) and detailed vegetation descriptions and maps at community complex level were produced (see section 1.4).

The high bog vegetation was divided into five different ecotopes (see Table 2.1):

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

Kelly *et al*. (1995) and Derwin and MacGowan (2000) considered face-bank as part of marginal ecotope and not as an independent ecotope. However, as the face-bank is the most dried out part of the bog it has been considered useful to considered as an independent ecotope during this project survey. The community types (see Appendix VIII), physical characteristics and the characteristic dominant species for each ecotope are given in table 2.1 below.

Table 2.1 Ecotopes characteristics

ECOTOPE	CHARACTERISTICS
FACE-BANK	• **Characteristic types present:** 4G, 4A, 4B, 3D, 3A, 3C, 1 • **Physical characteristics:** Water level low, surface very hard. Degraded microtopography with low hummocks/flats, hollows & lawns. No pools or wet hollows. • **Characteristic dominant species:** Very tall, vigorous *Calluna vulgaris*.
MARGINAL	• **Characteristic types:** 1, 2B, 3A, 3D, 3E, 4A, 4B dominant. 3Bb present. • **Physical characteristics:** Water level low, surface generally hard, soft in spots e.g. *Rhynchospora alba* hollows. Degraded microtopography, with very little differentiation between hummocks and hollows, etc. Non-algal pools & tall hummocks absent. Hollows can be frequent and these are dominated by *Rhynchospora*/*Narthecium*/*Trichophorum* (in tussock form) and algal mats. Pools absent except for tear pools. • **Characteristic species:** On lawns *Narthecium* is most dominant, *Sphagnum papillosum* & *S. capillifolium* present in small amounts (not lawns, not big hummocks, but small patches). *Trichophorum* common in tussock form. Kelly *et al.* (1995) also includes *Carex panicea* as typical species and more naturally frequent in western sites. On small hummocks and burnt/drained community types *Calluna vulgaris*, *Sphagnum capillifolium*, *Cladonia portentosa* are common. *Sphagnum* species present in order of decreasing occurrence: *S. capillifolium* → *S. tenellum* → *S. magellanicum* → *S. papillosum*
SUB-MARGINAL	• **Characteristic types:** 1, 3A, 3D, 4A, 4B dominant. 3E present. • **Physical characteristics:** Surface ranges from hard to soft but not quaking. Most wetter vegetation types are absent except for algal mats/*Rhynchospora* and *Narthecium* hollows are dominant. • **Characteristic species:** On lawns *Sphagnum papillosum* dominant, although absent from some areas. *S. magellanicum* & *S. capillifolium* present but *S. cuspidatum* is absent. *Trichophorum* common, but in less tussocky form than in marginal ecotope. *Rhynchospora fusca* occurs in hollows and pools. On hummocks *Calluna vulgaris*, *Sphagnum capillifolium*, *Cladonia portentosa* common and burnt/drained types.
SUB-CENTRAL	• **Characteristic types:** 3A, 3Ba, 3Bb, 3D, 4A, 4B, 4E, 4F, 1, 2A, 3E present. • **Physical characteristics:** Surface soft and sometimes quaking, occasionally hard. Microtopography ranges from *Narthecium* hollows to hummocks (moderately developed). Generally, however, the sub-central ecotope is lawn dominated with only a few hummocks. The lawns are usually dominated by *Sphagnum magellanicum*. *Sphagnum cuspidatum* pools occur occasionally & *Rhynchospora*/algal hollows are scarce. Wetter vegetation types, other than pools, are common. • **Characteristic species:** *Sphagnum magellanicum* is often common. *S. papillosum* occurs in small amounts. *Trichophorum* is scarce. *S. imbricatum* is present as a relict from when sub-central ecotope was central.
CENTRAL	• **Characteristic types:** 2A, 3A, 3Ba, 3Bb, 4A, 4C, 4F dominant. 3C, 4E present. • **Physical characteristics:** The surface is very soft and often quaking. Microtopography usually ranges from pools to tall hummocks (well developed). Pools are generally frequent to dominant, but do not have to be present for an area to be classed as Central. Lawns of *Sphagnum cuspidatum* are also typical of Central ecotope areas. All wet vegetation types are present and frequent. • **Characteristic species:** *Sphagnum cuspidatum* pools are common. *Rhynchospora*/algal hollows are absent. *Cladonia* dominated areas are absent.

	Kelly *et al.* (1995) differentiate between central ecotope in **midlands** sites and **western** sites. - In the **midlands** the pools of the central complex are usually colonised by *S. cuspidatum* with little open water. Other species, which tend to occur in the pools, are *Eriophorum angustifolium* and *R. alba* with *Drosera anglica* also occurring quite frequently. In between the pools on the midland sites *Sphagnum* lawns and hummocks are frequent. The lawn species are usually *S. magellanicum* and *S. papillosum* while the hummock species are mainly *S. magellanicum, S. capillifolium, S. subnitens, S. imbricatum* and *S. fuscum*. *Leucobryum glaucum* hummocks can also occur. *Narthecium* hollows with *S. tenellum* are frequent also. *Calluna* and *Erica tetralix* occur in abundance, the latter growing well on hummocks. The bog surface is wet and soft and the acrotelm layer is well developed. - On the more **westerly** sites pools tend to be more elongate and interconnecting with each other in places. More open water is seen and although *S. cuspidatum* is still important, *S. auriculatum* is more frequent. *Campylopus atrovirens* occurs around many of the pools edges and islands dominated by *Racomitrium* are quite common. *Sphagnum* lawns can occur between the pools but in general the inter-pool *Sphagnum* cover is lower than on the more easterly sites. *Narthecium* is frequent and *Carex panicea* can also reach high abundances. Hummocks of *S. imbricatum* and *S. fuscum* and various other *Sphagnum* and bryophyte species occur. The bog surface can be wet and soft but in comparison to the midlands central ecotope the acrotelm layer is not as well developed. It is thought that the hydrology of these western central pool complexes is somewhat different to the midland sites as excess water may flow through pools rather than through the inter-pool *Sphagnum* layer.

Central and sub-central ecotopes are allocated to Active Raised Bog habitat (7110). Flushes and soaks that are wet with active *Sphagnum* growth are also classed as active. Bog Woodland habitat (91D0) is also considered to occur on active peat forming areas. Face-bank, marginal and sub-marginal ecotopes are allocated to Degraded Raised Bog (7120) as are dry flushes, coniferous plantations and mineral mounds.

2.2.2.2. Cutting survey

One of the main objectives of this survey was to accurately quantify the overall extent of cutting on the designated raised bog sites and on each individual site. Therefore, a cutting assessment was carried out on all sites known to have priority habitat (Active Raised Bog and Bog Woodland) and current cutting activity. Overall 95 sites (102 raised bogs) were surveyed in 2003 in order to assess the impact of turf cutting (see Table 7.2-Appendix VII). Each turf cutting plot at the bog margin was visited and information recorded on the following aspects:

- General location: N-S-E-W sectors of the bog
- Face-bank height (m)
- Face-bank width (m). This data was subsequently refined using GIS techniques.
- High Bog and cutover slope: Sloping away from face-bank-flat-sloping down to face-bank
- Nature of cutting: Commercial or domestic based on extent and intensity of cutting
- Cutting technique: Ordinary hopper technique - lateral technique - pit technique - hand cutting - difco cutting
- Cutting age: A (currently cut) – B (cut within 5 years) – C (cut more than 5 years ago)
- Ecotope at the edge of the high bog: Facebank - Marginal - Submarginal - Subcentral - Central
- Cracking at the edge of the high bog present: Yes - No
- Description of drains on the high bog and on the cutaway. This section includes the following information: location, depth, flow direction and penetration of mineral soil. On the high bog distinction was made between functional and non-functional (overgrow) drains.
- Landscape: This data mainly corresponds to adjacent land use. Occasionally the size of the spread grounds was also taken to give an approximate idea of the intensity of turf cutting.

This information was used to calculate the impact score of each individual turf plot (see section 2.3.2.3).

A Turf Cutting Assessment Recording Form was devised at the beginning of the survey. The questionnaire included in the form was extended after initial site visits, to include the data shown in the points outlined above and thus make the form more comprehensive. Copies of the original and modified forms are included in Appendix

VI. Cutting assessment maps were prepared for each site surveyed. The location of plots, plot's number and the cutting age of each plot (i.e. currently cut, cut within 5 years or cut within more than 5 years) is illustrated on these maps, which are attached to each Site Report. An additional copy of these maps is included in Document 4.

2.3. Methods

2.3.1. Effects of turf cutting on raised bogs

Firstly and before describing the methodology used to assess the impacts of turf cutting it is considered necessary to include a summary of some of the effects of this activity on raised bogs.

It is essential to understand the hydrology of a raised bog to ascertain how they are damaged by turf cutting and evaluate possibilities of restoration. A brief description of raised bog hydrology is presented below based on internal NPWS document (Appendix X).

A raised bog is essentially a mound (dome) of water that supports and is retained by the peat deposit. The height of this mound is determined by the permeability of the peat, the climate and the area and shape of the mound – the more it approximates to a circle the greater the relative height of the dome can be for any given area under natural conditions. When the climate is stable the amount of water entering and leaving the mound (bog dome) over a year is in equilibrium. Anything that significantly increases the long-term rate at which water leaves the mound will cause the bog to dry out and shrink until a new equilibrium between water input and output is reached. The main reasons for such losses are a as follows:

1. Drainage on the high bog, alone or associated with turf cutting increases the speed of water movement from the dome to the bog margin.
2. Drainage and/or turf cutting on the margin increases the rate of water losses from the dome by increasing the relative difference in water tables height and therefore the gradient between the dome and cutaway margin.
3. Marginal drainage and/or turf cutting particularly if it cuts into the mineral soil may reduce water pressures in soil underlying the bog and thus increase water losses from the bottom of the bog.
4. Turf cutting can speed up water losses by removing the more humified (and less permeable) peat that forms on the margins of raised bogs.
5. Turf cutting as it advances onto the bog from the original margin increases the gradient between the dome and the new face-bank and thus increases water losses.
6. Peat shrinkage associated with drying out from drainage or turf cutting increases surface slopes thus increasing surface runoff rates and decreasing infiltration.
7. Fires, which are often associated with turf cutting can cause drying out by sealing the bog surface with fine ash particles thus increasing runoff rates and decreasing infiltration onto the bog. *(Note – in comparison with drainage and turf cutting fires only have short term effects).*
8. Another response of the bog to drying out as a result of cutting is the development of vertical cracks parallel to the cut margin indicating internal tension in the peat body. This provides a means by which water can rapidly leave the marginal areas of the bog.

During the drying out process peat formation ceases and species and communities characteristic of the wetter parts of the bog may be lost. The bog will thus move from the "Active Raised Bog" to the "Degraded Raised Bog" (i.e. from a priority to a non priority category according to the Habitats Directive). Indeed as reported by Schouten 2002 on the high bog away from the rand, once the surface slope exceeds 30cm/100m the acrotelm starts to deteriorate and by the time the surface slope reaches 1.5m/100m the acrotelm has disappeared entirely. As stated by Cross (1990) the drop in water table levels does not need to be great to have profound effect, as Sphagna have very narrow ranges of tolerance to water stress. For example *Sphagnum papillosum* is incapable of survival after 16 days of drought. Cross (1990) also outlines that the impact of drainage is likely to be greater on the True Midland sub-type, which has less humified and more permeable peat, than on the western sub-type. Once the acrotelm disappears the bog is effectively no longer accumulating peat and has become moribund. The acrotelm layer plays an essential role on the retention of water due to its large storage capacity. Therefore, in addition the destruction of the upper living layer the loss of the acrotelm also increases water losses.

Theoretical considerations predict that increased water loss from one part of the dome will overtime lower water levels everywhere else in that dome. Research work in Ireland has shown that drainage and turf cutting can dry out and lower the water table of a bog by several metres up to at least 600m away from the drainage or extraction site. Thus practical experience supports the theoretical predictions mentioned above. For the purposes of this study 250m is the figure used to assess the sensitivity of priority habitat to turf cutting on the bog margin. That is if an area of priority habitat (Active Raised Bog or Bog Woodland) is within 250m of the high bog margin, then this margin will be highly sensitive to cutting. The figure of 250m was derived from the absence of priority habitats from areas where only old turf cutting was evident. It is assumed in these areas that ongoing impacts of turf cutting were no longer present as all subsidence should have ceased and the new equilibrium being achieved. However, this is not a conservative position as impacts from turf cutting can under certain circumstances penetrate much more deeply into the bog as shown by Heggeler *et al.* (2005).

Furthermore, turf cutting has many other negative effects:

- Apart from directly decreasing the extent and quality of priority habitats, cutting decreases the long term ability of the high bog to support these habitats. Experience has shown that below certain size of high bog (60ha aprox.), which has been subject to marginal cutting, priority habitats rarely occur. In theory, the longer and more gentle the slope, the greater is the likelihood that hydrological conditions will exist which could support the occurrence and/or maintenance of priority habitat (Schouten, 2002). It is obvious that such conditions are more likely to occur in a large bog as the smaller the bog the shorter and steeper the high bog slopes will be. Such changes are irreversible.
- Cutting causes the direct loss of particular features of interest on the high bog, such are small flushes close to the margin.
- It also directly damages the ecological and archaeological information contained in the peat archive by removing it.
- Ongoing cutting delays the time when restoration activity can be fully implemented, as well as minimising the possibilities of restoration. This situation has already arisen several times during restoration works undertaken by NPWS and Coillte (pers. comm. Jim Ryan, 2006). In addition, the later the restoration works are initiated the higher the will be the cost involved while the potential benefits will often be reduced.
- Cutting could have other negative economic implications. If current trends continue the quality and extent of the raised bog priority habitats will continue to decline. This means that favourable conservation status would not be achieved leaving Ireland exposed to the risk of economic sanctions from EU in relation to the compliance with the EU Habitats Directive.
- Ongoing cutting causes drying out and oxidation of the peat, thus contributing to increased CO_2 emissions. In addition, by reducing the area and/or preventing the expansion of active peat formation associated with the priority habitats it reduces the presence contribution and future potential of the bogs as carbon sinks. Ireland is currently in danger of not meeting its obligations to control greenhouse gas emissions under the Kyoto Protocol. Under present conditions raised bogs are contributing to the problem rather than to the solution.

2.3.2. Assessment methodology

2.3.2.1. Baseline data

The assessment is based on the identification of sensitive margins by calculating distance from the margin to priority habitat and subsequent assessment of the potential impact of current turf cutting on these priority areas. Therefore, ecological (i.e. vegetation description and maps, landuse maps) and hydrological data (i.e. high bog and cutover drainage) produced in the surveys mentioned below have been employed in this assessment.

The assessments were based on data obtained during previous surveys and data collected during the current survey (see section 2.1). Data collected by Kelly *et al.* (1995), Derwin and MacGowan (2000), Derwin *et al.* (2002) and Fernandez *et al.* (2005) were used extensively to produce the site reports and carry out each individual site assessment. Another 58 raised bog sites, where detailed data have not been previously collected, were surveyed in 2003/4 as part of this current project and comprehensive survey descriptions on vegetation, drainage and turf cutting activities were produced. In all a total of 102 raised bogs were surveyed for turf cutting (section 2.2.2.2).

2.3.2.2. Data variability

Ideally to produce reliable comparative statistics for the impact of turf cutting on all raised bogs all relevant data should have been collected at the same time. However, as mentioned in the previous section, the data employed in the assessment was produced in different periods, as different sites were surveyed during each survey. As a result a combination of data source dates apply to each individual site impact assessment. The following are all the possible data source date combinations:

A. Distance of turf cutting (i.e. face-bank) recorded in 2003 from priority habitat using 1995 vegetation maps produced by Kelly *et al.* (1995).

B. Distance of turf cutting (i.e. face-bank) recorded in 2003 from priority habitat using 1995 vegetation maps (Kelly *et al.*, 1995) that have been revised as part of the Fernandez *et al.* (2004) project to ensure consistency in vegetation mapping.

C. Distance of turf cutting (i.e. face-bank) recorded in 2003 from priority habitat using 1995 vegetation maps produced by other ecologists. Falling in this category are Raford River (NHA 321) surveyed by Dromey and Douglas (1995) or Clara (SAC 572) surveyed by Kelly in 1992 (The original Clara vegetation description was revised by Fernandez *et al*., 2005).

D. Distance of turf cutting recorded in 2003 from priority habitat using 2000 vegetation maps (Derwin & MacGowan *et al.*, 2000).

E. Distance of turf cutting recorded in 2003 from priority habitat using vegetation maps produced as part of this survey.

The location of the face-banks is always derived from 2000 aerial images and was taken during the 2003 survey. Appendix IV includes a list of sites sorted according to the above categories.

2.3.2.3. Impact potential assessment methodology

The main aim of this project is to provide an assessment of the impacts of turf cutting on designated raised bogs in order to identify the most sensitive areas where the cessation of turf cutting is a priority. One of the main outcomes of this project is a turf cutting cessation program for all the raised bogs designated.

The development of the impact potential assessment methodology started at the commencement of Phase 1 of this project and was improved through field work carried out at the beginning of Phase 2. The basis of this methodology were set by a NPWS working group established in 1998 which focused on the identification areas where turf cutting would have the least impact on the conservation status of raised bogs (Appendix X).

The current impact assessment methodology is based on assigning impact potential scores to individual turf plots which give an indication of the potential impacts that cutting at each individual plot may have on priority habitats. The impact potential is defined by a series of parameters (e.g. face-bank height, distance from priority habitat) which are described below. This method ensures that a relatively uniform approach is taken to assessing impacts. The results obtained probably give a reasonable ranking of the relative impacts of different turf plots, but are probably less good at predicting the overall long term impact on the whole bog. This is because the approach is relatively crude and other factors may also be important in individual instances (e.g. in the case of small bogs). As a consequence it is frequently necessary to modify the results obtained by the use of appropriate professional expertise (best professional judgement).

The process of calculating scores is based, as already mentioned above, on ranked values of four turf plot parameters, which were considered to influence the impact of turf cutting on the bog and which were relatively easy to measure in the field (see table 2.2). These parameters are:

1) Face-bank height
2) Distance from priority habitat (Active Raised Bog and Bog Woodland)
3) Peat hardness
4) Angle of cutaway

Table 2.2 Ranked values of turf plot parameters

1-Face-bank height [1]	**Score**
0-1m	**0**
≥1-2m	**1**
≥2-3m	**2**
≥3-4m	**3**
≥4-5m	**4**
≥5m	**5**
2-Distance from priority habitat	
0-50m	**5**
50-100m	**4**
100-150m	**3**
150-250m	**2**
ca 250m	**1**
>250m	**0**
3-Peat hardness [2]	
Soft (sub-marginal)	**2**
Hard (narrow marginal zone, <100m)	**1**
Hard (wide marginal zone, >100m)	**0 (occasionally 1)**
4-Angle of cutover [3]	
A - Sloping away from face-bank	**1**
B - Flat	**2**
C - Sloping down to face-bank	**3**

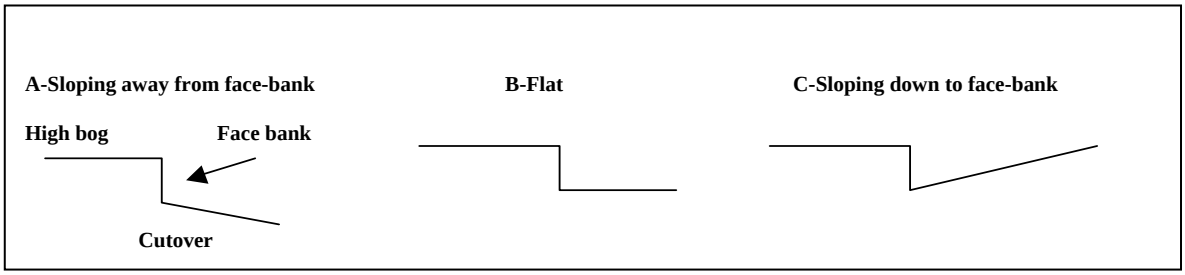
Note

[1] Where slumping exists adjacent non-slumped face-bank heights have been used in order to gauge the original height.

[2] Measurements of peat hardness were taken at first with the use of a metallic probe, but following fieldwork it was felt that recording ecotope type gave an adequate reflection of the peat hardness.

[3] The angle of cutover is depicted in figure 2.1 below.

Figure 2.1 Angle of cutover



The overall Impact Potential (IP) score of each turf cutting plot is obtained by multiplying each individual parameter score. The resulting IP score is ranked in table 2.3 and this table illustrates that each IP score implies that cutting at the plot poses a certain threat to priority habitats, which requires an specific cutting cessation term. Through this process an overall site cutting cessation term requirement can be ascertained.

Cutting cessation terms

As can be seen from table 2.3 the higher the threat the shorter the cessation term. Only three (i.e. **immediate term, short term and medium term**) of the five cessation terms given in table 2.3 are used subsequently in this report as it was decided that applying any more categories to the cessation options eventually developed would make them unduly complex. The medium term was set at ten years to link it to the overall ten years phase out period as implied by the 1999 & 2004 Agreements between the Government and turf cutters (see section 1.4). The immediate term mend that in 2003 that significant impacts were likely to already be experienced at that stage and obviously are now worse. The short term was taken as five years simply to indicate that there was an intermediate category. Neither the short or medium term is to be taken to imply that no damage would be done by continuing cutting for these periods of time.

Table 2.3 Impact Potential Scores

IP Scores	Threat to priority habitats	Cessation term required
0-10	Minimal	Medium term cessation
>10-20	Significant	Short term cessation
>20-40	Serious	Rapid cessation [1]
>40-80	Very serious	Immediate cessation
>80-150	Very serious	Immediate cessation and major remedial works required

Note
The highest total possible IP score is 150.
[1] An intermediate category "rapid cessation", between short term cessation and immediate cessation, is given in many of the site reports. At a later stage in the project it was decided that given the relatively short time scales involved in various cessation options that there was not point in maintaining this distinction and it was merged into the immediate cessation category term.

Parameters

The rationale for using these parameters is as follows:

1) Face-bank height

The value of this parameter directly reflects the potential impact of a turf cutting operation. Face-banks vary from less than a meter to up to four meters high, although occasionally reaching more than five meters. The higher the face-bank the greater will be the potential for subsidence to occur, all other factors being equal. For example a 5m face-bank which losses 50% of its water will subside by approximately 2.5m, while a 1m face-bank will only subside by 50cm. In addition, the higher the face-bank the greater is the gradient between the dome and the new face-bank and hence the greater the potential for water loss.

2) Distance from priority habitats

The further the peat cutting is away from priority habitat the less likely there is to be an impact, as the potential gradient between the bottom of the face-bank and the priority habitat surface declines with increasing distance. The research at Clara appears to indicate when gradients are less than 30cm/100m Active bog can still maintained itself.

A **250m threshold** has been taken as the theoretical maximum distance at which cutting will normally have any negative effects on priority habitats (Active Raised Bog and Bog Woodland). Thus, when cutting occurs more than 250m from the priority habitat the score associated with this parameter is zero. Since the IP scores of all the parameters are multiply by each other this also means that the overall IP score is zero. This was based on observations of the extent of marginal drying out associated with very old (inactive) turf cutting at Clara and Raheenmore bogs. This threshold should be considered as a very crude rule of thumb. It does not take into account situations where permeable layers under the bog may be affected which can lead to much more extensive drying out as has occurred at Clara bog (Heggeler *et al*. 2005), where significant subsidence due to turf cutting was measured over 600m away from the face-bank within a period of ten years. On the other hand, it also does not allow for situations where subsidence is inhibited by shallow or very dense peat layers between the cutting and the active bog. To summarise, it is normally only within the 250m zone that an Impact Potential Score assessment was carried out to give a crude ranking of the threat of cutting. The IP score given in this 250m zone is essentially related to the other three parameters (face bank height, peat hardness and distance from priority habitat).

3) Peat hardness (Vegetation ecotope at the edge)

The potential for subsidence will be related to the water content of the peat with high water contents being associated with the greatest subsidence potential. It was not possible to measure this characteristic in the field so that an alternative measure was used that of peat hardness which should be inversely related to water content that is, the lower the water content the harder the peat. Measurements of peat hardness were taken at first with the use of a metallic probe, but following fieldwork it was felt that recording ecotope type gave an adequate reflection of the peat hardness. Using the probe there were indications that peat underlying the different ecotopes at the bog margin seemed to be associated with different water contents (based on the resistance when pushing the probe down through the top 2m of peat), with resistance apparently decreasing from the marginal to the central ecotope. In general, when a marginal ecotope exceeding 100m occurred behind the face-bank it was considered that the potential for subsidence was very small and therefore a 0 IP score was given (see Table 2.2). However in some such cases, other factors were considered to exacerbate the

threat of cutting and in these situations the IP score was deemed to be 1. This alteration in the method has been justified for each particular case in the site report peat cutting assessment section.

4) Angle of cutover

This was considered an important factor as it has implications for the future height of the face bank. If the cutaway was sloping towards the face-bank this implied that further cutting would rapidly increase the height of the face-bank and require increasingly intensive marginal drainage to maintain dry conditions at the base of the face-bank. Flat cutaway would imply that the face-bank would not increase significantly in height as it progresses into the bog. When the cutaway slopes away from the face-bank the height of this is likely to be stable or decreasing.

The four parameters have a direct influence on the high bog gradient and thus increase in subsidence that will lead to higher water losses.

Exceptions to the impact potential assessment methodology

There are several situations where the methodology outlined above is not followed to determine the cutting cessation term required. Some of the following exceptions has been developed in 2005 as part of the project revision carried out in 2005/06 and are given as a note at the end of conclusions section of each site report. These exceptions are as follows:

- Cutting is always immediately phased out irrespective of its IP score when it takes place within 50m of priority habitat.
- Cutting is always phased out in a short term irrespective of its IP score when it takes place within 100m of priority habitat.
- The cessation of cutting on those sections of high bog where the cutting rate is high 4-5m/yrs (or higher) is prioritised. Although usually there are not enough evidence to prove definitively that this cutting is purely commercial, this rate of cutting indicates that this activity may be of *commercial nature*. This situation was found at Barroughter bog (SAC 231), particularly along the northern section. In this case it was deemed necessary to phase out this cutting in a short term instead medium (as the IP score suggested).
- Cutting at the centre of the high bog is likely to increase drainage effects and thus has higher impact that any cutting at the edge of the high bog (e.g. Derrycanan NHA 605). Thus, when considered necessary the cessation of such type of cutting is prioritised.
- Cutting occurring at the edge of a flush connected to priority habitat is likely to increase water losses in the upstream areas of the flush catchment on the high bog at a faster rate than would apply in an ordinary situation. This is because flushes are areas where rates of water movement will be higher than in ordinary bog surface. An example of this situation was found at Carrownagappul (SAC 1242) and the cessation of this particular cutting is prioritised.
- **Cutting on areas with potential for restoration works**

  Occasionally the cessation of turf cutting is recommended despite a low IP score, as this activity may interfere future restoration works on the high bog. This scenario is found in sites where cutting occurs on or near drains on the high bog.

- **Cutting techniques not allowed**

  There are certain techniques of cutting that are considered to have a significant impact on the high bog vegetation and thus automatically fall into the most impacting category that requires immediate cessation. These techniques are *lateral cutting* and *pit cutting* (described in Chapter 3). These techniques imply the machinery working from the high bog surface that subsequently is used as spread grounds, resulting in a high bog compacted and completely devoid of vegetation. Occasionally this is accompanied buy the insertion of drains. The immediate cessation of any type of *surface cutting* is also recommended.

- **Simultaneous cessation of turf cutting**

  This usually occurs when the plots are part of a defined group of plots. Thus, in this case it is considered sensible to phase out cutting within the same group simultaneously, regardless of a low IP score of some of these plots. An individual cessation program may lead to intensification of cutting on the plots where later cessation would have been adopted according to their IP score. The intensification of cutting would lead to major impacts. Hence, a simultaneous cessation is considered more appropriate as regards management decisions making (i.e. putting into practise actual cutting cessation) and as well as to prevent

further damage on susceptible areas. Corbo SAC 2349 is an example of this particular case where cessation of cutting along long sections of the high bog margin is deemed appropriate.

- **High impacts associated with small size and/or natural range preservation**

  It is considered necessary to immediately phase out any cutting at those sites with priority habitat which are subject to high level of turf cutting impacts where either the small size of the high bog (60ha approximately or less) and/or its importance to the preservation of the priority habitats natural range makes them particularly vulnerable.

  60ha of high bog is deemed to be the lowest size limit which can support significant areas of priority habitat. Therefore, any further cutting at such sites will risks the loss of the habitat present on the site.

  Priority is given to the protection of raised bogs with priority habitat which occur near the limit of current raised bog distribution in Ireland. This is to ensure the retention of these habitats natural range.

- **Sites with limited turf cutting**

  A number of sites with priority habitats exist where turf cutting is now restricted to a few active plots whose impact potential scores are not particularly high. However, because of the damage, especially burning, associated with turf cutting it is deemed appropriate to recommend the immediate cessation of cutting on these sites (e.g. Ferbane SAC 575 and Mongan SAC 580).

- **Cutting on isolated raised bog remnants and cutover**

  Cutting occasionally occurs on isolated segments of high bog where priority habitats are absent or on the cutover away from these habitats. In these cases cutting is considered to do not impact these priority habitats and therefore have no direct implications on their conservation status. However, continued cutting in these areas would delay the initiation of effective restoration and increases the risk of damage by burning to the whole site. Therefore, we are recommending that cutting in these situations should be phased out in the medium term.

  Examples of this situation are found at Carrickynaghtan NHA 1623, where peat cutting occurs on the cutover and Lough Ree where cutting occurs on small isolated sections of high bog.

Impact assessment limitations

It is accepted that the impact assessment process undertaken was relatively crude due to lack of information and time constraints. Ideally a more detailed assessment should have been carried out, but it would have required much more detailed information on a range of factors which would have taken much longer to collect an involved enormously greater expense. The type of information that would have been useful is as follows:

- The ideal situation would have been a full levelling survey of both the high bog and cutaway areas been carried out. However, this was not feasible in the time available.
- Information on geology and sub-soils underlying the various sites (i.e. whether the underlying materials are very permeable or not). In some of the earlier surveys assessments of the permeability of underlying materials were made based upon the mineral substrates exposed in the deeper marginal drains. However, in most situations this does not provide sufficient information on which to base reliable risk assessments.
- Information on peat depths and the shape of mineral soil underlying the bog would also have indicated the potential for subsidence and therefore changes in the topography of surface of the bog. For example, where impermeable mineral soil ridges underlie a subsiding bog they may produce surface ridges that impede water flow off the high bog surface, thereby creating wet areas.
- Measurement of the peat water content would provide an estimate potential subsidence. Initially a probe was used when surveying to measure dryness of the peat. The logic being that the drier the peat the greater the resistance to the probe is likely to be and the smaller the possibility of subsidence. The probe used did not have any measuring devise attached and resistance was estimated subjectively. While the results tend to suggest a crude relationship between vegetation type and peat density, this relationship requires proper scientific investigation. The method also proved to be extremely labour intensive.
- Ideally the impact of turf cutting for each site should be assessed by the use of an individual hydrological model as suggested by JNCC No.365.

Although the methodology employed has its limitations and does not pretend to provide conclusive scientific prove of impacts at the individual plot level, at a more general level it provide useful guidance to probable impacts. The lack of certainty in individual cases should not serve as a pretext for delaying the introduction of effective measures to deal with the general problem of turf cutting impacts on raised bogs.

Turf cutting impact assessment process

This section outlines the main steps of the process followed to carry out the impact potential assessment of turf cutting on a raised bog with priority habitat (Active Raised Bog and Bogs Woodland). This process has been completed on a total of 93 raised bogs (those included the sub-category 1.2 - section 2.3.2.4 below). As mentioned below the assessment was actualised for many of the raised bogs at different times from 2003 onwards. The findings of the Raised Bog Monitoring Project (Fernandez *et al*. 2005) brought the necessity of refining the assessment made in 2003 at many raised bogs and giving new recommendations. Many of these new recommendations are related to the "Exceptions to the impact potential assessment methodology" summarised in the previous section of this report.

The inclusion of a **site study** case is considered a useful method to make the whole process more understandable. Knockacoller bog SAC 2333 has been chosen as the site study case for several reasons: its locations make this site of particular interest as it is of importance to preserve the geographical variation of Active Raised Bog; it is a small raised bog that makes it more vulnerable to any impact; it was included in the Raised Bog Monitoring Project (Fernandez *et al*. 2005) and the findings of this project required new recommendations in the final assessment.

Figures 2.2 and 2.3 illustrate changes occurred at the site in the period 1995-2004/5.

The following are the main steps that have been followed to perform the turf cutting impact assessment, once all the data required was gathered and the surveys completed:

A. Digitalisation of vegetation maps

The vegetation maps (i.e. vegetation ecotopes) produced during previous surveys or current survey were digitised and GIS maps were produced (Arcview 3.2 was utilized). Occasionally other information such as drainage and slopes was also digitised and included in these maps. 2000 ortho-rectified images (produced by the Ordnance Surveys services) were used to undertake this step and were particularly important to define boundaries as occasionally certain features (i.e. ridges, pools) are discernible on the images. 6" maps were used as the background of these maps.

Appendix XI includes a copy of this map for Knockacoller bog and a copy of the site cutting assessment table.

B. Representation on map of turf cutting activities occurring on the raised bog

Turf cutting plots or any other sort of exploitation (e.g. surface cutting) were depicted on the GIS map with the aid of the 2000 aerial images and data recorded during the 2003 surveys. Plots were classed according to their age: a) Plots currently cut or cut within the last five years, which are depicted in orange and b) Plots that were not cut within the last five years, depicted in violet.

A total of 15 plots were reported in Knockacoller bog in 2003, although the nature of cutting at plots 9-15 in the eastern section was uncertain, the findings of Fernandez et al. (2005) project confirmed the commercial nature of these plots. All cutting was described as ordinary Hopper method, and the rate of cutting was particularly high (4-5 m/yr) at plots 9-15. Although some turf plots more than 5 years old are obvious on the aerial image, only those currently cut plots were described and an impact potential assessment was done for them. As it can be seen in Table 6.1 of Knockacoller site report all these plots were deemed currently cut (A) in 2003 (Appendix XI).

Identification of the high bog sensitive margin

This is an essential part in this step of the process. Any section of high bog margin within 250m of priority habitat was highlighted on the map and its length given in the site Summary Table. Any cutting occurring on this sensitive margin is considered to potentially pose a threat to the priority habitat.

The whole high bog margin was deemed sensitive at Knockacoller. Thus any cutting occurring at the high bog margin is considered to pose a threat of various level to the priority habitat. Knockacoller Summary Table shows the whole 3.65km of high bog margin is sensitive.

Note
Although not all the plots more than five years old were recorded during this survey. Occasionally were described, depicted on the map and an IP score was given to these plots as if they were currently cut. This additional data, which was included at the bottom of each site Summary Table and at the end of conclusion section of each Site Report, is considered particularly useful in the case of recommencement of cutting at these plots.

C. Calculation of distances to categorise threats from each individual plot

The calculation of distances of each turf cutting plot from priority habitat is an essential step in the process of assessing impact potentials. The use of GIS techniques has been crucial to uniform this process, make it more accurate and optimise time.

All the turf cutting plots noted at Knockacoller are within the sensitive margin. Furthermore, cutting at plots 1-7 occurs within 100m which is one of the exceptions to the Impact assessment method, which indicates that automatically cutting at these plots goes at least to the short term cessation category.

Note
The distance of the priority habitat to turf plots is underestimated due to the fact that the locations of the turf plot's face-banks was done using the 2000 aerial images as the 2004 were not available when this assessment was carried out. Cutting at plots cut for domestic use usually advance at approximately 2-3m/years into the bog. Commercial plots can advance at two to three times this speed (>4m/year). Therefore, when inspecting the tables provided it should be borne in mind that distances from priority habitat to face-banks are likely to be overestimated by 8-12 m for domestic and more than 16m for commercial.

D. Assignment of Impact Potential scores

An Impact Potential (IP) score is given to each individual turf plot. This score gives an estimation of what the potential impact of cutting at each plot could be. The method outlined in section 2.3.2.3 is applied here and according to the characteristics of each turf plot given in Table 6.1 of each individual Site Report an IP score is calculated.

Concerning Knockacoller bog, the majority of the plots have height from to 2 to 3m which corresponds to 2 score regarding face-bank height (see table 2.2). The distance of these plots from Active Raised Bog, varies from 65 to150m. Cutting at plots 1-7 is considered to pose the highest threat as there is sub-marginal ecotope at the edge of the high bog (worst scenario as regards peat hardness, see point 3 - Table 2.2). All the turf plots have flat cutovers which gives 2 score respecting angle of cutover.

E. Turf cutting cessation proposal

Once each individual plot is given an IP score a cessation priority program can be proposed according to table 2.3. However the exceptions to the methodology summarised in previous sections such as: cutting techniques not allowed, simultaneous cessation, high impacts associated with small size and/or natural range preservation are considered at this stage of the process.

Plots 2-7 in the western section of Knockacoller have the highest IP score (32) and thus according to table 2.3 pose a serious threat to Active Raised bog and require a rapid cessation. The remaining plots required either short term or medium term cessation.

Knockacoller bog was included in the Raised Bog Monitoring Project (Fernandez et al. 2005). A new vegetation survey was carried out and it was found that new areas of Active Bog developed in the eastern section of the bog in the period 1995-2004 (see figure 2.2). This new scenario required a reassessment of the 2003 results as explained in the note below (Updating impact assessments using the results of the Raised Bog Monitoring Project). In these cases a new map derived from Fernandez et al. (2005) project is included for this site. This map also shows the extent of high bog that has been removed in the period 1995-2000, which indicates the extent of turf cutting (occasionally this maps does not indicate high bog removed in section currently cut, this may due to recommencement of cutting after 2000 or errors). The new scenario indicates that Active Bog currently occurs closer to the eastern margin and thus the assessment of cutting at plots 9 to 15 had to be revised. Cutting at plots 9-11 now occurs within 50m of Active Bog, that is one of the exceptions to the methodology and thus requires immediate cessation. Furthermore, this most recent survey also confirmed that cutting at plots 9-15 was of commercial nature, which confirms the immediate cessation. This new assessment is based on the principal of "worst scenario" defined below.

The Fernandez et al. (2005) project also noted that the extent of Active Raised Bog significantly decreased (by 64.5%) in the period 1995-2004. They also notified that this decrease was related to turf cutting and cutover drainage. Furthermore the principal of high impacts associated with small size (53.6ha) and/or natural range preservation (isolated bog in the southeastern region of its natural range), which are exceptions to the method, were considered at Knockacoller bog. Hence, the new assessment considers necessary the immediate cessation of any cutting at the site. A note highlighting the conclusion is also included at the bottom of the site Summary Table.

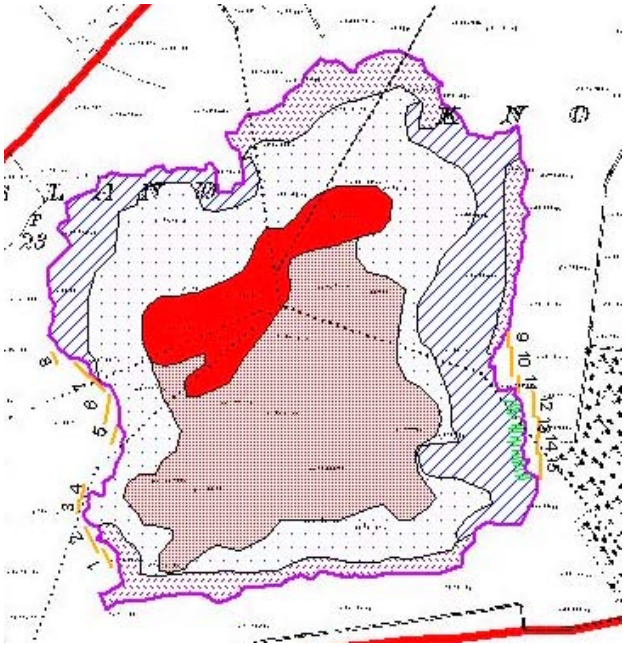


Figure 2.2 Knockacoller (SAC 2333) high bog ecotopes, turf cutting (2003), high bog drains map derived from Kelly *et al.* (1995)

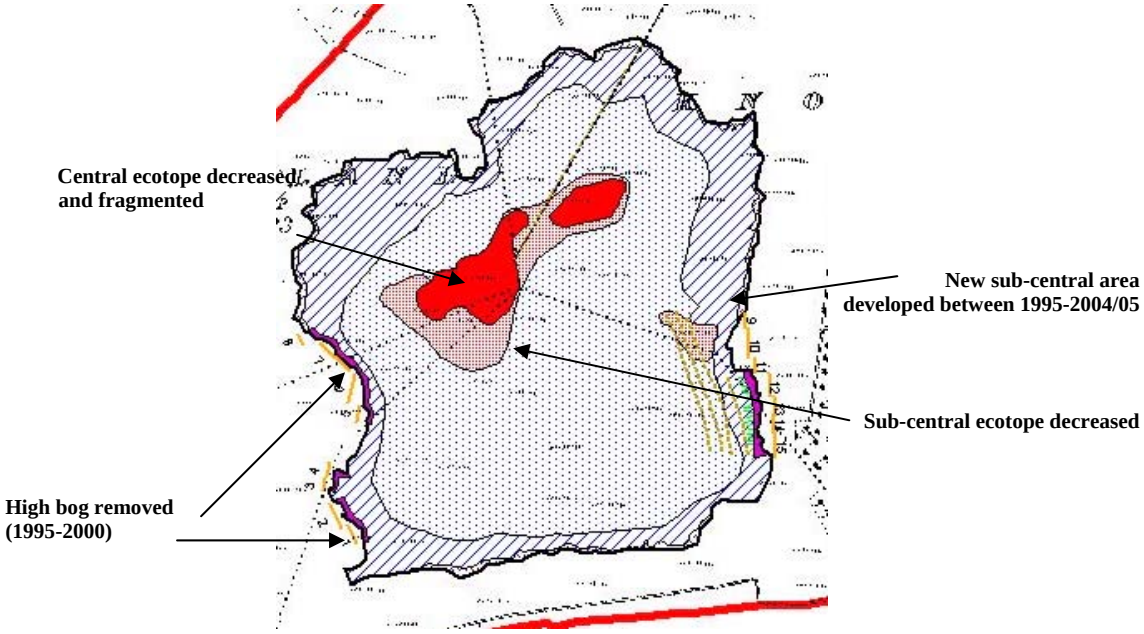


Figure 2.3 Knockacoller (SAC 2333) high bog ecotopes, turf cutting (2003), high bog drains map derived from Fernandez *et al.* (2005)

Updating impact assessments for each site using the results of the Raised Bog Monitoring Project (Fernandez *et al*. 2005) and the recommendations of the Summary Report

When reading the site reports one is essentially given a series of assessments written at different times from 2003 onwards. This essentially list a series of options, which relate to a perception of the threat pose by turf cutting at the time that they were written. The first major change resulted from the outcome of the Raised Bog Monitoring Project (Fernandez *et al*. 2005) which showed very high rates of loss in the extent of Active Raised Bog habitat. In response to this information the recommendation for immediate cessation of turf cutting were significantly strengthen in the 2005/06 notes, especially for individual sites where a loss rate were high and for small sites where the total loss of Active Raised Bog was considered a significant threat.

Therefore, as a result of the Raised Bog Monitoring Project (Fernandez *et al*. 2005) significant new information emerged for some sites which has resulted in significantly different recommendations having to be made. Rather to rewriting the initial report, we have included this information as a note after the conclusions in the original Site Report. A brief note is also included in the Summary Table.

The recommendations of the Summary Report in relation to the different turf cutting cessation options as it applies to each site is given in Table 6.2 in each Site Report.

Worst scenario

As already mentioned, the maps produced by Kelly *et al*. (19995) and Derwin and MacGowan (2000) were essential to calculate distances from cutting to priority habitat at each site. However, in those sites where new priority habitat have developed within the period 1995-2005, as recorded within the Raised Bog Monitoring Project (Fernandez *et al*. 2005), the impact of turf cutting is also assessed considering distance from this new priority habitat. This case only occurs at those sites surveyed in 2005, as there is no recent data for those sites surveyed in 2000, where on the other hand the possibilities of new habitat developed is lower. We do not take into account in the assessment those areas of priority habitat that have disappeared or decreased on extent within the period 1995-2005. This is mainly due to turf cutting is likely to be the main reason for this decline. Thus, an assessment considering a more negative situation (i.e. less priority habitat) would allow cutting to continue longer, particularly in those raised bogs where major changes occurred (losses in priority habitat as a result of turf cutting). Therefore, where information exists at series of times for one site the **worst scenario** from each time period are combined in making the assessment.

2.3.2.4. Categorisation of raised bogs

The categorisation of raised bogs according to the necessity to carry out an impact potential assessment was essential at the commencement of Phase 2 of this project. This process was mainly based on the presence of priority habitat and turf cutting on each raised bog. The categorisation of raised bogs is also necessary to give an overall picture of the current situation of the raised bogs designated as regards the presence of turf cutting. The original list of raised bogs considered for assessment consisted of 127 designated raised bog sites, which contained 139 individual raised bogs. It should be highlighted that the results the process outlined within this section do not correspond to an assessment of where cutting should be phased out or allowed to continue. This categorisation was carried out as a attempt to sort list those raised bogs where a turf cutting impact assessment should be carried out. Therefore, the 139 original raised bogs have been categorised as follows:

1. PRIORITY RAISED BOGS

This corresponds to either NHA or SAC where priority habitat was found present during the current survey or previous surveys. This category includes 109 raised bogs, sub-categorised as follows:

1.1. Priority habitat present - Turf Cutting absent in 2003

There is a total of 16 raised bogs within this category (15 SACs and 1 NHA), (see Table 9.1. – Appendix IX).

1.2. Priority habitat present - Turf Cutting present in 2003

This category contains 93 raised bogs and has been sub-categorised as follows (see Table 9.2. – Appendix IX):

1.2.1. SACs

A total of 49 SACs are included in this sub-category**.**

1.2.2. NHAs

This sub-category contains 44 NHAs (Ayler Lower NHA 993, Killure NHA 1283 and Girley NHA 1580 are excluded due to their insignificant amount of priority habitat).

2. NON PRIORITY RAISED BOGS

This group corresponds to raised bogs where priority habitat is absent or insignificant. This category is divided into two sub-categories according to the presence or absence of turf cutting in 2003:

2.1. Priority habitat absent or insignificant - Turf Cutting present in 2003

There is a total of 24 raised bogs within this category, all of them are NHAs. Girley NHA 1580, Ayler Lower NHA 993 and Killure NHA 1283 that are included in the table have insignificant amount of Active Raised Bog habitat (see Table 9.3. – Appendix IX).

2.2. Priority habitat absent - Turf Cutting absent in 2003

There is a total of 3 raised bogs within this category, all of them are NHA (see Table 9.4. – Appendix IX).

There are 3 raised bogs where the presence of priority habitat is unknown and turf cutting was absent in 2003. These raised bogs are Cangort NHA 890, Lough Kinale NHA 985 and Loughanilloon NHA 1020 (see Table 9.5 – Appendix IX).

Table 2.4 Summary of raised bogs categorised

CATEGORY	SAC	NHA
1.1	15	1
1.2.1	49	0
1.2.2	0	44
2.1	0	24
2.2	0	3
Un-surveyed raised bogs with no cutting found in 2003	0	3
Partial totals	**64**	**75**
Totals	**139**	

Note

It should be clarified that figures given above correspond to raised bogs included in designated sites and not designated sites. The total number of designated raised bog sites is 127 (see Appendix I).

3. RESULTS

3.1. Output

3.1.1. Site Report

A detailed report has been written for those raised bogs where a turf cutting assessment was required, as priority habitat is present and turf cutting was recorded in 2003 (Document 3). This report is based on data collected as part of the current project surveys and previous relevant projects (see section 1.4 and 2.3.2.1). A copy of the Site Report template is included in Appendix XIII. This template includes a summary of the information contained within each particular section. The following are the main headings of a Site Report.

1. Summary of site details
2. Introduction
   - 2.1 Survey history
   - 2.2 Location and access
3. Geomorphology
   - 3.1 Bog type
   - 3.2 Shape
   - 3.3 % High bog remaining
   - 3.4 Topography of the high bog
     - 3.4.1 Slopes of the high bog
   - 3.5 Topography of the high bog margins
4. Hydrological System
   - 4.1 Geology
     - 4.1.1 Bedrock
     - 4.1.2 Sub-soils
   - 4.2 Hydrology
     - 4.2.1 High bog hydrology
     - 4.2.2 Bog margin hydrology
5. Vegetation
   - 5.1 Vegetation summary
   - 5.2 Detailed vegetation of the high bog
     - 5.2.1 Ecotope Descriptions
       - 5.2.1.1 Facebank ecotopes
       - 5.2.1.2 Marginal ecotopes
       - 5.2.1.3 Sub-marginal ecotopes
       - 5.2.1.4 Sub-central ecotopes
       - 5.2.1.5 Central ecotopes
       - 5.2.1.6 Flushes
6. Peat cutting assessment
   - 6.1 Overview of cutting activities
   - 6.2 Conclusions
7. References

A total of 93 site reports have been produced at the end of the project. These 93 site reports correspond to 93 raised bogs which are part of 86 designated sites. These raised bogs are listed in Table 9.2 (Appendix IX). Appendix XX contains a list of these bogs sorted by code and the CD media where the site report can be found. A total of 20 CDs have been produced for storing these assessment reports, which also contain a copy of each raised bog Arcview 3.2 GIS project, a summary table, oblique photos and JPEG backups of maps. CD n^{o} 20 includes partial Site Reports for those sites that were visited but a turf cutting impact assessment was not essential because of the absence of priority habitats or turf cutting.

3.1.2. Summary Table

A Summary Table has been produced for each raised bog where a turf cutting assessment was carried out (93 bogs). This document has been created to summarise the information contained in the Site Report. All the summary tables are compiled in Document 2. A blank template of the Summary Table is included in Appendix XII. The summary tables contain the following information:

- **General site information**

  Site Name - Site Code - Grid Reference - SAC or NHA area - High Bog area (in the early 1800s & 2003) - High Bog perimeter - Altitude.

- **Geology and sub-soil**

  As listed in Derwin *et al*. (2002).

- **Ecological description**

  Ecotopes present on the high bog and their extent. This information is collected from different sources (see section 2.1). The maps produced as a result of these surveys were digitised in 2003 with the use of Arcview 3.2 GIS and the extent of the ecotopes calculated with the aid of this GIS package may differ slightly from the original figures. These revised figures are those used in the compiling statistics for this report.

- **Human impacts summary**

  This section contains information on burning records, drainage, ownership and turf cutting (e.g. turf cutting techniques, length of margin cut, sensitive margin length and data regarding number of plots).

- **Turf cutting impact assessment summary**

  This section lists the current active turf plots present on the raised bog and the cessation term required.

When a significant change to the original 2003 report is being recommended (e.g. the immediate cessation of all cutting at the raised bog level due to its particular vulnerability) as part of the 2005/06 project revision, a note is included at the bottom of the Summary Table.

3.1.3. Maps

Site maps

Digital maps were produced of all 37 raised bogs surveyed in detailed for the first time (2003) as well as 56 bogs surveyed previously (Kelly *et al*.(1995), Derwin & MacGowan.(2000), etc) where a turf cutting assessment was done as part of this project.

An Arcview 3.2. GIS project and digital maps have been produced for these raised bogs. The 6" (1910) Ordnance Survey map was used as a base (scale 1:10,560) and provides the background to these maps. The Ordnance Survey ortho-rectified images (OI) from 2000 have been used to define high bog boundaries, locate drainage and other relevant visible features. OIs have also been used in conjunction with field work data to refine ecotope boundaries.

These maps contain information on vegetation ecotopes (i.e. facebank, marginal, sub-marginal, sub-central and central), other vegetation features (flushes, coniferous plantations, Bog woodland etc), high bog drainage (classed as functional, not functional and reduced functional), turf cutting operations (i.e. surface cutting, turf plot currently cut, turf plots uncut for more than 5 years). Occasionally they also include information on slopes on the high bog. Critical information on ecotopes extent, high bog perimeter, facebank width and distance of turf cutting from priority habitat has been obtained from these maps. An example of this map is included in Appendix XI showing Knockacoller bog (SAC 2333).

Arcview 3.2 GIS projects and maps are included in CDs (Document 5) and listed in Appendix XX. A printed copy of the digital maps mentioned in the previous paragraph is attached to each Site Report. An extra copy of these maps is included in three different volumes in order to facilitate the consultation of data (Document 4).

A copy of the original Kelly *et al.* (1995) or Derwin & MacGowan (2000) project maps is attached to each Site Report when relevant. These surveys produced detailed community complex maps, peripheral margin maps, slopes maps and land-use maps which although used to carry out the turf cutting impact assessment, were not digitised as part of this project. Thus, it has been considered convenient to include a copy of them to facilitate the understanding of the assessment.

Detailed vegetation maps were produced on tracing paper for bogs where priority habitat was not present in 2003 and are currently held on file.

National distribution maps

Maps showing the location and classification of all designated raised bogs based on the presence of priority habitats and occurrence of turf cutting in 2003 have been also produced and are included in Appendix XXII. This appendix also includes maps displaying raised bogs classed according to three different turf cutting cessation options (B.1,B.3 and B.5 -see chapter 4 and Appendices XXIII & XXIV). These maps are also held in digital format.

3.1.4. Site photographs

As already mentioned in section 2.2.1, 121 sites were flown as part of this project's aerial surveys and as a result a considerable number of oblique photos were taken. These photos were taken in two different formats: a) digital and b) slides. Appendix III includes a list of sites flown as part of the aerial surveys. A copy of each raised bog oblique digital photos is included within each raised bog folder in the 20 CDs mentioned above and an additional copy of all these photos is also submitted in specific oblique photos CDs (Document 5). The slides are filed in boxes. Appendix XIV contains a list of raised bogs sorted by site code, where slides were taken. This also contains the box number and slide numbers for each site.

Occasionally ground photos were taken on some of the raised bogs where ground surveys were carried out. These photographical records display details of drainage, cutting, vegetation and other ecological features. These ground photos are included within each raised bog folder in CDs.

3.2. Overview of turf cutting on designated raised bogs

3.2.1. Presence of turf cutting on designated raised bogs

The total number of designated raised bogs is 139 (included in 127 designated sites) of which 64 are SACs and 75 NHAs. The combination of raised bogs where priority habitat (Active Raised Bog and Bog Woodland) and turf cutting present in 2003 is as follows (see Appendix II and maps in Appendix XXII):

A. 96 raised bogs where priority habitat is present and turf cutting was recorded in 2003.

B. 16 raised bogs where priority habitat is present and turf cutting was absent in 2003.

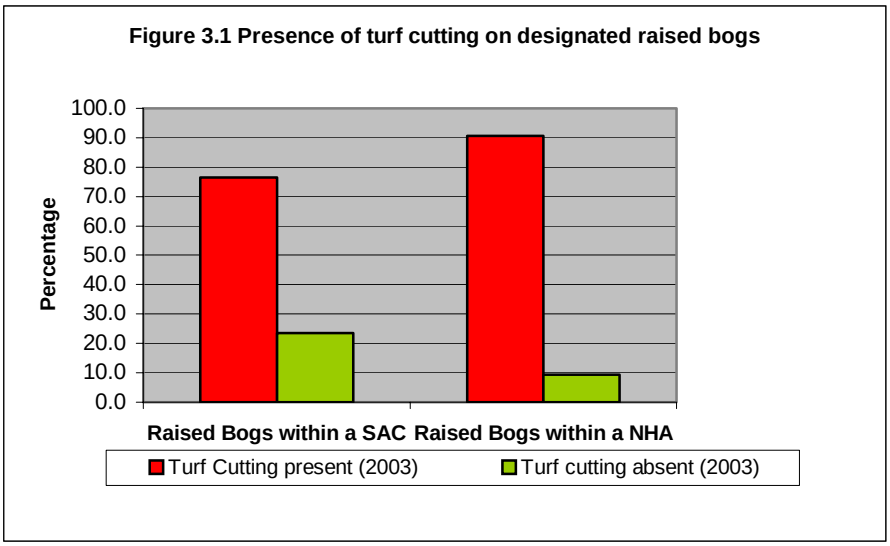
C. 3 raised bogs where the presence of priority habitat is unknown and turf cutting was absent in 2003.

D. 21 raised bogs where priority habitat is absent and turf cutting was recorded in 2003.

E. 3 raised bogs where priority habitat is absent and turf cutting was absent in 2003.

Hence, turf cutting was noted at 117 raised bogs. 68 of these are in NHAs and 49 in SACs. This indicates that first 84.2% of the designated raised bogs are being currently cut for turf, and second 76.6 % of the raised bogs included in a designated SAC are currently cut whereas 90.7% of the raised bogs contained in a designated NHA are currently cut (see Figure 3.1). The difference in frequency of turf cutting arises from the initial selection criteria for the SACs, rather than any subsequent change in cutting trend following designation (*pers. comm*. Jim Ryan).

An assessment of the impact of turf cutting was only done for type **A** bogs above (see Table 9.2 - Appendix IX). In fact only 93 bogs were assessed as the amount of Active Raised Bog was deemed insignificant at three of the raised bogs (see Table 9.3-Appendix IX).



3.2.2. Turf cutting trend and types

This project surveys have produced a vast amount of information which is essential to ascertain what has been the overall trend of the turf cutting activity on designated raised bogs. It has been found that cutting for fuel and domestic purposes, where peat is apparently cut at the rate of one year's supply for a household per year, is the most common type of cutting on the sites surveyed. The mechanical removal of peat using the hopper method is the most commonly used peat cutting technique.

Commercial cutting

Peat cutting for commercial purposes is likely to have occurred at 17 of the 93 bogs where a turf cutting assessment was made (see Table 3.1). The total number of sites affected by commercial cutting is likely to be higher as there are 24 bogs where cutting occurs but, as a comprehensive cutting survey was not carried out, undetected commercial cutting may also be present. The following techniques were used on the designated bogs:

Moss peat cutting is the most seriously damaging commercial operation as it takes place on the high bog and involves very intensive drainage and removal of large amounts of surface peat over short time periods over extensive areas. It also usually occurs on previously very wet areas of bog where active peat formation was recently underway and therefore tended to be of major conservation importance. Therefore, the immediate cessation of this type of cutting is always recommended. This technique was recorded at 6 bogs, however this activity has ceased and all areas involved have been acquired by, or are under negotiations with, NPWS.

- Scohaboy bog NHA 937 contains two commercial operations, the largest one at the southwest of the high bog consists of a moss peat operation that has been acquired by NPWS, while the adjacent operation has been stopped and negotiations are in progress.
- Arragh More NHA 640 (see Figure 3.2 below) and Mouds 2331 (see Figure 3.3 below) contain large moss peat exploitations, which were stopped and are subject to negotiations.
- This type of activity also occurred at All Saint's Bog SAC 566 and Ballyduff SAC 641 until recently, but the companies involved have been bought out by NPWS and the activity has ceased. The high bog drains associated with the Ballyduff operation were blocked by NPWS in 2003.
- At Ballinderry/ Ballynagrenia bog NHA 674, a large moss peat operation was initiated but has been since acquired by NPWS. There is also evidence of possible commercial fuel peat cutting at this site.

Fuel peat cutting

The remaining raised bogs in the list below contain very large turf plots where **mechanical peat extraction** using **Hopper technique** is employed (see Figure 3.5). Through this technique the high bog margin is directly cutaway using the bucket of a Hopper machine. Turf plots in this situations reach 100-150m in width and 4-5m of the high bog are removed every year along the whole margin. Once peat is extracted, it is spread in continuous and regular lines on the adjacent cutover with the use of **field press** machinery (see Figure 3.6). This method of peat cutting also involves the insertion and maintenance of drains in the cutover, generally perpendicular to the facebank, to

drain the facebank and dry out the spread grounds on which the turf is saved. Occasionally, high bog drains are also inserted close to the face-bank.

Particularly intensive examples of this kind of activity are as follows:

- The southern lobe of Monaincha-Ballaghmore NHA 652 is intensively cut for commercial use as the presence of large cutover areas and long face-banks indicate. However, this entire section (i.e. southern lobe) that had been so severely damaged was excluded from the NHA following an informal appeal to NPWS.
- Nore Valley - Timoney NHA 1853, all current cutting is of the ordinary Hopper technique, but with large spread-grounds and long face-banks (see Figure 3.4). In addition the high bog, which contained a large area of priority habitat has been completely drained since 2000 without an EIA in contravention of the EIA Directive and Regulations. This issue is currently under investigation.
- Redwood bog SAC 2353, part of which has been a Nature Reserve since 1991, also features commercial cutting but in this case the lateral cutting technique predominates. The site in general and the Nature Reserve in particular has been significantly impacted by drainage and also by regular burning since 1980s. This situation is currently under negotiation between the turf company and NPWS. The Fernandez *et al*. (2005) survey noted that a large section of Redwood was severely burnt prior to their survey.
- Cornaveagh NHA 603. This bog appears to have several small scale commercial operations on a complex of serious face-banks and with a significant amount of drainage and spreading on the high bog.

Figure 3.2 Arragh More (NHA 640) - 2000 image

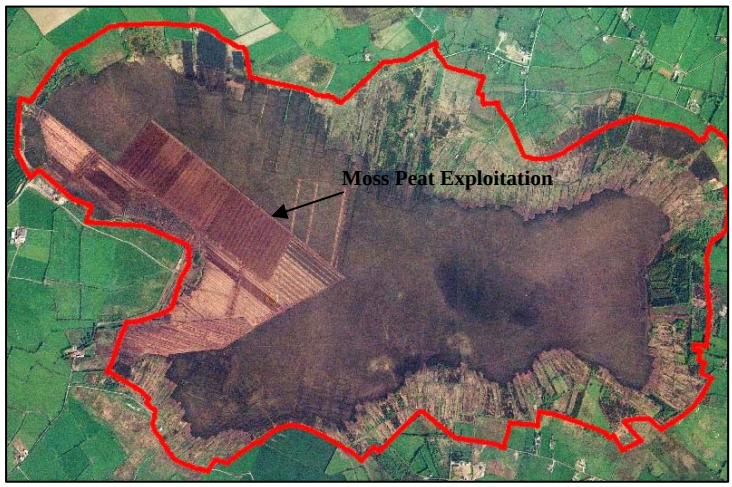


Figure 3.3 Mouds (SAC 2331) - 2000 image

Table 3.1 includes a list of raised bogs where commercial turf cutting is likely to occur. It can be difficult to separate in terms of domestic cutting from small scale commercial cutting for fuel-peat.

Table 3.1 Raised bogs where cutting of commercial nature is likely to have taken place

Code	Name	Designation	County
231	Barroughter	SAC	Galway
391	Ballynafagh	SAC	Kildare
572	Clara	SAC	Offaly
603	Cornaveagh	NHA	Roscommon
640	Arragh More	NHA	Tipperary
647	Kilcarren	SAC	Tipperary
652	Monaincha - Ballaghmore	NHA	Tipperary, Laois
674	Ballinderry - Ballynagrenia	NHA	Westmeath
937	Scohaboy	NHA	Tipperary
1448	Forthill	NHA	Longford
1853	Nore Valley -Timoney	NHA	Tipperary
2298	Gowlaun (River Moy)	SAC	Mayo
2331	Mouds	SAC	Kildare
2333	Knockacoller	SAC	Laois
2340	Lough Sheelin - Moneybeg	SAC	Cavan, Meath, Westmeath
2353	Redwood	SAC	Tipperary
2355	Hawkswood	NHA	Offaly

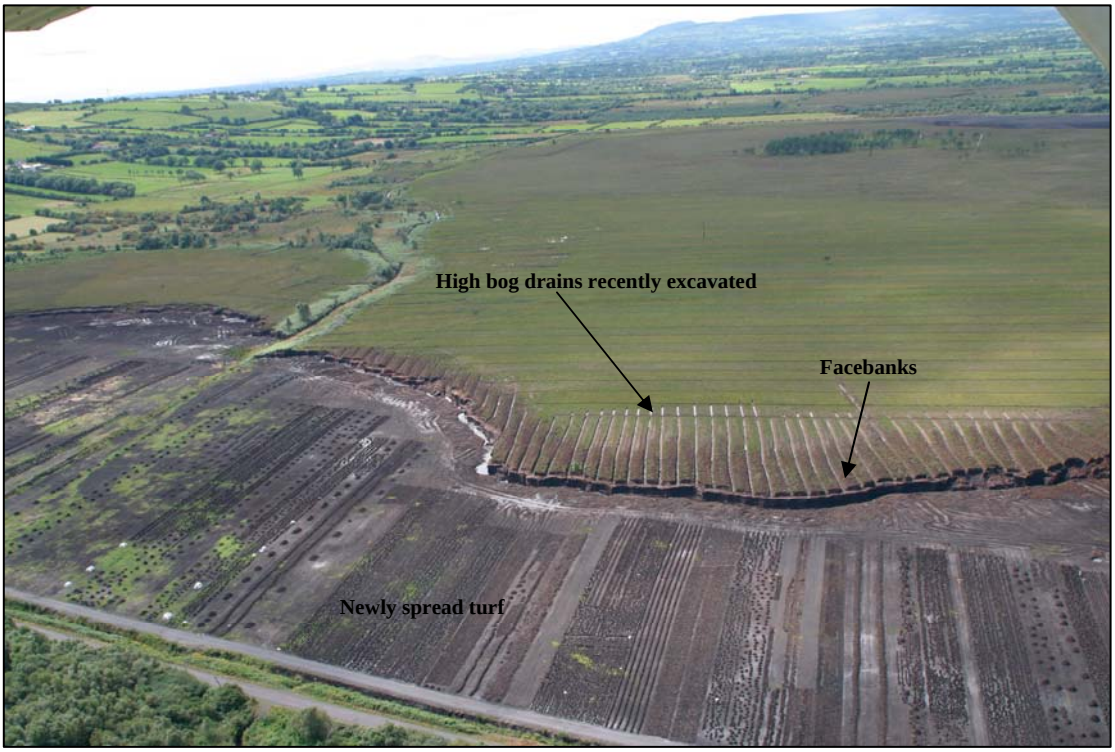


Figure 3.4 Nore Valley- Timoney bog (NHA 1853) Co. Tipperary. Hooper technique is used and new high bog drains were recently excavated. Large spread grounds indicate the commercial nature of cutting.

Figure 3.5 Hopper machine

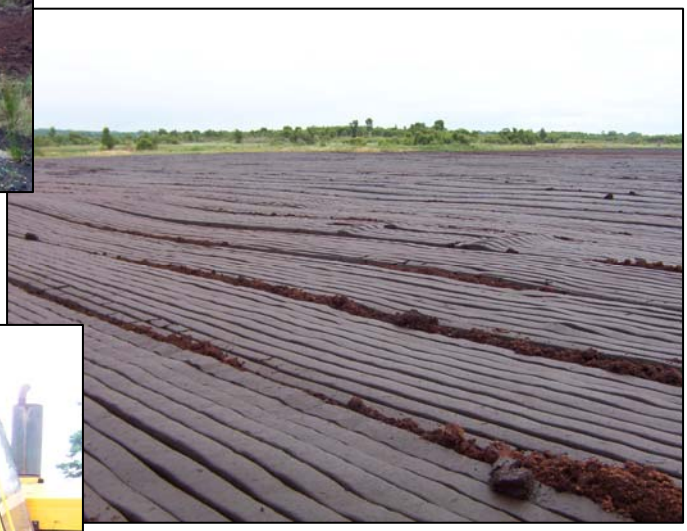


Figure 3.7 Newly spread turf

Figure 3.6 Field press machine

Domestic cutting

All domestic cutting is for fuel peat. This activity has been going on for centuries and is the main cause for the reduction in the original raised bog area from 311,000ha to current area of around 18,000ha. Most of this cutting was carried out by hand but now most cutting is mechanised and appears like a scaled down version of the commercial type. The main techniques used are as follows:

Hopper technique

This is the most commonly used peat cutting technique on designated raised bogs and is the same as that described under the commercial section above. However in this particular case, the individual facebank width varies from 20 to 40m (32m average). This figure is slightly above that given (20-30 yards = approx. 18-27m) by Feehan & O'Donovan (1996). As noted during this survey the average rate of cutting into the bog is 2-3m/year, approximately half of those commercial operations. In this case, as well as providing drainage the cutover drains are used to define the turbary right width.

In some cases it would appear that the same machinery contractor is hired by several turf cutters and as a result these areas may appear to have some other characteristics of commercial cutting but they are obviously less intensive. However, in many cases it has become difficult to distinguish between legitimate domestic cutting and small scale commercial operations. In table 3.1 above we have only included situations where we are reasonably sure that commercial exploitation is involved and have not included such borderline cases.

Hand peat cutting, frequently recorded by Kelly *et al.* in 1994/95, was not recorded within the current survey. It is not likely to be a significant activity on any designated raised bogs now or in the future.

Surface Difco cutting was also recorded by Kelly *et al.* (1995). This technique involved the use of small tractor drawn machines with a chainsaw like extractor which is drawn across the surface of the bog making deep cuts into the peat and extruding it as a long "sausage". During the Kelly *et al.* (1995) it was particularly common on the western raised bogs and the cutovers. This technique proved to be unsuitable for the relatively un-humified upper parts of raised bogs and cuttings with these characteristics were only recorded at four sites within the current survey (Addergoole SAC 237, Raford River NHA 321, Trien SAC 2110 and Mouds SAC 2331). Furthermore, Difco cutting seems to have been replaced by lateral turf cutting at some of the sites where Kelly *et al*. (1995) recorded this technique. This activity is particularly damaging as it results a series of long, deep (approx. 1.5m) drains being cut into the bog.

Lateral turf cutting is carried out using by machinery working from the top of the bog and cutting a long facebank laterally into the bog. As a result of the machinery traffic the high bog is highly disturbed, compacted and devoid of vegetation which increases rates of run off. Once the turf is extracted it is often laid out on the high bog to dry (see Figures 3.8 & 3.10). In these cases, surface drainage is generally carried out to speed up the drying out process. As a result this technique causes more rapid and extensive damage to the high bog than ordinary facebank cutting.

Pit cutting, that has some similarities to lateral peat cutting, was also recorded in several occasions. This extraction technique leaves isolated pools of water close to the facebank. It appears to occur in situations where the original limit of turbary plot has been reached and an attempt is made to extract more peat from the plot by digging more deeply. This results in holes which lay below the existing drainage level and consequently fill with water. Where suitable spread grounds do not exit on the cutover the turf is generally dried on areas of high bog (see Figure 3.9).

In both cases, lateral and pit cutting types, because of the immediacy and extent of the impacts an immediate cessation of these activities is always recommended. Figures 3.8 to 3.11 illustrate some of the negative effects of these cutting techniques and Table 3.2 include a list of raised bogs where these techniques were reported.

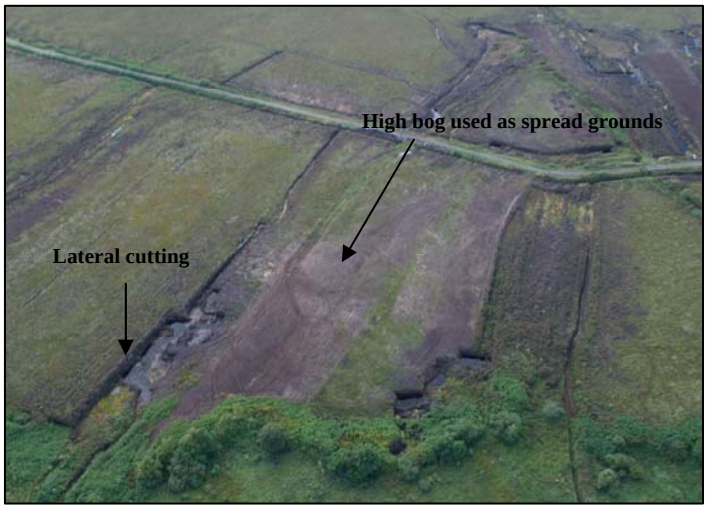


Figure 3.8 Callow (SAC 595) lateral cutting technique (oblique image 2003)

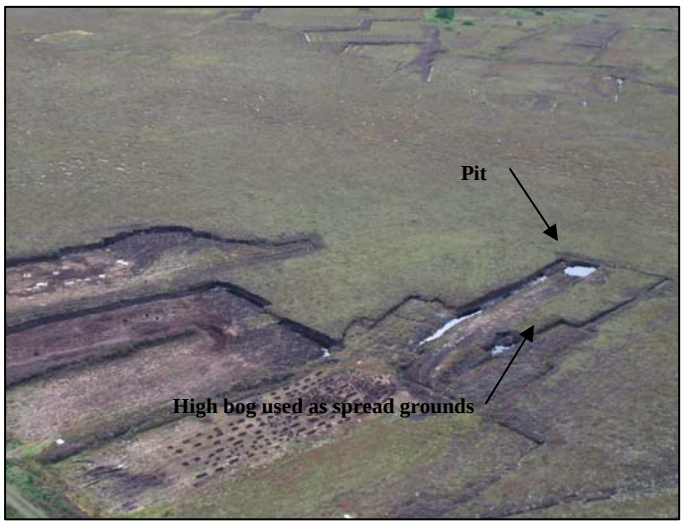


Figure 3.9 Drumalough West (SAC 2338) pit cutting technique (oblique image 2003)

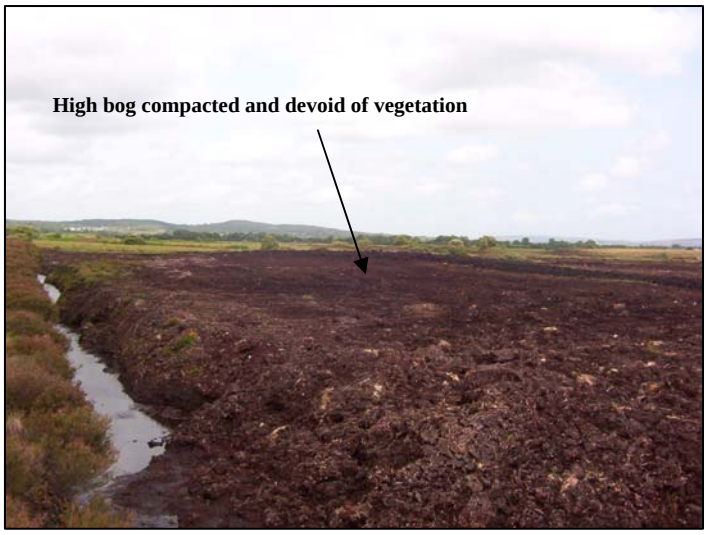


Figure 3.10 Callow (SAC 595) lateral cutting technique (ground image 2003)

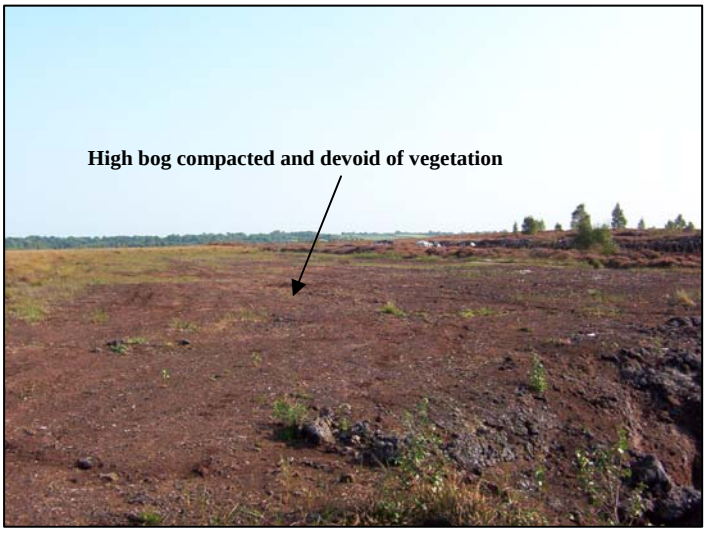


Figure 3.11 Clara West (SAC 572) lateral cutting technique (ground image 2003)

As per Table 3.2 these types of cutting were found at 15 raised bogs, being pit cutting only reported at Cloongoonagh SAC 2298, Drumalough West SAC 2338 and Moneybeg SAC 2340. Although these cutting techniques were also found on midland sites, they are more frequent on western sites (i.e. Co. Roscommon and Galway).

Table 3.2 Raised bogs where either lateral or pit cutting were recorded

Code	Name	Designation	County
297	Addergoole	SAC	Galway
301	Lough Lurgeen	SAC	Galway
497	Flughany	SAC	Mayo/Sligo
572	Clara	SAC	Offaly
595	Callow (part of Lough Gara)	SAC	Roscommon, Sligo
605	Derrycanan	NHA	Roscommon
1623	Carrickynaghtan	NHA	Roscommon
2110	Corliskea	SAC	Roscommon, Galway
2298	Gowlaun (River Moy)	SAC	Mayo
2298	Cloongoonagh (River Moy)	SAC	Sligo
2310	Lough Ree (Clooncraff - Cloonlarge)	SAC	Roscommon
2338	Drumalough West	SAC	Roscommon
2340	Lough Sheelin - Moneybeg	SAC	Cavan, Meath, Westmeath
2347	Camderry	SAC	Galway
2353	Redwood	SAC	Tipperary

According to Feehan & O'Donovan (1996) the mechanisation of peat extraction by private producers has steadily increased since the 1980s allowing the mechanised exploitation of small bogs by small commercial companies and cooperatives. They also noted that this has been accompanied by intensive drainage of the high bog which was practically non-existent on the smaller bogs up to 1981. Therefore, in the last two decades medium and small size bogs have been increasingly severely impacted by mechanised turf cutting. In the view of the IPCC (2005) the widespread use of machinery has in recent years greatly accelerated the process of decline in peatland resources, particularly Lowland Raised Bogs. They consider that, more peat is being now being harvested over a wider area of bog and on a semi-commercial basis than since the decline of hand cutting. This has altered the scope of "turbary rights" from the traditional domestic small scale to encompass semi-industrial scale extraction.

In contrast, the results of the current survey when compared with previous surveys (Kelly *et al*.,(1995) and Derwin & MacGowan, (2000)) and the 1995 to 2000 aerial images suggest that the common trend in the last ten years has

been a reduction in the length of margin actively cut, and thus number of cutters. However this trend has been accompanied by an intensification of the amount of peat extracted per plot as result of mechanisation. This has involved an increase in the amount of peat extracted locally and thus of the negative effects associated with this activity. In addition, when one includes the impact of the commercial moss peat and fuel peat operations mentioned above, it is possible that the overall impact on the bog resource has increased in recent years.

Drainage both on the high bog and cutover and burning are the most negatively impacting activities associated with cutting. As reported by the Fernandez *et al*. (2005) project, high bog drainage was present at 46 out of 48 raised bogs surveyed. This activity was considered to have a highly negative influence on the high bog habitats at 21 raised bogs. In several cases high bog drainage was considered as the main reason for the decline in the Active Raised Bog habitat. Furthermore cutover drainage was considered to have a high negative influence on the high bog at 29 raised bogs. Burning was recorded at 24 of the 48 raised bogs surveyed and it was noted that this activity is more likely to occur in those raised bogs where extensive peat cutting takes place. It was deemed one of the main reasons for decline in Active Raised bog habitat at 5 bogs. Fernandez *et al*. (2005) also estimated that approximately 1% of the 1995 original high bog area has been irreversible lost as a result of turf cutting in a ten years period. Although these results only relate to 48 raised bogs, it is reasonable to assume that they are representative of all the sites. In fact as these 48 were originally selected as representing the better quality raised bogs and a relatively high proportion of them is uncut, it is probable that the figures are even worst for the remaining 91 bogs.

In relation to the effectiveness of the current turbary cessation schemes (see section 1.4) it will appear from the above that there have been relatively successful in dealing with obvious commercial activity such as moss peat developments. Indeed this technique which was recorded in 6 bogs, where an impact potential assessment was carried out, have been ceased. However, much less successful in dealing with small scale, semi commercial to commercial fuel peat operations and have had almost negligibly impact on domestic cutting (less than 400 out of 20000 turbary right owners).

Turbary

Turbary is the term used to describe the ancient right to cut turf on a particular area of bog. These rights came about with the resettlement of confiscated land or by prescription. Prescription is a legal term meaning that if a person is able to demonstrate that they cut turf without secrecy, without permission and without force continuously for a period of 30 years they have a turbary right. A more comprehensive definition of this term is given by Feehan *et al*. (1996)

Since the 15th century traditional turbary has been responsible for the loss of 544,000ha of raised and blanket bogs or 46% of the original peatland area in the Republic of Ireland (IPCC,2005).

According to the calculation provided in Appendix XVIII of this report the estimated number of turbary rights owners for the 139 designated bogs is approximately 20,000.

3.2.3. Overall assessment of turf cutting activity on designated sites with priority habitat

The results given in this section only correspond to currently cut raised bogs (2003) where priority habitats were present A total of 93 raised bogs fall into this group (category 1.2 - section 2.3.2.4). Three raised bogs are not included in this category despite the occurrence of turf cutting and presence of Active Raised bog, as the extent of this priority habitat is deemed insignificant (category 2.1 - section 2.3.2.4).

Appendix XV contains a range of statistics for these 93 bogs including plots categorised by the cessation term required, the margin currently cut, the margin cut more than 5 years ago, the sensitive margin and the sensitive margin currently cut[1].

The following points are a summary of the overall assessment of turf cutting activity on the 93 bogs where the "impact potential assessment methodology" has been followed (see section 2.3.2.3). This methodology which proposes the cessation of cutting at turf plot level is detailed in section 4.1.3 of Chapter 4 (Recommendations - option **C.1**) and is the basis for turf cutting cessation at raised bog level outlined in section 4.1.2.1 (Chapter 4 - option **B.1**).

[1] Appendix XV also includes a categorisation of raised bogs according to percentage of plots requiring immediate response, % of margin currently cut and % of sensitive margin currently cut. This information was used to assess the impacts of turf cutting and was taken into account when developing the turf cutting cessation options proposed in the recommendations section (Chapter 4).

- Of these 93 bogs, 44 are included in NHAs and 49 in SACs.
- A total of 2660 turf plots were identified as currently cut within these 93 raised bogs (this category includes turf plots cut within the last 5 years). 1121 of these plots were found in NHAs and 1539 in SACs. Another 189 turf plots were described as not cut for more than 5 years. However, the recording of this latter type of plots has not been consistent and there is no accurate data for plots which have not been cut within last 5 years.
- These 2660 currently cut turf plots require different cessation terms (see section 2.3.2.3 – Table 2.3) according to this project assessments. These current cut plots are classed as follows:
  - Immediate cessation required: 779 turf plots (229 in NHAs and 550 in SACs)
  - Short term cessation required: 533 turf plots (306 in NHAs and 227 in SACs)
  - Medium term cessation required: 1348 turf plots (586 in NHAs and 762 in SACs)

This terminology implies a certain impact potential derived from cutting at each turf plot. It should be noted that although an intermediate category "rapid cessation", between short term cessation and immediate cessation, is given in many of the site reports. There is no real difference between this category and the immediate term category, and thus any plot requiring rapid cessation is deemed as requiring immediate cessation in the statistics and future assessments within this report.

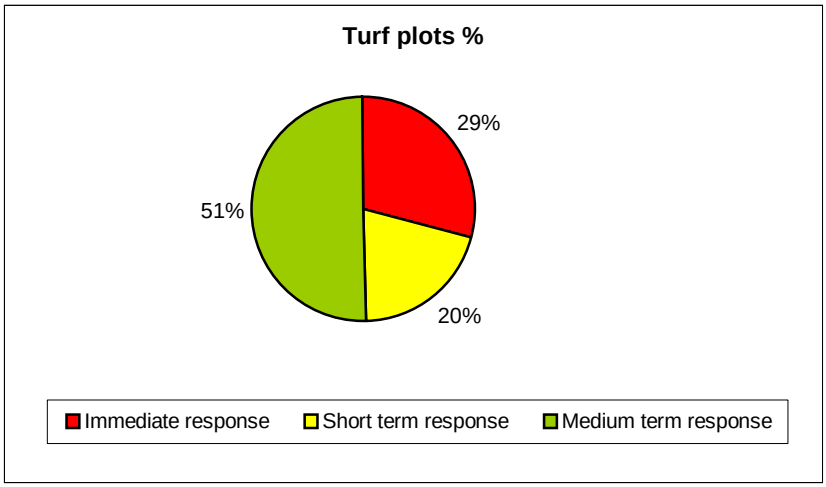


Figure 3.12 Turf plots currently cut classed according to cessation term required

As illustrated in Figure 3.12, 29% of the currently cut turf plots require immediate cessation, 20% short term and 51% medium term cessation.

Medium term cessation of turf cutting
It is important to bear in mind that **all turf cutting** has negative impacts on the conservation value of the site. In a few situations such as small high bog remnants which do not form part of the main high bog this impact is restricted to the actual location of cutting. In all other cases the impacts are more widespread. The impact potential score has two elements; the first the severity of the impact in the immediate to short term the other is the probability of impact in the medium to long term. It is very important to note that the medium to long term negative impacts of a turf plot with a low IP score may be as great as those with the high IP score. This will depend on many factors which could not be taken into account in this survey, such as the overall depth of the bog and therefore its potential for subsidence, the permeability of the underlying subsoil and therefore the potential for an extensive area to be impacted, or the relative gradient between the turf cutting and the areas containing priority habitat of the bog. All of these features will significantly affect the medium to long term impacts of turf cutting. In effect all turf cutting should ideally cease immediately and the longer it continues the longer into the future negative trends in the conservation status of priority habitats will continue. The extent and speed of these impacts has been clearly demonstrated by the results of the Raised Bog Monitoring Project (Fernandez *et al*. 2005), which show that turf cutting and raised bog ecosystem conservation are incompatible.

Table 3.3 below contains a summary of data in relation to turf cutting activity on the 93 bogs where a turf cutting assessment was done. This data is derived from Appendix XV. As illustrated in the table, 37.68% of the high bog margin at these 93 bogs is deemed as sensitive, thus cutting at this margin is likely to have some negative effects on the priority habitat in the immediate to medium term. It was found that 23.07% of this sensitive margin is currently cut, which highlights the highly impacting nature of current cutting.

Table 3.3 Turf cutting activity at 93 raised bogs where an assessment was done

Total values	
Total length of margin for all raised bogs	923.21km
Total length of margin currently cut	168.63km
Total length of margin cut more than 5 years ago[1]	694.55km
Percentage of margin currently cut	18.27%
Average percentage of margin currently cut per raised bog	21.35%
Estimated total number of current cutters for all the raised bogs	2660
Average turf plot width [2]	34m
Total values sensitive margin (<250m from priority habitat)	
Total length of sensitive margin	347.86km
Percentage of high bog margin deemed sensitive	37.68%
Total length of sensitive margin currently cut	80.27km
Percentage of sensitive margin currently cut	23.07%
Average percentage of sensitive margin currently cut per raised bog	24.84%
Total values of low sensitivity margin	
Total length of margin of low sensitivity	575.35km
Total length of margin of low sensitivity currently cut	88.36km

Note

[1] The difference between the total raised bog margin and the length of margin currently cut plus that cut more than 5 yrs ago does not correspond to the high bog natural margin, as in some very old cut areas it is hard to distinguish between cut and natural margins.

[2] The total length of high bog margin currently cut (168.63km) is much higher than the total length of currently cut plots (90.24km). This is because the first figure represents every single twist in the face bank measured by GIS, whereas the length of plots corresponds to the width of a turbary right, which calculated average is 34m (see Appendix XV).

It should be highlighted that the overall extent of turf cutting on designated raised bogs (e.g. numbers of turf cutters, length of margin currently cut) is higher than reported above as these figures do not include sites where priority habitats is either insignificant or absent.

- According to the results reflected in Appendix XV and summarised in tables 4.4, 4.5, 4.6 and 4.7.
  - 70 of 93 bogs have at least one turf plot that requires immediate cessation, 15 bogs have at least one turf plot requiring short term cessation and in the remaining 8 bogs all the turf plots require medium term cessation.
  - 40 of 49 bogs included in a SAC have at least one turf plot that requires immediate cessation (see Table 3.4).
  - Within the 9 remaining bogs included in a SAC, 6 bogs at least have one plot that requires short term cessation, and at the remaining 3 bogs all the turf plots require medium term cessation (see Table 3.5).
  - 30 of 44 bogs included in a NHA have at least one turf plot that requires immediate cessation (see Table 3.6).
  - Within the 14 remaining bogs included in a NHA, 9 bogs at least have one plot that requires short term cessation, and at the remaining 5 bogs all the turf plots require medium term cessation (see Table 3.7).

Table 3.4. SAC raised bogs where at least 1 turf plot requires immediate cessation

	Code	Name	County	Designation
1	231	Barroughter	Galway	SAC
2	248	Cloonmoylan	Galway	SAC
3	297	Addergoole	Galway	SAC
4	301	Lough Lurgeen	Galway	SAC
5	326	Shankill West	Galway	SAC
6	391	Ballynafagh	Kildare	SAC
7	497	Flughany	Mayo, Sligo	SAC
8	566	All Saint's Bog	Offaly	SAC
9	572	Clara	Offaly	SAC
10	575	Ferbane	Offaly	SAC
11	580	Mongan	Offaly	SAC
12	581	Moyclare	Offaly	SAC
13	585	Sharavogue	Offaly	SAC
14	595	Callow (part of Lough Gara)	Roscommon, Sligo	SAC
15	641	Ballyduff	Tipperary	SAC
16	647	Kilcarren	Tipperary	SAC
17	1242	Carrownagappul	Galway	SAC
18	2110	Trien	Roscommon	SAC
19	2110	Moorfield Bog-Farm Cottage	Galway	SAC
20	2110	Corliskea	Roscommon, Galway	SAC
21	2298	Cloongoonagh (River Moy)	Sligo	SAC
22	2298	Gowlaun (River Moy)	Mayo	SAC
23	2310	Lough Ree (Clooncraff-Cloonlarge)	Roscommon	SAC
24	2331	Mouds	Kildare	SAC
25	2332	Coolrain	Laois	SAC
26	2333	Knockacoller	Laois	SAC
27	2336	Carn Park	Westmeath	SAC
28	2337	Crosswood	Westmeath	SAC
29	2339	Ballynamona & Corkip Lough	Roscommon	SAC
30	2340	Lough Sheelin - Clare Island	Cavan, Meath, Westmeath	SAC
31	2340	Lough Sheelin - Moneybeg	Cavan, Meath, Westmeath	SAC
32	2341	Ardagullion & Cloonshannagh	Longford	SAC
33	2342	Mount Hevey	Meath, Westmeath	SAC
34	2347	Camderry	Galway	SAC
35	2348	Clooneen	Longford	SAC
36	2349	Corbo	Roscommon	SAC
37	2350	Curraghlehanagh	Galway	SAC
38	2352	Monivea	Galway	SAC
39	2353	Redwood	Tipperary	SAC
40	2356	Ardgraigue	Galway	SAC

Note
A total of 1381 currently cut turf plots were identified in this category (550 requiring immediate cessation, 208 requiring short term cessation and 623 medium term cessation).

Table 3.5. SAC raised bogs where no turf plot requires immediate cessation

	Code	Name	County	Designation	At least 1 plot short term	At least 1 plot medium term
1	285	Kilsallagh	Galway	SAC	**Yes**	Yes
2	296	Lisnageeragh	Galway	SAC	**Yes**	Yes
3	592	Bellanagare	Roscommon	SAC	**Yes**	Yes
4	600	Cloonchambers	Roscommon	SAC	**Yes**	Yes
5	614	Cloonshanville	Roscommon	SAC	No	Yes
6	2110	Clonfelliv	Roscommon	SAC	No	Yes
7	2298	Derrynabrock	Mayo, Roscommon	SAC	No	Yes
8	2338	Drumalough West	Roscommon	SAC	**Yes**	Yes
9	2351	Moanveanlagh	Kerry	SAC	**Yes**	Yes

Table 3.6. NHA raised bogs where at least 1 turf plot requires immediate cessation

	Code	Name	County	Designation
1	235	Bracklagh	Galway	NHA
2	245	Clooncullaun	Galway	NHA
3	249	Cloonoolish	Galway	NHA
4	280	Castlefrench West	Galway	NHA
5	281	Keeloges	Galway	NHA
6	283	Kilmore	Galway	NHA
7	307	Lough Tee	Galway	NHA
8	321	Raford River	Galway	NHA
9	564	River Little Brosna	Offaly	NHA
10	565	Clonydonnin	Westmeath	NHA
11	603	Cornaveagh	Roscommon	NHA
12	605	Derrycanan	Roscommon	NHA
13	640	Arragh More	Tipperary	NHA
14	642	Ballymacegan	Tipperary	NHA
15	652	Monaincha & Ballaghmore	Tipperary, Laois	NHA
16	674	Ballynagrenia	Westmeath	NHA
17	674	Ballinderry	Westmeath	NHA
18	691	Rinn River	Leitrim, Longford	NHA
19	694	Wooddown	Westmeath	NHA
20	921	Screggan	Offaly	NHA
21	937	Scohaboy	Tipperary	NHA
22	1254	Derrinlough Bog	Galway	NHA
23	1303	Moorfield	Galway	NHA
24	1324	Jamestown	Meath	NHA
25	1420	Corracramph	Leitrim	NHA
26	1448	Forthill	Longford	NHA
27	1450	Mount Jessop	Longford	NHA
28	1623	Carrickynaghtan	Roscommon	NHA
29	1853	Nore Valley & Timoney	Tipperary	NHA
30	2323	Milltown Pass	Westmeath	NHA

Note
A total of 884 currently cut turf plots were identified in this category (229 requiring immediate cessation, 202 requiring short term cessation and 453 medium term cessation).

Table 3.7. NHA raised bogs where no turf plot requires immediate cessation

	Code	Name	County	Designation	At least 1 plot short term	At least 1 plot medium term
1	254	Crit Island	Galway	NHA	**Yes**	Yes
2	284	Kilnaborris (Killeragh)	Galway	NHA	**Yes**	Yes
3	310	Meneen	Galway	NHA	**Yes**	Yes
4	333	Anna More	Kerry	NHA	No	Yes
5	422	Aghnamona	Leitrim, Longford	NHA	**Yes**	Yes
6	570	Blackcastle	Offaly	NHA	**Yes**	Yes
7	677	Cloncrow Bog (New Forest)	Westmeath	NHA	No	Yes
8	684	Lough Derravaragh	Westmeath	NHA	No	Yes
9	1227	Aughrim	Galway	NHA	No	Yes
10	1244	Castlefrench East	Galway	NHA	**Yes**	Yes
11	1405	Cashel	Leitrim	NHA	**Yes**	Yes
12	1423	Cloonageeher Bog	Leitrim, Longford	NHA	**Yes**	Yes
13	2344	Annaghbeg	Galway	NHA	**Yes**	Yes
14	2355	Hawkswood	Offaly	NHA	No	Yes

The previous tables 4.4 to 4.7 are summarised in the following figures:

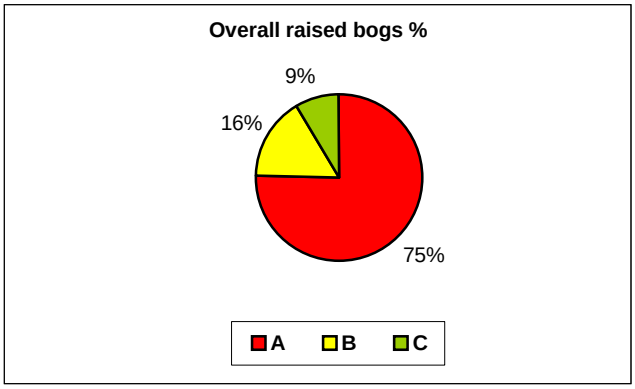


Figure 3.13 Percentage of raised bogs according to turf cutting cessation required

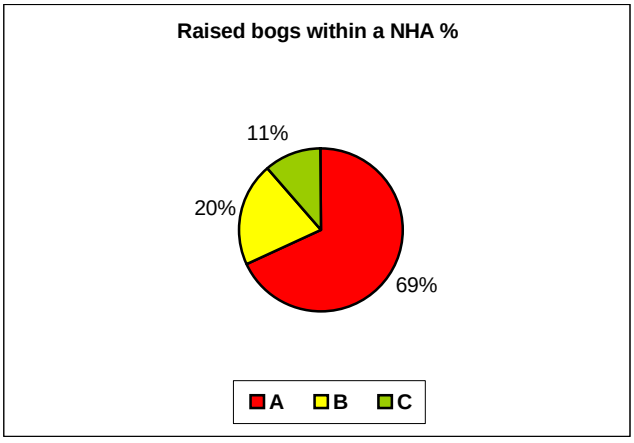


Figure 3.15 Percentage of NHA raised bogs according to turf cutting cessation term required

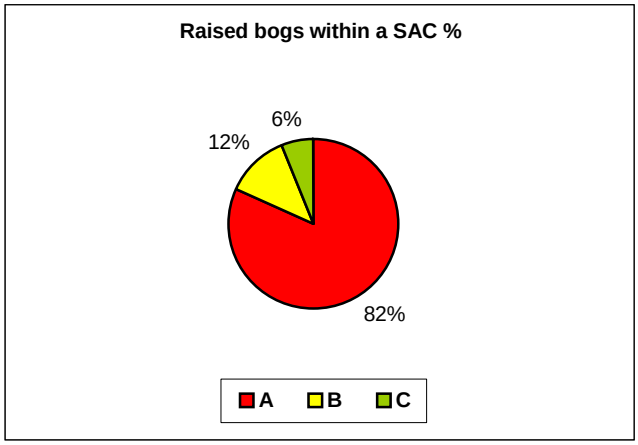


Figure 3.14 Percentage of SAC raised bogs according to turf cutting cessation term required

A - Raised bogs where at least one turf plot requires immediate term cessation
B - Raised bog where although no one turf plots requires immediate cessation at least one turf plot requires short term cessation
C - Raised bogs where turf plots only require medium term cessation

As illustrated in figures 3.13 to 3.15, 75% of the overall raised bogs where a turf cutting impact potential assessment was done contains at least one turf plot that requires immediate cessation. The proportion was significantly higher in SACs (82%) than NHAs (69%). 16% of sites do not contain immediate cessation plots but contain at least 1 short cessation plot (SACs 12% & NHAs 20%). 9% of sites contain only plots requiring medium term cessation (SACs 6% & NHAs 11%).

3.2.4. High impacts associated with small size and/or natural range preservation

As part of the most recent revision (2005/06) of the 2003 results of this project it was considered necessary to phase out cutting immediately at those raised bogs that met certain criteria. These are the occurrence of highly impacting cutting (i.e. high intensity and high negative influence as reported by Fernandez *et al*., 2005), the small size of the high bog and the natural range of priority habitats (i.e. Active Raised Bog and Bog Woodland). Thus, as outlined in section 2.3.2.3, it is recommended to immediately phase out any cutting at those sites where the high bog covers less than 60ha or in certain situations where it is slightly above this limit and cutting of high intensity poses a serious risk to the survival of the priority habitats remaining on the bog. This extent is considered the lowest size at which these priority habitats can be maintained. Furthermore, priority is also given to those raised bogs with highly impacting cutting where their geographical location is of importance to ensure the retention of the natural range of the priority habitats. The retention of natural range is a very important attributes used when assessing the conservation status of annexed habitats under the Habitats Directive. Any significant decrease will tend to result in an assessment of unfavourable conservation status in relation to the national resource, which could have significant implications in relation to EU actions against Ireland. In addition, a considerable decline in Active Raised bog habitat extent and quality as reported by Fernandez *et al*. (2005), have also been taken into account in combination with highly impacting cutting, small high bog size and geographical location (i.e. natural range preservation) for this assessment.

This criteria were met by 26 raised bogs included in table 3.8 below. This cutting cessation option at raised bog level is named as option **B.3** in Chapter 4 (Recommendations).

Table 3.8 Raised bogs where the immediate and complete cessation of turf cutting is necessary as determined by high impacts associated with small size and/or natural range preservation

	Code	Name	County	Designation	High bog extent (ha)	Determining factors
1	231	Barroughter	Galway	SAC	84.13	Size, intensity and influence of turf cutting, changes in Active Raised bog (ARB).
2	235	Bracklagh	Galway	NHA	57.32	Small size, intensity of turf cutting.
3	249	Cloonoolish	Galway	NHA	59.52	Small size, intensity of turf cutting.
4	283	Kilmore	Galway	NHA	75.34	Small size, intensity of turf cutting.
5	297	Addergoole	Galway	SAC	159.71	Geographical location, intensity and influence of turf cutting changes in ARB.
6	326	Shankill West	Galway	SAC	67.37	Small size, intensity of turf cutting.
7	391	Ballynafagh	Kildare	SAC	73.22	Small size, intensity of turf cutting, geographical location, changes in ARB.
8	570	Blackcastle	Offaly	NHA	96.47	Size, intensity of turf cutting, geographical location, changes in ARB.
9	572	Clara	Offaly	SAC	446.32	Geographical location, intensity and influence of turf cutting, changes in ARB and Bog Woodland.
10	603	Cornaveagh	Roscommon	NHA	62.93	Small size, intensity of turf cutting.
11	642	Ballymacegan	Tipperary	NHA	54.80	Small size, intensity of turf cutting and geographical location.
12	674	Ballinderry	Westmeath	NHA	43.00	As above
13	684	Lough Derravaragh	Westmeath	NHA	48.84	As above
14	691	Rinn River	Leitrim, Longford	NHA	78.40	As above
15	1244	Castlefrench East	Galway	NHA	64.26	Small size, intensity of turf cutting.
16	1324	Jamestown	Meath	NHA	44.51	Small size, intensity of turf cutting and geographical location.
17	1853	Nore Valley - Timoney	Tipperary	NHA	129.52	Small size of each individual raised bog, intensity of turf cutting, geographical location.
18	2110	Cloonfelliv	Roscommon	SAC	54.60	Small size, intensity of turf cutting.
19	2323	Milltown Pass	Westmeath	NHA	46.4	Small size, intensity of turf cutting and geographical location.
20	2331	Mouds	Kildare	SAC	280.63	Geographical location, intensity and influence

						of turf cutting.
21	2332	Coolrain	Laois	SAC	54.71	Small size, intensity of turf cutting and geographical location.
22	2333	Knockacoller	Laois	SAC	53.62	As above
23	2337	Crosswood	Westmeath	SAC	103.42	Geographical location, intensity and influence of turf cutting, and changes in ARB.
24	2339	Ballynamona & Corkip Lough	Roscommon	SAC	65.14	Small size, intensity of turf cutting and presence of Bog Woodland
25	2341	Ardagullion - Cloonshannagh	Longford	SAC	57.64	Small size, intensity of turf cutting and geographical location.
26	2351	Moanveanlagh	Kerry	SAC	120.13	Geographical location and intensity of turf cutting.

The immediate cessation of all turf cutting at raised bog level (26 bogs) as outlined in this section was not considered in the previous section of the report (i.e. 3.2.3, where the "impact potential assessment methodology" is employed). Thus, although the final recommendation at these 26 bogs is the complete cessation of turf cutting, an individual turf plot impact potential assessment was carried out at these bogs. This assessment, which proposes the cutting cessation at turf plot level, is given within the conclusions section of each Site Report. In addition, a supplementary note is also given within the same section of the Site Report for these 26 bogs, in which the justification for the complete cessation of turf cutting is detailed.

It has been found that in several raised bogs (e.g. Blackcastle NHA 570, Lough Derravaragh NHA 684, Castle Freanch East NHA 1244, Cloonfelliv SAC 2110 and Moanveanlagh SAC 2351) the immediate cessation of turf cutting is not required at any plot according to the "impact potential assessment methodology" as reflected in tables 3.4 to 3.7. However, according to the criteria outlined in this section of the report (i.e. 3.2.4) the complete cessation of cutting is required. The results of these two independent but complementary assessments can be cross related in Appendix XVI. Section 4.1.2.2 in Chapter 4 deals with the possibility of combining this two options.

Although the extent of many other raised bogs is also small (ranging between 60 – 80ha) the complete cessation of turf cutting was not considered such a priority, as either these bogs do not have the same importance to preserve the priority habitats geographical variation or the intensity of turf cutting is not so high as in the raised bogs listed in Table 3.8. This fact does not exclude these raised bogs from being considered priority as regards cessation of turf cutting according to other factors.

3.2.5. Presence of large vulnerable areas of high quality priority habitat

A higher conservation value has been given to those raised bogs where the presence of large areas of high quality Active Raised bog habitat (i.e. over 10ha of central ecotope or large active peat forming flushes) or Bog Woodland habitat (over 2ha) are present. The occurrence of these habitats within just one hydrological unit make them more vulnerable to be impacted by cutting or drainage and the risk of loosing the whole habitat is higher.

A total of eight bogs are found to meet these characteristics (see Appendix XVI) and the immediate cessation of any cutting at these bogs is recommended. This cutting cessation option at raised bog level is named as option **B.5** in Chapter 4 (Recommendations). These 8 bogs are listed in Table 3.9 below.

Table 3.9 Raised bog with large vulnerable areas of high quality priority habitat

Code	Name	County	Designation
248	Cloonmoylan	Galway	SAC
297	Addergoole	Galway	SAC
326	Shankill West	Galway	SAC
566	All Saint's Bog	Offaly	SAC
572	Clara	Offaly	SAC
580	Mongan	Offaly	SAC
2339	Ballynamona & Corkip Lough	Roscommon	SAC
2340	Lough Sheelin - Moneybeg	Cavan, Meath, Westmeath	SAC

For the purpose of this analysis, only current areas of central ecotope has been considered. Thus, the raised bogs listed above contain some of the current most important example of priority habitat and the immediate cessation of all turf cutting at these raised bogs is a priority. As it can be co-related in Appendix XVI and already shown in Table 3.4 all these raised bogs have at least one plot requiring immediate cessation according to the criteria detailed in section 3.2.3 above.

The immediate cessation of all turf cutting at raised bog level on the 8 bogs included in Table 3.9 above was not considered in section 3.2.3 of the report. Thus, although the final recommendation at these 8 bogs is the complete cessation of any turf cutting, an individual turf plot impact potential assessment was carried out at these bogs. This assessment, which proposes the cessation of cutting at turf plot level, is given within the conclusions section of each Site Report. In addition, a supplementary note is also given within the same section of the Site Report for each of these 8 bogs, in which the justification for the complete cessation of any turf cutting is detailed.

4. RECOMMENDATIONS

The main aim of this project is to provide an assessment of the impacts of turf cutting on designated raised bogs in order to identify the most sensitive areas where the cessation of turf cutting is a priority. This in turn is used as the basis for developing a series of turf cutting cessation options "turf cutting cessation programs" for all the designated raised bogs. Although turf cutting was not currently active on some raised bogs, they should also be included in the overall program as otherwise cutting may recommence in them at any time in the immediate to medium term.

4.1. Turf cutting cessation program proposals

It is important to note that turf cutting and raised bog conservation are basically incompatible and that ideally turf cutting should be phased out immediately. The justification for this statement should be apparent when one considers the effects of ongoing cutting which are listed in section 2.3.1.

In recognition that immediate phasing out of cutting may not be feasible, it has been considered appropriate to provide several different options for approaching the turf cutting cessation program. Each alternative lists advantages and disadvantages for nature conservation effectiveness, NPWS personnel workloads, resource requirements and the number of turbary rights affected. These options go from those proposing the immediate complete cessation of cutting at all sites, to those where a cessation of individual turf plots is considered. These options and their implications are given in the following section of the report. The option of continuing with the current turf cutting cessation policy of the Department of Environment, Heritage and Local Government is also explored (DEHLG). The origin and meaning of the different cessation terms is explained in section 2.3.2.3.

Given the incompatibility of turf cutting and conservation we have recommended, in all but the last option, that all turf cutting in the designated raised bogs will be phased out at the latest within 10 years of the 2004 Agreement. For those sites designated in 1997 (see Appendix I) we recommend that, as a minimum, the original 1999 Agreement, which requires phasing out of all cutting by 2008, be retained. Thus by 2013, at the latest all cutting at all sites will have ceased under all but the last option. To provide a more meaningful basis for comparison, the statistics for the different options are generally based on the number of sites or area protected in the immediate term. To prevent the text becoming unduly clogged with long tables, all those listing individual sites are given at the end of the chapter.

Under those options where turf cutting can recommence it is assumed, on sites with priority habitat, that new individual turf cutting impact assessment will be required to diminish the most serious impacts of these options on the nature conservation value of the sites.

Appendix XIX contains a summarised table of the nine possibly feasible cutting cessation options (A.1,A.2,A.3,B.1,B.2,B.3,B.4,B.5 and C.1) proposed below. It provides basic statistics and ranked list of the advantages and disadvantages of each option, divided into ecological or socio-economic/management aspects. The aim of this appendix is to provide an accessible overview of each option to simplify decision making in the selection of the most appropriated cessation program. The final option, continuing with the current cessation policy, is not shown as it is not comparable with the other options.

4.1.1. Immediate cessation of turf cutting

Three options are considered under this heading. The first involves an immediate cessation of all turf cutting in both SACs and NHAs regardless of whether they support priority habitat (i.e. Active Raised Bog and/or Bog Woodland). The second involves the immediate cessation of turf cutting on all sites with priority habitats, with turf cutting in the remaining sites phased out in the medium term. The third prioritises SACs for immediate cessation of turf cutting, with cutting in the NHAs being phased out under some of the options outlined below. From a purely nature conservation perspective the first option is the most appropriate.

4.1.1.1. All SACs and NHAs

All cutting would be immediately phased out on all designated SACs and NHAs and no recommencement elsewhere on these bogs is allowed. This would require the suspension or extinguishment of all turf cutting

rights on these sites associated presumably with a greatly accelerated acquisition process. This option is called option **A1** (see Appendix XXII).

Statistics

This option would apply to 139 raised bogs (see table 4.1 below) which are part of 127 designated sites (74 NHAs and 53 SACs). The list of raised bogs affected by this first option is given in Appendix I. In 2003 turf cutting was noted at 117 of these 139 raised bogs, 68 in NHAs and 49 within SACs (see Appendix II).

Table 4.1 Summarised data for option A.1

Cessation category	Number of raised bogs	Total length of high bog margin (km)	Total length of margin currently cut (km) [2]	Total length of currently cut plots (km) [2]	Total number of current cutters [2]	Estimated n° of turbary right owners [3]	Overall extent of priority habitats protected (ha) [1]
Immediate cessation of cutting	139	1206	> 174.25	>92.28	>2720	>19155	2474 (100%)
Short term cessation of cutting	-	-	-	-	-	-	-
Medium term cessation of cutting	-	-	-	-	-	-	-

Note

[1] This figure corresponds to the overall extent of Active Raised Bog and Bog Woodland habitats contained on the raised bogs considered within this option. The extent of these habitats was measured at different times since 1999 and given the current rates of decline in priority habitats known to have occurred, these figures will tend to be too high.

[2] No figures on length of margin currently cut, length of currently cut plots and number of current plots are available on 21 raised bogs (see table 9.3 – Appendix IX) where turf cutting assessments were not carried out. For three sites in table 9.3 (Girley NHA 1580, Ayler Lower NHA 993 and Killure NHA 1283) figures where available and are provided in table above.

[3] This figure has been calculated following the process outlined in Appendix XVIII.

Advantages

This is the most advantageous option from a nature conservation point of view as demonstrated by the following points:

- By minimising further losses of raised bog habitats and damage to the high bog it maximises the long term ability of the high bog to support priority habitats. Note that it protects 100% of the raised bog priority habitats designated resource.
- It eliminates damage associated with turf cutting such as burning or drainage from all the designated raised bogs.
- It avoids the direct loss of particular features of interest (e.g. small flushes close to the margin).
- It maximises the retention of the peat archive (i.e. ecological and archaeological information) contained in the peat.
- It allows restoration activity to commence at the earliest possible date, thus reducing the overall costs of such work, while increasing their effectiveness.
- It avoids costs associated with ongoing assessments of the impacts of recommencing turf cutting.
- Monitoring compliance is simple.
- As the most effective option for maintaining the priority habitats associated with raised bog it has the greatest chance of avoiding or reducing sanctions associated with the EU Habitats Directive (92/43 EEC).
- It will have the greatest impact on reducing CO_2 emissions from the bog and on restoring carbon sinks in line with the Kyoto Protocol.
- It treats all turf cutters and turbary right owners equally.
- As the complete cessation of turf cutting on all designated sites is proposed, there is no risk of cutting transferring to any other designated bog.

Disadvantages

- In the immediate to short term is the option that requires more resources for acquisition and management agreements (139 bogs).
- It maximises the short term local disruption to fuel supplies for current cutters (117 bogs).
- As it immediately affects the maximum number of raised bogs (139), current cutters (>2720) and turbary owners (>19155), it is likely to attract a high level of controversy, at least in the short term.

4.1.1.2. All sites with priority habitats

All cutting should be immediately phased out at those raised bogs (SACs or NHAs) where priority habitats (i.e. Active Raised Bog or Bog Woodland) are present. No recommencement is allowed elsewhere on these bogs. The no recommencement clause also applies to those sites with priority habitat where no cutting was recorded in 2003 (see Table 9.1, Appendix IX). This would require the suspension or extinguishment of all turf cutting rights on these sites associated presumably with a greatly accelerated acquisition process. This option is called option **A2**.

Statistics

This alternative would apply to 109 raised bogs (see table 4.2 below), of which 64 are in SACs and 45 in NHAs. These sites are listed in table 9.1. & 9.2 (Appendix IX). 16 of these bogs do not have currently any turf cutting (Table 9.1 – Appendix IX).

Table 4.2 Summarised data for option A.2

Cessation category	Number of raised bogs	Total length of high bog margin (km)	Total length of margin currently cut (km)	Total length of currently cut plots (km)	Total number of current cutters	Estimated n° of turbary right owners [2]	Overall extent of priority habitats protected (ha) [1]
Immediate cessation of cutting	109	1016	168.63	90.24	2660	>16140	2474 (100%)
Short term cessation of cutting	-	-	-	-	-	-	-
Medium term cessation of cutting [3]	30	>190	>5.62	>2.04	>60	>3015	0

Note

[1] This figure corresponds to the overall extent of Active Raised Bog and Bog Woodland habitats contained on the raised bogs considered within each cessation term. The extent of these habitats was measured at different times since 1999 and given the current rates of decline in priority habitats known to have occurred these figures will tend to be too high.

[2] This figure has been calculated following the process outlined in section Appendix XVIII.

[3] No figures on length of margin currently cut, length of currently cut plots and number of current plots are available on 21 raised bogs (see table 9.3 – Appendix IX) where turf cutting assessments were not carried out. For three sites in table 9.3 (Girley NHA 1580, Ayler Lower NHA 993 and Killure NHA 1283) figures where available and are provided in table above.

A total of 30 raised bogs, all of them designated as NHAs, are excluded from this option and cutting at these raised bogs should be phased out in a medium term. At 24 of these bogs priority habitats are absent or insignificant (see Table 9.3– Appendix IX). Cutting in the 6 raised bogs included in table 9.4 and 9.5 (Appendix IX, where no cutting occurs and priority habitat is not known to be present) would also be phased out in a medium term, if this activity recommenced.

Advantages

- It minimises the loss of the present priority habitats consistent with minimising the number of sites involved in the short term. Note that although it protects 100% of the raised bog priority habitats designated resource, this option decreases the long term ability to support Active Raised Bog at 30 bogs where the medium term complete cessation of cutting is proposed.
- It eliminates damage associated with turf cutting such as burning or drainage for bogs containing priority habitat (109 raised bogs).
- It avoids the direct loss of particular features of interest (e.g. small flushes close to the margin) on those sites with priority habitat (109 raised bogs).

- It allows restoration activity to commence at the earliest possible date on those sites with priority habitat.
- It is the second most effective option for protecting the peat archive, for avoiding sanctions associated with the EU Habitats Directive and contributing to obligations under the Kyoto Protocol.
- It avoids costs associated with ongoing assessments of the impacts of recommencing turf cutting.
- Monitoring compliance is simple.

Disadvantages

- In the short to medium term it does not protect the 30 raised bogs without priority habitat.
- In the immediate to short term requires high resources for acquisition (109 raised bogs) although less than option A.1.
- In the immediate term displaces >16140 turbary right owners from 109 raised bogs, including 2660 current turf cutters from 93 raised bogs of these 109 bogs. Although this figure is still high, it represents 24 bogs with current cutting fewer than option A.1.
- Although in the short term, it involves a smaller number of cutters (2660) than option A.1, the total numbers involved is still relatively high.
- Local disruption to fuel supplies is still relatively high (93 raised bogs with current cutting).
- While turf cutters on individual bogs will be treated the same a major distinction, with probable associated controversy will be made between turf cutters on sites with or without priority habitat.
- Turf cutting pressures may transfer from sites with priority habitat to those without such habitat.
- In 30 raised bogs without priority habitat the following will occur:
    - A decrease in the long term ability of the high bog to support Active Raised bog.
    - Damage associated with turf cutting (e.g. burning, drainage, etc) will continue to occur on these raised bogs.
    - It does not prevent the direct loss of particular features of interest (e.g. small flushes close to the margin) on these bogs.
    - It allows damage to continue to the ecological and archaeological information contained in the peat.
    - It delays the time when restoration activity can be fully implemented.
    - The cost of restoration works will be higher and effectiveness reduced as further damage would be done.

4.1.1.3. All SACs and phase out NHAs

This option involves the immediate cessation of cutting on raised bogs designated as SACs, because of their international importance. The cessation of cutting at NHAs could be left to the medium term (option **A.3**), without regard to the presence of priority habitat. Alternatively, NHA cutting could be phased out using options B.1 (section 4.1.2.1) and B.3 (section 4.1.2.2), which target different groups of sites with priority habitat. These combined options respectively B.2 and B.4 are discussed in more detail below (sections 4.1.2.1.1 and 4.1.2.2.1). Note both the latter options in contrast to A.3, involve a immediate cessation at some NHAs and new assessments would be required for turf cutting on NHAs with priority habitats.

Statistics

This alternative only involves the immediate cessation of all current turf cutting at 49 raised bogs designated as SACs (see Table 4.3. below). These raised bogs are listed in table 4.4 at the end of this chapter. In addition, at the 15 SAC bogs where cutting was absent in 2003 (see table 9.1 - Appendix IX) this activity would not be allowed to recommence. Cutting at NHAs will be phased out in the medium term.

Table 4.3 Summarised data for option A.3

Cessation category	Number of raised bogs	Total length of high bog margin (km) [2]	Total length of margin currently cut (km)	Total length of currently cut plots (km)	Total number of current cutters	Estimated n° of turbary right owners [4]	Overall extent of priority habitats protected (ha) [1]
Immediate cessation of cutting	64	619.64	94.18 [3]	52.54 [3]	1539 [3]	>9841	1954 (79%)
Short term cessation of cutting	-	-	-	-	-	-	-
Medium term cessation of cutting [5]	75	>586.36	>80.07	>39.74	>1181	>9314	520 (21%)

Note

[1] This figure corresponds to the overall extent of Active Raised Bog and Bog Woodland habitats contained on the raised bogs considered within each cessation term. The extent of these habitats was measured at different times since 1999 and given the current rates of decline in priority habitats known to have occurred these figures will tend to be too high.

[2] This figure corresponds to the overall high bog margin of the 64 raised bogs within a site designated as a SAC.

[3] These figures correspond to raised bogs within a SAC where cutting was recorded in 2003 (49 raised bogs).

[4] This figure, which correspond to 64 bogs, has been calculated following the process outlined in Appendix XVIII.

[5] These figures correspond to raised bogs within a NHA where cutting cessation is proposed in a medium term. No figures on length of margin currently cut, length of currently cut plots and number of current plots are available on 21 raised bogs (see table 9.3 – Appendix IX) where turf cutting assessments were not carried out. For three sites in table 9.3 (Girley NHA 1580, Ayler Lower NHA 993 and Killure NHA 1283) figures where available and are provided in table above.

Advantages

- It maximises the protection of the SAC network.
- It eliminates damage associated with turf cutting such as burning or drainage for the SACs.
- It avoids the direct loss of particular features of interest (e.g. small flushes close to the margin) on the SACs.
- It allows restoration activity to commence at the earliest possible date on the SACs.
- In the immediate to short term requires considerably less resources for acquisition than either of the previous options (64 raised bogs).
- It avoids costs associated with ongoing assessments of the impacts of recommencing turf cutting, as cutting is allowed to continue in all NHAs in the medium term.
- Monitoring compliance is simple.
- In the immediate term it displaces a low number of current turf cutters (1539 from 49 bogs) and turbary right owners (>9841 from 64 bogs).
- In the immediate term as it only affects sites of international importance it may cause less controversy than the previous two options (A.1 and A.2).

Disadvantages

- In the immediate term it only protects 79% of the priority habitats and therefore is a relatively poor option for avoiding sanctions associated with the EU Habitats Directive and contributing to obligations under the Kyoto Protocol. The remaining 21% priority habitat resource are included in a NHA designation and the medium term cessation of cutting on any NHA is proposed under this option (A.3).
- As turf cutting can continue in the short to medium term in 75 NHAs it is a much less effective option for protecting the peat archive than options A.1 and A.2.
- Turf cutting pressures may transfer to NHAs sites with priority habitats (45 raised bogs).
- In the 75 NHAs raised bogs, the following will occur:
  - A decrease in the long term ability of the high bog to support Active Raised bog.
  - Damage associated with turf cutting (e.g. burning, drainage, etc) will continue to occur on these raised bogs.

- It does not prevent the direct loss of particular features of interest (e.g. small flushes close to the margin) on these sites.
- It allows damage to continue to the ecological and archaeological information contained in the peat.
- It delays the time when restoration activity can be fully implemented.
- The cost of restoration works will be higher and effectiveness reduced as further damage would be done.

4.1.2. Prioritise cessation at raised bog level based on:

4.1.2.1. Impact potential assessment criteria

This option is based on the results of the methodology established by this project which consisted of assigning impact potential scores to each individual currently cut turf plot (section 2.3.2.3). However, due to the difficulty of phasing out individual plots within the same raised bog in different periods, one possibility is to require the immediate cessation of all turf cutting at those raised bogs where at least one turf plot requires immediate cessation. In line with this approach, on those raised bogs where no plots require immediate cessation but at least one plot requires short term response, all cutting would be phased out in a short term. Finally, those raised bogs where cutting only requires medium term response would be phased out in a medium term. For any site where cutting is absent (16 raised bogs) or with short or medium term response (23 raised bogs) any recommencement at any plot within a sensitive margin would require to be assessed. Where the impact potential is greater than those currently present no turf cutting will be allowed on that particular plot or the cessation term will have to be adjusted for the whole bog (e.g. on a site currently having medium term response if a recommencement assessment of a plot results in short term cessation either cutting is not allowed to occur or all cutting is phased out in the short term). This option is called option **B1** (see Appendix XXIII).

Under this option, it could be argued that where the owners of highly impacting plots agree to cease operating that turf cutting could continue on the less damaging plots. In our view this will make the whole operation of cessation program extremely complex and impractical. However, not to do so would seem to be inequitable. This problem may suggest that this option is impractical.

As mentioned above, cutting would not be allow to recommence in those 16 raised bogs where priority habitats was present and cutting was absent in 2003 (see Table 9.1-Appendix IX) without an impact assessment report. Should any of the plots at any of these sites achieve a potential impact score which would require immediate cessation then no cutting will be allowed to recommence on the site. These 16 bogs contain 488.2ha (19.73%) of priority habitat and the estimated number of turbary owners is 1479. Cutting in those 24 raised bogs where turf cutting and priority habitats are both absent (table 9.3 – Appendix IX) would be phased out in a medium term. Cutting in the 6 raised bogs included in table 9.4 and 9.5 (Appendix IX, where no cutting occurs and priority habitat is not known to be present) would also be phased out in a medium term if this activity recommenced. The estimated number of turbary right owners for these 30 raised bogs with a medium term cessation is 3021.

Statistics

Table 4.5 below contains a summary of the 93 raised bogs where an assessment was done classed according to the cutting cessation response required. It also includes information on the estimated number of turbary right owners for each cessation term and the approximated overall extent of priority habitats protected falling into each cessation response. The figures illustrate that by phasing out cutting immediately at 70 raised bogs we minimise the deterioration of 65.76% of priority habitats associated with raised bog.

Table 4.5 Summarised data for the 93 raised bogs where an assessment was carried out (option B.1)

Cessation category	Number of raised bogs	Total length of high bog margin (km)	Total length of margin currently cut (km)	Total length of currently cut plots (km)	Total number of current cutters	Estimated n° of turbary right owners [1]	Overall extent of priority habitats protected (ha) [2]
Immediate cessation of cutting	70	686.5	139.55	79.03	2265	10903	1627 (65.76.%)
Short term cessation of cutting	15	187.16	26.61	10.28	368	2973	300.10 (12.1%)
Medium term cessation of cutting	8	49.56	2.47	0.94	27	787	58.90 (2.4%)

Note

[1] These figures has been calculated following the process outlined in Appendix XVIII.

[2] These figures corresponds to the overall extent of Active Raised Bog and Bog Woodland habitats contained on the raised bogs considered within this option. The extent of these habitats was measured at different times since 1999 and given the current rates of decline in priority habitats known to have occurred these figures will tend to be too high.

Note that table 4.5 only includes 93 of the 139 bogs as no assessments were carried out on the remaining 46 bogs. However as already mentioned, cutting at 30 of these bogs is phased out in a medium term and at the remaining 16 bogs no cutting is occurring and any recommencement would require an assessment.

Tables 4.6, 4.7 and 4.8, at the end of this chapter, contain site lists relevant to this option. Table 4.6 includes the list of sites where the immediate cessation of any turf cutting is required as there is at least one turf plot requiring immediate cessation. Raised bogs where a turf cutting assessment was done requiring short term response are listed in table 4.7 and those requiring medium term are contained in table 4.8.

Appendix XV contains a summarised list of those raised bogs where a turf cutting assessment was carried out and the cessation term assigned to them according to the criteria used for this option.

Advantages

- It is the second option after A.3 in terms of minimising the loss of the present priority habitats consistent with minimising the number of sites involved in the immediate to short term. In the immediate term, it protects 1627ha (65.76%) of the designated raised bog priority habitats resource.
- In the immediate to short term requires less resources for acquisition than the first two options (A.1 & A.2), but more than the previous one (A.3).

Disadvantages

- In the immediate term it only protects 65.76% of the priority habitats while in the short term it protects a further 12.1%. Therefore it is the sixth most effective option for avoiding sanctions associated with the EU Habitats Directive and contributing to obligations under the Kyoto Protocol.
- In the immediate term it only protects 70 bogs (50.36%) from damage associated with turf cutting (i.e. burning or drainage), the direct loss of particular features of interest and the destruction of the peat archive, while allowing the earliest possible commencement of restoration activity on only these sites.
- It is likely to incur significant costs associated with ongoing assessments of the impacts of recommencing turf cutting, as a new assessment is necessary at 39 of the 109 raised bogs where priority habitats are present but the immediate cessation of cutting is not proposed.
- Recommencement applications which result in higher impacts assessment than those previously recorded for a site would change the cessation period for the whole site and result in severe controversy amongst the turf cutters and with NPWs. On the other hand, it could encourage the owners of highly damaging plots to cease operations and therefore allow less damaging plots to continue cutting for longer time period. This will make the whole cessation rather complex and controversial (see below).
- Monitoring compliance is moderately complex. More complicated than the first three options (A.1, A.2 and A.3).

- While turf cutters on individual bogs will be treated the same, a major distinction with probable associated controversy will be made between turf cutters on sites with the most threatened priority habitats or those with less threatened. On each bog, there is very likely to be considerably controversy between those cutters with highly impacting and those with less impacting operations, as the latter will try to put pressure in the former to cease cutting.
- In the immediate term displaces 2265 turf cutters from 70 raised bogs which is 21 bogs more than the previous option (A.3).
- Local disruption to fuel supplies is still relatively high although smaller than the first two options (A1 and A.2).
- Cutting pressures may transfer to raised bogs with priority habitats which have short to medium term cessation (39 raised bogs).
- In sites where the cutting cessation will take place in a short to medium term (38 to 54, depending on if recommencement of cutting is allowed in the 16 raised bogs where is currently absent) the following will occur:
    - A decrease in the long term ability of the high bog to support Active Raised bog.
    - Damage associated with turf cutting (e.g. burning, drainage, etc) will continue to occur on these raised bogs.
    - It does not prevent the direct loss of particular features of interest (e.g. small flushes close to the margin) on these sites.
    - It allows damage to continue to the ecological and archaeological information contained in the peat.
    - It delays the time when restoration activity can be fully implemented.
    - The cost of restoration works will be higher and effectiveness reduced as further damage would be done.

4.1.2.1.1. All SACs complemented by B.1

This option involves the immediate banning of cutting on raised bogs designated as SACs with cessation at NHAs based on the results of the impact potential assessments (option B.1, see Table 4.9). For NHA bogs with priority habitat option B.1 would phase out cutting immediately at 30 bogs (see Table 4.11), in the short term at 9 (see Table 4.12) and in the medium term at 5 bogs (see Table 4.13). This combined option is called option **B2**.

Cutting would not be allow to recommence on the 1 raised bog (Ballygar NHA 229) where priority habitats was present and cutting was absent in 2003 (see Table 9.1-Appendix IX) without an impact assessment carried out. Should any of the plots at this site achieve an impact potential score which will require immediate cessation then no cutting will be allowed to recommence on the site. This site contains 12.5ha (0.51%) of priority habitat and the estimated number of turbary owners is 72. New assessments would also be required for the 14 NHA raised bogs, with priority habitats and short term or medium term cessation (see tables 4.12 and 4.13), if new cutting recommenced.

Cutting in those 24 raised bogs where turf cutting and priority habitats are both absent (table 9.3 – Appendix IX) would be phased out in a medium term. Cutting in 6 raised bogs included in table 9.4 and 9.5 (Appendix IX) would also be phased out in a medium term if this activity recommenced. The estimated number of turbary right owners for these 30 raised bogs with a medium term cessation is 3021.

Under this option, it could be argued that at NHAs where the owners of highly impacting plots agree to cease operating that turf cutting could continue on the less damaging plots. In our view this will make the whole operation of cessation program extremely complex and impractical. However not to do so would seem to be inequitable. This problem may suggest that this option is impractical.

Statistics

Table 4.9 Summarised data for the 44 NHA raised bogs where an assessment was carried out (option B.1)

Cessation category	Number of raised bogs	Total length of high bog margin (km)	Total length of margin currently cut (km)	Total length of currently cut plots (km)	Total number of current cutters	Estimated n° of turbary right owners [1]	Overall extent of priority habitats protected (ha) [2]
Immediate cessation of cutting	30	262.65	56.09	30.92	884	4172	329.14 (13.30%)
Short term cessation of cutting	9	94.40	17.19	6.01	214	1500	166.63 (6.74%)
Medium term cessation of cutting	5	35.09	1.17	0.78	23	557	12.26 (4.96%)

Table 4.10 Summarised data for the 108 raised bogs included in option B.2

Cessation category	Number of raised bogs	Total length of high bog margin (km)	Total length of margin currently cut (km)	Total length of currently cut plots (km)	Total number of current cutters	Estimated n° of turbary right owners [1]	Overall extent of priority habitats protected (ha) [2]
Immediate cessation of cutting	94	882.29	150.27	83.46	2423	14013	2283.14 (92.03%)
Short term cessation of cutting	9	94.40	17.19	6.01	214	1500	166.63 (6.74%)
Medium term cessation of cutting	5	35.09	1.17	0.78	23	557	12.26 (4.96%)

Note

[1] These figures has been calculated following the process outlined in Appendix XVIII.

[2] These figures corresponds to the overall extent of Active Raised Bog and Bog Woodland habitats contained on the raised bogs considered within this option. The extent of these habitats was measured at different times since 1999 and given the current rates of decline in priority habitats known to have occurred these figures will tend to be too high.

Note that table 4.10 only includes 108 of the 139 bogs as no assessments were carried out on the remaining 31 bogs. However as already mentioned, cutting at 30 of these bogs is phased out in a medium term and at the remaining 1 bog (Ballygar NHA 229) no cutting is occurring and any recommencement would require an assessment.

Advantages

- It maximises the protection of the SAC network, also protecting the most threatened of the NHAs. It protects 2283.14 ha (92.03%) of the designated raised bog priority habitat resource.
- In the immediate term eliminates damage associated with turf cutting such as burning or drainage for all the SACs and 30 NHAs (67.64% of the bogs).
- In the immediate term, it avoids the direct loss of particular features of interest (e.g. small flushes close to the margin) on the SACs and 30 NHAs (67.64% of the bogs).
- It allows restoration activity to commence at the earliest possible date on the SACs and 30 NHAs (67.64% of the bogs).
- In the immediate term it protects 92.03% of the priority habitats, while in the short term it protects a further 6.74%. Therefore, it is the third most effective option for avoiding sanctions associated with the EU Habitats Directive and contributing to obligations under the Kyoto Protocol.

Disadvantages

- As turf cutting can continue in the short to medium term on 45 NHAs it is only moderately effective option for protecting the peat archive.
- In the immediate to short term requires a considerable amount of resources for acquisition (103 raised bogs) .
- For 15 NHAs with priority habitat it involves ongoing assessments of the impacts of recommencing turf cutting, with its associated costs.

- In NHAs, recommencement applications which result in higher impacts assessment than those previously recorded for a site would change the cessation period for the whole site and result in severe controversy amongst the turf cutters and with NPWs. On the other hand, it could encourage the owners of highly damaging plots to cease operations and therefore allow less damaging plots to continue cutting for longer time period. This will make the whole cessation rather complex and controversial.
- Monitoring compliance is moderately complex.
- Local disruption to fuel supplies is still relatively high as in the immediate term it displaces 2423 turf cutters from 79 raised bogs.
- While turf cutters on individual bogs will be treated the same a major distinction, with probable associated controversy, will be made between turf cutters on sites with the most threatened priority habitats or those with less threatened at NHA level. On each bog, there is very likely to be considerably controversy between those cutters with highly impacting and those with less impacting operations, as the latter will try to put pressure in the former to cease cutting.
- Cutting pressures may transfer to raised bogs with priority habitats which have short to medium term cessation (15 raised bogs).
- In 45 NHAs raised bogs (with recommencement of cutting at Ballygar NHA 229 subject to assessment) the following will occur:
    - A decrease in the long term ability of the high bog to support Active Raised bog.
    - Damage associated with turf cutting (e.g. burning, drainage, etc) will continue to occur on these raised bogs.
    - It does not prevent the direct loss of particular features of interest (e.g. small flushes close to the margin) on these sites.
    - It allows damage to continue to the ecological and archaeological information contained in the peat.
    - It delays the time when restoration activity can be fully implemented.
    - The cost of restoration works will be higher and effectiveness reduced as further damage would be done.

4.1.2.2. High impacts associated with small size and/or natural range preservation

As already outlined in section 3.2.4 of the report the immediate and complete cessation of turf cutting has been proposed at certain raised bogs with priority habitat which are subject to high level of turf cutting impacts where either the small size of the high bog (60ha approximately or less) and/or its importance to the preservation of the priority habitats natural range makes them particularly vulnerable (see Appendix XXIV). A total of 26 raised bogs fall into this category (see table 3.8). The overall number of current cutters on these 26 bogs is 944 and the estimated number of turbary right owners is 2548. Thus, on the basis of number of turf cutters affected the level of controversy associated with this option would be lower than any of the other ones. However, the basis for this option may not be readily apparent to the general public and that in itself may cause controversy.

This option, which is called option **B3**, only restricts cutting at these specific raised bogs, which represent a very small proportion of the priority habitats resource (611.58ha – 24.72%). Thus, it should be merely taken as complementary to the immediate cessation of turf cutting on all SACs (see option B4 below) or B.1 (based in the impact potential assessment criteria), making them more valuable from the nature conservation point of view by increasing the number of bogs where immediate cessation is required.

The adoption of this alternative on its own would not protect the national resource of raised bog priority habitats. It would only eliminate damage associated with turf cutting at 26 raised bogs, whereas it will continue at least on 91 raised bogs where cutting was recorded in 2003. Restoration activities would only be possible on these 26 bogs, increasing the overall cost of this action in the short to long term, as well as decreasing the long term ability of the high bog to support priority habitats. Moreover, it will allow ongoing loss of the peat archive (i.e. ecological and archaeological information) and not preventing the loss of particular features of interest on the bog. Cutting may transfer to other sites with priority habitats where it is allowed to continue. Where those sites are relatively small and the increase in cutting intensity is significant, ongoing assessment of turf cutting

may be needed. This alternative does not avoid sanctions associated with the EU Habitats Directive and neither contributes to obligations under the Kyoto Protocol, as the protection of priority habitats is low.

In comparison when treated as a complementary option to B.1 many of the above disadvantages are significantly reduced. Appendix XVI includes lists of raised bogs which meet the criteria of this option and option B.1. That appendix allows one to compare these two complementary options. Thus, while there is a considerable overlap between the two lists, there are five raised bogs none of whose turf plots require immediate cessation according to criteria of B.1. However, the fact that they meet the criteria of this section means that they are at significant risk in the short term and that all cutting at these five sites should be phased out immediately. These raised bogs are: Blackcastle NHA 570, Lough Derravaragh NHA 684, Castle French East NHA 1244, Cloonfelliv SAC 2298 and Moanveanlagh SAC 2351. Hence, while the addition of this complementary option to option B.1 only slightly increases the number of sites involved, it significantly increases the nature conservation benefits compared to that of option B.1 on its own.

4.1.2.2.1. All SACs complemented by B.3

This option involves the immediate banning of cutting on raised bogs designated as SACs with cessation at NHAs based on the results of option B.3. This combined option is called option **B4**.

Statistics

According to this option cutting will be phased out immediately in all SACs where is currently occurring (49 raised bogs) and 13 NHAs which meet the criteria under option B.3 (see table 4.16). In addition no recommencement will be allowed in the 15 SAC bogs where cutting was absent in 2003 (see table 9.1 - Appendix IX). In the remaining NHAs cutting will be phased out in the medium term. Note that this includes 32 raised bogs where priority habitats are present covering 411ha (16.62%).

Table 4.14 Summarised data for the 13 NHA raised bogs selected under option B.3

Cessation category	Number of raised bogs	Total length of high bog margin (km)	Total length of margin currently cut (km)	Total length of currently cut plots (km)	Total number of current cutters	Estimated n° of turbary right owners[1]	Overall extent of priority habitats protected (ha) [2]
Immediate cessation of cutting	13	67.85	20.85	12.48	408	1078	108.94 (4.40%)

Table 4.15 Summarised data for 139 raised bogs included in option B.4

Cessation category	Number of raised bogs	Total length of high bog margin (km)	Total length of margin currently cut (km)	Total length of currently cut plots (km)	Total number of current cutters	Estimated n° of turbary right owners[1]	Overall extent of priority habitats protected (ha) [2]
Immediate cessation of cutting	77	687.49	115.03	65.02	1947	10919	2062.94 (83.38%)
Short term cessation of cutting	-	-	-	-	-	-	-
Medium term cessation of cutting[3]	62	518.51	>59.22	>27.26	>773	>8236	411.06 (16.62%)

Note

[1] These figures has been calculated following the process outlined in Appendix XVIII.

[2] These figures corresponds to the overall extent of Active Raised Bog and Bog Woodland habitats contained on the raised bogs considered within this option. The extent of these habitats was measured at different times since 1999 and given the current rates of decline in priority habitats known to have occurred these figures will tend to be too high.

[3] No figures on length of margin currently cut, length of currently cut plots and number of current plots are available on 21 raised bogs (see table 9.3 – Appendix IX) where turf cutting assessments were not carried out. For three sites in table 9.3 (Girley NHA 1580, Ayler Lower NHA 993 and Killure NHA 1283) figures where available and are provided in table above.

Advantages

- It maximises the protection of the SAC network also protecting 13 NHAs raised bogs considered priority according to option B.3. It protects 2062.94ha (83.38%) of the designated raised bog priority habitat resource.
- In comparison with the previous combined option(B.2), it requires less resources for acquisition in the immediate to short term (77 raised bogs).
- Monitoring compliance is relatively simple, except on a few small bogs.

Disadvantages

- In the immediate and short term, it only protects 13 of the 45 NHAs raised bogs where priority habitats occur (which include only a quarter of the priority habitat present in the NHAs).
- In the immediate to short term it only protects 83.38% of the priority habitats and therefore is a relatively poor option for avoiding sanctions associated with the EU Habitats Directive and contributing to obligations under the Kyoto Protocol.
- In the immediate term it only protects 77 bogs (55.4%) from damage associated with turf cutting (i.e. burning or drainage), the direct loss of particular features of interest and the destruction of the peat archive, while allowing the earliest possible commencement of restoration activity on only these sites.
- Ongoing assessments maybe required on a few small NHAs raised bogs impacted by displacement of turf cutters from adjacent sites.
- In the immediate term displaces 1947 turf cutters from 62 raised bogs, where cutting currently occurs, and 10919 turbary right owners from 77 raised bogs.
- Local disruption to fuel supplies is still relatively high as in the immediate term it displaces turf cutters from 62 raised bogs.
- While turf cutters on individual bogs will be treated the same a major distinction, with probable associated controversy, will be made between turf cutters on SACs and most, but not all, NHAs.
- Cutting pressures may transfer to raised bogs with priority habitats which have medium term cessation (32 NHA bogs).
- In 61 NHAs and Ballygar (NHA 229) if cutting recommenced, the following will occur:
    - A decrease in the long term ability of the high bog to support Active Raised bog.
    - Damage associated with turf cutting (e.g. burning, drainage, etc) will continue to occur on these raised bogs.
    - It does not prevent the direct loss of particular features of interest (e.g. small flushes close to the margin) on these sites.
    - It allows damage to continue to the ecological and archaeological information contained in the peat.
    - It delays the time when restoration activity can be fully implemented.
    - The cost of restoration works will be higher and effectiveness reduced as further damage would be done.

Note

We briefly consider the option of combining the immediate cessation of cutting on all SACs (option A.3) with options B.1 and B.3 but the increase in the number of sites over option B.2 was only three small very damaged sites. When one takes into account the relatively small gains in nature conservation benefit versus the complexity of explaining to turbary owners the basis of such a complex selection process it was not considered worthwhile to further explore this option.

4.1.2.3. Presence of large vulnerable areas of high quality priority habitat

This option, which is called as **B5**, has been also previously described in section 3.2.5 of the report (see Appendix XXIV). The immediate cessation of turf cutting is deemed necessary at certain raised bogs where large areas of high quality priority habitats (i.e. Active Raised bog habitat or Bog Woodland) remain as part of one hydrological unit. Cutting at these raised bogs pose a serious risk of losing these valuable habitats. 8 raised bogs, all SACs, were found to meet these determining factors (see table 3.9). This 8 bogs contain a very small portion of the priority habitats resource (488ha – 19.73%). The overall number of current cutters on these 8 bogs is 290 and the estimated number of turbary right owners is 1152.

This option on its own would have similar negative consequences to B.4, as outlined in the third paragraph of section 4.1.2.2 above. In fact the negative consequences would be even larger as only 8 raised bogs require immediate response.

It is not useful to combine this option with the immediate cessation of turf cutting in all SACs, as it does not include any NHAs. This option is also not complementary to option B.1 as all the eight bogs include plots that require immediate response and therefore all cutting on these sites should cease immediately according to option B.1 (see Appendix XVI).

This option is in theory complementary to option B.3 as two of the eight bogs do not qualify for immediate cessation under the criteria of that option. These are Mongan SAC 580 and Moneybeg (Lough Sheelin) SAC 2340. However, this combination can only be considered in the context of option A.3 (already excluded above) and B.1. In the later case, it does not add to the sites protected as both Mongan and Moneybeg are already included under the criteria associated with B.1. The combination of option B.5 with any other option therefore is not considered further.

4.1.2.4. The results of the Raised Bog Monitoring Project (Fernandez *et al*. 2005)

The Raised Bog Monitoring Project (Fernandez *et al*. 2005) assessed the conservation status of a selection of Habitats Directive annexed habitats at 48 raised bogs. Active Raised bog habitat and Bog Woodland are priority habitats that were considered to be the most important habitats to considered when evaluating overall raised bog conservation status. This assessment was based on changes in habitat extent and quality, and the future prospects of the priority habitats taking into account impacting activities (mainly turf cutting and the associated activities: burning and drainage). The conservation status given was classed as follows (A - Favourable, B - Unfavourable inadequate and C - Unfavourable bad). This assessment only covered 48 raised bogs of the 139 raised bogs included in the original list of this project. The results obtained suggest that an immediate cessation of turf cutting should apply to those raised bogs where the conservation status of the priority habitats was assessed as “Unfavourable bad”. Such an assessment indicates a loss of bog habitat exceeding 25% in a ten years period (1995-2004/05). To some extend this information has been applied on option B.3 (see section 3.2.4) but it did not included all the large bogs which show major decline in priority habitats. Although this option may be appropriate to prioritise the cessation of turf cutting on these 48 raised bogs, the Raised Bog Monitoring Project (Fernandez *et al*. 2005) did not considered the remaining 91 raised bogs included in this project’s original list. Thus, the use of this option on its own to prioritise turf cutting cessation is not appropriate.

Nevertheless, the conservation status assessment provided by Fernandez *et al*. (2005) confirms the gravity of the situation facing raised bog conservation and justifies the necessity of an immediate cessation of turf cutting proposed in this chapter. By comparing the sites listed in Appendix XVI, it can be seen that most of the raised bogs whose conservation status assessment was “Unfavourable bad” (C) also require immediate cessation according to option B.1. There are three exceptions (Kilsallagh SAC 285, Bellanagare SAC 592 and Derrynabrock SAC 2298). For these sites other factors, such as burning in the case of Bellanagare, and drainage in the other two cases, were considered to be the major causes of the decline of priority habitats. However, these activities, especially burning and turf cutting, are interrelated and therefore it is appropriate to add these sites to the list.

4.1.2.5. The percentage of margin currently cut and number of cutters

Another option could be based on the intensity of turf cutting which is defined by the % of margin currently cut and number of cutters. As the size of each bog and thus the margin length varies, the number of cutters per raised bog is not an accurate parameter to assess the intensity of turf cutting. Instead the % of margin cut gives a more accurate picture of the intensity of this activity. Appendix XV includes a list of 93 raised bogs where a turf cutting assessment was done and the % of margin currently cut per raised bog.
However, although this % may give an accurate picture of the intensity of cutting is not deemed appropriate to prioritise the cessation of turf cutting. Occasionally, the raised bog is composed of several individual peat bodies which overall have a long high bog margin. It may occur that cutting takes place on the peat body supporting the highest extent of a priority habitat. In this particular case, the overall raised bog % of margin cutting would be low but the threat pose by cutting may be rather high. Therefore, if the % of margin cut is used as a parameter to prioritise cessation of cutting this hypothetical but common raised bog case would not be a priority.

4.1.2.6. The percentage of sensitive margin currently cut

A variant on the previous option would be to prioritise cutting based on the % of sensitive margin currently cut. The higher the % the greater would be the threat to the priority habitats (i.e. Active Raised bog and Bog Woodland), as this implies that the turf cutting is occurring within 250m of priority habitats and also within the same hydrological unit. This option seems more appropriate than the previous one since it is targeting the most sensitive locations for turf cutting. For example, if a raised bog contains several areas of high bog this measure directly reflects the pressure of peat cutting on those areas where priority habitats is present. The previous option would not discriminate between those areas of high bog containing priority habitat and those which did not.
However, this option only takes into account one of the factors involved in the calculation of an impact potential score (i.e. distance of cutting from priority habitats) as per the “impact potential assessment methodology”. It ignores other important factors such as: angle of cutaway, facebank height and ecotope at the edge of the high bog. It also ignores other additional determining factors mentioned in section 2.3.2.3 of the report which were used to recommend the immediate cessation of turf cutting. Therefore, we consider inappropriate to use this option for prioritising cessation of turf cutting.

Appendix XV includes a column illustrating the % of sensitive margin cut per raised bog.

4.1.3. Prioritise cessation at individual turf plot level based on:

4.1.3.1. The cutting cessation as outlined in the individual site reports

This option is based on “impact potential assessment methodology” for each individual turf plot. It includes all the considerations applicable to individual turf developed during the project. The individual turf plot cessation proposal is given at the end of each site report within the conclusions section, as well as within the site summary table associated with each sites report. The most significant elements, including the cutting cessation term required, for all 93 raised bogs assessed is summarised in Appendix XV. This option is called option **C1**.
At all bogs where priority habitat is present, recommencement of cutting would require a new impact assessment. This also includes sites where cutting was not recorded in 2003 (see Table 9.1 - Appendix IX). Cutting on raised bogs where priority habitats are absent or insignificant (Table 9.3 – Appendix IX) would be phased out in a medium term. Cutting on raised bogs included in table 9.4 and 9.5 (Appendix IX) would also be phased out in a medium term if this activity recommenced.

Statistics

The figures in table 4.17 below only apply to 93 raised bogs (49 within a SAC designation and 44 within a NHA designation) for which a turf cutting assessment was carried out.

Table 4.17 Summarised data for option C.1

Designation	N° of plots requiring immediate cessation	N° of plots requiring short term cessation	N° of plots requiring medium term cessation	Totals
SAC	550	227	762	1539
NHA	229	306	586	1121
Totals	779	533	1348	2660

Note that initially cutting will cease at 1312 plots in a immediate to short term. As already mentioned in table 4.1 and calculated in Appendix XVIII, the estimated total number of turbary owners is likely to be greater than 19155. Hence, there are over 17840 turbary right owners (including 1348 that are currently cutting) that will have a medium term cessation and the right to cut could be exercised anytime on these plots potentially leading to high levels of damage on priority habitats. Thus, this option by delaying the completion of the cessation process at the site level will inevitable lead to major negative implications for bog conservation. It will also involve enormous numbers of cutters requiring compensation at the end of the medium term period.

Table 4.17 illustrates that there is a much higher number of plots requiring immediate response in SACs when compared with NHAs.

Advantages

- It minimises current threat to the present priority habitats consistent with minimising the number of plots involved in the immediate to short term.
- It is the option that involves the smallest number of cutters in the immediate to short term (1312 plots).
- It the short term is the option that requires less resources for acquisition.
- It minimises the short term disruption to local fuel supplies.

Disadvantages

- In the immediate term it only proposes the cessation of all current cutting at 6 raised bogs containing 135ha (5.4%) of priority habitat. Cutting at these raised bogs could recommence on other plots at anytime, subject to an impact assessment. Thus, this option does not fully protect priority habitat by completely banning cutting at any site in the immediate to short term.
- Cutting could continue at 111 of the 117 raised bogs where cutting was recorded (see Appendix XV).
- At any time cutting can recommence on the less sensitive plots at any of the 139 raised bogs.
- As it allows more turf cutting to continue than any other option, this will result in the largest decrease in the long term ability of the high bog to support priority habitats.
- This is the second least effective option (after option outlined in section 4.1.4) for preventing damage associated with turf cutting (e.g. burning, drainage, etc), the direct loss of particular features of interest (e.g. small flushes close to the margin), as cutting can occur at the less sensitive plots at any time in any bog.
- It is the second least effective option (after option outlined in section 4.1.4) for protecting the peat archive, for avoiding sanctions associated with the EU Habitats Directive and contributing to obligations under the Kyoto Protocol.
- On all bogs it will seriously delay or inhibit restoration activity as turf cutting can continue at the less sensitive plots in any bog .
- It will involve the highest level of cost associated with ongoing assessments of the impacts of recommencing turf cutting.
- This option will be extremely complex for monitoring compliance.
- The cessation of cutting at turf plot level would make the process rather complicated and resource demanding in terms of staff time.
- Turf cutting pressures may transfer within the same raised bog and between bogs, always subject to assessment.

- It does not treat cutters within the same bog equally and thus it is likely to be the option that will cause the highest and most long lasting controversy at the local level.

As an evidence from the disadvantages cited above in comparison to all the other options this alternative is the least advantageous from a nature conservation view point. In the immediate to short term this option may appear to minimise the most obvious threats to priority habitats. However, as it allows turf cutting to continue on all bogs in the medium term we consider that on balance it will probably allow more damage to priority habitats in the medium to long term than any of the other options. In addition, turf cutting subject to an assessment, could recommence on up to 17840 plots at any time in the medium term (see note below table 4.17).

The implementation of the individual turf plot cessation option was considered by regional staff in NPWS in August 2005 as likely to create great difficulties on the ground. In particular, they considered that will be practically impossible to explain to one turf cutter why they must cease immediately while their neighbours, apparently carrying out the same activity, were allowed to continue cutting. In their opinion these difficulties could eventually cause the failure of the whole cessation process. They considered that the most realistic way to address the situation of cessation of turf cutting on designated raised bogs requires that all cutting on individual raised bogs should stop at the one time as outlined in the options above.

4.1.4. Continuation with the current cessation policy

It is has been considered appropriate to also discuss and provide the option of continuing with the current turf cutting cessation policy of the DEHLG (see section 1.4). This policy is based on the voluntary purchase of turbary rights, simple fee and freehold from the owners by the Department. Two turf cutting cessation schemes were introduced by the Department since April 1999. The first scheme finalised in January 2004, and a total of 374 plots were acquired. The second scheme started in July 2004 and although it improved the conditions of the first one the results only improved slightly with 1350 applications until the end of February 2004, but only 10 sales closed. Thus, considering the current rate of progress and always bearing in mind that cutting will cease, except in exceptional circumstances, after the ten years phase out period, major losses in priority habitats are expected. As already mentioned according to Fernandez *et al*. (2005) survey, the overall loss in Active Raised Bog habitat extent in the period 1995 –2004/5 has been greater than 36%. Thus, it is reasonable to expect that similar losses are likely to occur within the next ten years if the current policy continues.

This option is the most disadvantageous from the conservation point of view and although it offers advantages from the management and economical aspect these are only in the short term as in the long term the complete cessation would be implemented.

Advantages

- In the immediate to short term is the option that requires less resources for acquisition and management agreements.
- It avoids costs associated with ongoing assessments of the impacts of recommencing turf cutting.
- Monitoring compliance is simple.
- It minimises the short term local disruption to fuel supplies for current cutters.
- It treats all turf cutters and turbary right owners equally.
- It will cause the lowest level of controversy as all turf cutting cessation is voluntary for the entire phase out period and some options for ongoing turf cutting exist.

Disadvantages

- Cutting would continue and could recommence on any site until the whole high bog is purchased or until the end of ten years period phase out period.
- It allows further major losses of raised bog priority habitats as well as diminishing the long term ability of the high bog to support these habitats.
- It allows damage associated with turf cutting such as burning or drainage to continue on all the designated raised bogs until the end of ten years period phase out period.

- It allows the direct loss of particular features of interest (e.g. small flushes close to the margin) on all the designated raised bogs until the end of ten years period phase out period.
- It minimises the retention of the peat archive (i.e. ecological and archaeological information) contained in the peat.
- On all bogs it will seriously delay or inhibit restoration activity as turf cutting can continue until the whole high bog is purchased or until the end of ten years period phase out period.
- It is the less effective option reducing CO_2 emissions from the bog and on restoring carbon sinks in line with the Kyoto Protocol.
- It is the less effective in avoiding or reducing sanctions associated with the EU Habitats Directive (92/43 EEC).

4.2. Most appropriate alternative from a nature conservation perspective

Several alternatives in relation to the cessation of turf cutting on designated raised bogs have been given within this chapter. These options range from those proposing the immediate complete cessation of cutting at all sites, to those where a cessation of individual turf plots is considered and continuing with the current turf cutting cessation policy of the DEHLG.

The first alternative given, which consists on the immediate cessation of turf cutting on all SACs and NHAs (option A.1), is the most appropriate from the nature conservation point of view. This option maximises the protection of 100% of the priority habitats and the long term ability of high bog to support priority habitats. It eliminates damage associated with turf cutting as well as allows restoration activity to commence at the earliest possible date. A complete cessation of turf cutting treats all the cutters and owners of turbary rights equally and in addition is the simplest to implement and monitor. Although it may have higher cost in the short term, the cost in the medium and long term are likely to be lower as no new assessments would be required. Moreover, if cutting continues the cost involved in the restoration of the ecosystem would also increase, while the positive effects will decrease. These costs do not take into consideration the substantial economical implications that non compliance with the Habitats Directive could have, arising from the failure to achieve favourable conservation status for the priority habitats. Currently these habitats are declining rapidly as shown by Fernandez *et al*. (2005). The second most favourable option is A.2 and the major difference between it and A.1 is the fact that turf cutting can continue in 30 bogs in the medium term which will have adverse effects on their long term ability to support priority habitat. This difference is important as due to the residual effects of turf cutting for up to several decades after turf cutting ceases one can expect further declines in the area of priority habitat, which will have to be offset by restoration activities to meet the requirements of the Habitats Directive.

If any of the options which involve phasing out cutting in sites with priority habitat (i.e. A.3,B.1, B.2,B.3,B.4,B.5 and C.1) are adopted, significant further losses of priority habitat are inevitable. The comparative effects of different option on protecting priority habitats is shown in Appendix XIX. The option of confining immediate protection to SACs (A.3) also has this major draw back. We therefore could not recommend the adoption of any of these option from a nature conservation point of view.

The main difficulty associated with the turf cutting cessation program is not just the need to stop current cutting but to effectively extinguish turbary rights. As per our calculations the estimated number of turbary right owners is greater than 19000 and a total of 2660 current cutters have been identified in 93 of the 139 raised bogs designated. The progress to date in using voluntary acquisition has resulted in a relatively small number of rights being acquired. If turf cutting is effectively to be eliminated even in the medium term on these sites it will appear necessary to adopt a new approach. Exactly what that will require is beyond the scope of this report. Whatever methods are used, will undoubtedly give arise to considerable controversy. The immediate cessation of turf cutting on designated raised bogs would require the largest number of extinguishments in a short time frame. However, it is important to note that all options would require the effective extinguishment of all turbary rights in the ten years phase out period**.**

A more phased approach might appear to give rise to less immediate problems. However, it will still be necessary to establish a mechanism to extinguish large numbers of turbary rights over short time frames. In addition, if these phased approaches involved excluding recommencement of turf cutting our calculations show that 85% of turbary rights would effectively eliminated immediately. If people who are not cutting are not prevented from restarting the current damage from cutting may increase as new turf cutters may restart rather than decrease during the phasing out period.

4.3. Restrictions to the alternative selected

If any other alternative except the immediate cessation of turf cutting at all SACs and NHAs (A.1) is chosen we recommend that the following restrictions are applied:

- Certain cutting techniques should no longer be allowed. These techniques are lateral cutting, pit cutting and surface cutting which are described in Chapter 3. These methods of cutting have more severe negative effects on the raised bog habitats than the standard methods used for cutting turf.
- All commercial cutting is already supposed to have stopped in all designated sites. Where such a cutting appeared to be occurring during the 2003 survey (see Table 3.1), these situations should be investigated further and where warranted, the immediate cessation of this cutting should be implemented. Note that table 3.1 only includes raised bogs where priority habitats were present. Commercial cutting may also occur on raised bogs where the priority habitats are absent and a turf cutting assessment was not done. A rapid assessment of these bog should be undertaken to identify if this activity is occurring and if so immediate cessation should be enforced.

4.4. Future work

On all sites where phasing out of cutting is allowed more frequent monitoring will be required to identify potential commercial activity or inappropriate cutting methods.

All Local Authorities whose administrative areas contains bogs with priority habitat should be informed of the sensitivity of the sites and asked to ensure that any proposals for commercial cutting are subject to EIA.

Recommencement considerations

Assessments relating to recommence cutting could arise in relation to option B.1, B.2 and C.1 for those sites with priority habitat.

There are two possible responses to this situation:

A. The simplest will be to ban all new turf cutting on these raised bogs. This will affect the great majority of turbary owners who are not exercising their right to cut turf on such bogs at present. However, it will undermine the whole basis for using any of the options based on the impact potential assessment methodology, as it will obviously be treating turbary right owners unequally.

B. If recommencement is allowed, it will require an impact potential assessment to ensure that the most damaging plots are excluded or appropriate conditions imposed. If applied to all plots where recommencement is sought, this option would require considerable resources. If the resources are not available to meet this requirement, assessments could be limited to sensitive margins (<250m from priority habitats) as any cutting here is more likely to cause significant impacts on priority habitats. This sensitive margin is depicted on the individual raised bog map attached to site report for the 93 raised bogs where a turf cutting assessment was done. It could be easily produced for the remaining 16 raised bog where priority habitats are known to exist. The length of sensitive margin for the 93 raised bogs is 347.86km (see Appendix XV). Using similar calculations to those justified in Appendix XVIII this gives a total of 5524 turbary right owners. Each recommencement application would require an individual site assessment and report on its potential impact which would be enormously expensive and time consuming. Note that the turbary right owners on the 16 bogs without turf cutting impact assessment reports (see Table 9.1 Appendix IX) are not included in the above figure.

Table 4.4 Raised bogs designated as SACs requiring immediate cessation of turf cutting according to option A.3

	Code	Site Name	County	Designation
1	231	Barroughter	Galway	SAC
2	248	Cloonmoylan	Galway	SAC
3	285	Kilsallagh	Galway	SAC
4	296	Lisnageeragh	Galway	SAC
5	297	Addergoole	Galway	SAC
6	301	Lough Lurgeen	Galway	SAC
7	326	Shankill West	Galway	SAC
8	391	Ballynafagh	Kildare	SAC
9	497	Flughany	Mayo, Sligo	SAC
10	566	All Saint's Bog	Offaly	SAC
11	572	Clara	Offaly	SAC
12	575	Ferbane	Offaly	SAC
13	580	Mongan	Offaly	SAC
14	581	Moyclare	Offaly	SAC
15	585	Sharavogue	Offaly	SAC
16	592	Bellanagare	Roscommon	SAC
17	595	Callow (part of Lough Gara)	Roscommon, Sligo	SAC
18	600	Cloonchambers	Roscommon	SAC
19	614	Cloonshanville	Roscommon	SAC
20	641	Ballyduff	Tipperary	SAC
21	647	Kilcarren	Tipperary	SAC
22	1242	Carrownagappul	Galway	SAC
23	2110	Corliskea	Roscommon, Galway	SAC
24	2110	Moorfield Bog - Farm Cottage	Galway	SAC
25	2110	Trien	Roscommon	SAC
26	2110	Clonfelliv	Roscommon	SAC
27	2298	Derrynabrock	Mayo, Roscommon	SAC
28	2298	Gowlaun (River Moy)	Mayo	SAC
29	2298	Cloongoonagh (River Moy)	Sligo	SAC
30	2310	Lough Ree (Clooncraff - Cloonlarge)	Roscommon	SAC
31	2331	Mouds	Kildare	SAC
32	2332	Coolrain	Laois	SAC
33	2333	Knockacoller	Laois	SAC
34	2336	Carn Park	Westmeath	SAC
35	2337	Crosswood	Westmeath	SAC
36	2338	Drumalough West	Roscommon	SAC
37	2339	Ballynamona - Corkip Lough	Roscommon	SAC
38	2340	Lough Sheelin - Clare Island	Cavan, Meath, Westmeath	SAC
39	2340	Lough Sheelin - Moneybeg	Cavan, Meath, Westmeath	SAC
40	2341	Ardagullion - Cloonshannagh	Longford	SAC
41	2342	Mount Hevey	Meath, Westmeath	SAC
42	2347	Camderry	Galway	SAC
43	2348	Clooneen	Longford	SAC
44	2349	Corbo	Roscommon	SAC

45	2350	Curraghlehanagh	Galway	SAC
46	2351	Moanveanlagh	Kerry	SAC
47	2352	Monivea	Galway	SAC
48	2353	Redwood	Tipperary	SAC
49	2356	Ardgraigue	Galway	SAC

Table 4.6 Raised bogs requiring immediate cessation of turf cutting according to option B.1

	Code	Site Name	County	Designation
1	231	Barroughter	Galway	SAC
2	235	Bracklagh	Galway	NHA
3	245	Clooncullaun	Galway	NHA
4	248	Cloonmoylan	Galway	SAC
5	249	Cloonoolish	Galway	NHA
6	280	Castlefrench West	Galway	NHA
7	281	Keeloges	Galway	NHA
8	283	Kilmore	Galway	NHA
9	297	Addergoole	Galway	SAC
10	301	Lough Lurgeen	Galway	SAC
11	307	Lough Tee	Galway	NHA
12	321	Raford River	Galway	NHA
13	326	Shankill West	Galway	SAC
14	391	Ballynafagh	Kildare	SAC
15	497	Flughany	Mayo, Sligo	SAC
16	564	River Little Brosna	Offaly	NHA
17	565	Clonydonnin	Westmeath	NHA
18	566	All Saint's Bog	Offaly	SAC
19	572	Clara	Offaly	SAC
20	575	Ferbane	Offaly	SAC
21	580	Mongan	Offaly	SAC
22	581	Moyclare	Offaly	SAC
23	585	Sharavogue	Offaly	SAC
24	595	Callow (part of Lough Gara)	Roscommon, Sligo	SAC
25	603	Cornaveagh	Roscommon	NHA
26	605	Derrycanan	Roscommon	NHA
27	640	Arragh More	Tipperary	NHA
28	641	Ballyduff	Tipperary	SAC
29	642	Ballymacegan	Tipperary	NHA
30	647	Kilcarren	Tipperary	SAC
31	652	Monaincha - Ballaghmore	Tipperary, Laois	NHA
32	674	Ballynagrenia	Westmeath	NHA
33	674	Ballinderry	Westmeath	NHA
34	691	Rinn River	Leitrim, Longford	NHA
35	694	Wooddown	Westmeath	NHA
36	921	Screggan	Offaly	NHA
37	937	Scohaboy	Tipperary	NHA
38	1242	Carrownagappul	Galway	SAC
39	1254	Derrinlough Bog	Galway	NHA

40	1303	Moorfield	Galway	NHA
41	1324	Jamestown	Meath	NHA
42	1420	Corracramph	Leitrim	NHA
43	1448	Forthill	Longford	NHA
44	1450	Mount Jessop	Longford	NHA
45	1623	Carrickynaghtan	Roscommon	NHA
46	1853	Nore Valley - Timoney	Tipperary	NHA
47	2110	Corliskea	Roscommon, Galway	SAC
48	2110	Moorfield Bog-Farm Cottage	Galway	SAC
49	2110	Trien	Roscommon	SAC
50	2298	Gowlaun (River Moy)	Mayo	SAC
51	2298	Cloongoonagh (River Moy)	Sligo	SAC
52	2310	Lough Ree (Clooncraff -Cloonlarge)	Roscommon	SAC
53	2323	Milltown Pass	Westmeath	NHA
54	2331	Mouds	Kildare	SAC
55	2332	Coolrain	Laois	SAC
56	2333	Knockacoller	Laois	SAC
57	2336	Carn Park	Westmeath	SAC
58	2337	Crosswood	Westmeath	SAC
59	2339	Ballynamona - Corkip Lough	Roscommon	SAC
60	2340	Lough Sheelin - Clare Island	Cavan, Meath, Westmeath	SAC
61	2340	Lough Sheelin - Moneybeg	Cavan, Meath, Westmeath	SAC
62	2341	Ardagullion - Cloonshannagh	Longford	SAC
63	2342	Mount Hevey	Meath, Westmeath	SAC
64	2347	Camderry	Galway	SAC
65	2348	Clooneen	Longford	SAC
66	2349	Corbo	Roscommon	SAC
67	2350	Curraghlehanagh	Galway	SAC
68	2352	Monivea	Galway	SAC
69	2353	Redwood	Tipperary	SAC
70	2356	Ardgraigue	Galway	SAC

Table 4.7 Raised bogs requiring short term cessation of turf cutting according to option B.1

	Code	Site Name	County	Designation
1	254	Crit Island	Galway	NHA
2	284	Kilnaborris (Killeragh)	Galway	NHA
3	285	Kilsallagh	Galway	SAC
4	296	Lisnageeragh	Galway	SAC
5	310	Meneen	Galway	NHA
6	422	Aghnamona	Leitrim, Longford	NHA
7	570	Blackcastle	Offaly	NHA
8	592	Bellanagare	Roscommon	SAC
9	600	Cloonchambers	Roscommon	SAC
10	1244	Castlefrench East	Galway	NHA
11	1405	Cashel	Leitrim	NHA
12	1423	Cloonageeher Bog	Leitrim, Longford	NHA
13	2338	Drumalough West	Roscommon	SAC
14	2344	Annaghbeg	Galway	NHA
15	2351	Moanveanlagh	Kerry	SAC

Table 4.8 Raised bogs requiring medium term cessation of turf cutting according to option B.1

	Code	Site Name	County	Designation
1	333	Anna More	Kerry	NHA
2	614	Cloonshanville	Roscommon	SAC
3	677	Cloncrow Bog (New Forest)	Westmeath	NHA
4	684	Lough Derravaragh	Westmeath	NHA
5	1227	Aughrim	Galway	NHA
6	2110	Clonfelliv	Roscommon	SAC
7	2298	Derrynabrock	Mayo, Roscommon	SAC
8	2355	Hawkswood	Offaly	NHA

Table 4.11. NHAs requiring immediate cessation response according to option B.2

	Code	Site Name	County	Designation
1	235	Bracklagh	Galway	NHA
2	245	Clooncullaun	Galway	NHA
3	249	Cloonoolish	Galway	NHA
4	280	Castlefrench West	Galway	NHA
5	281	Keeloges	Galway	NHA
6	283	Kilmore	Galway	NHA
7	307	Lough Tee	Galway	NHA
8	321	Raford River	Galway	NHA
9	564	River Little Brosna	Offaly	NHA
10	565	Clonydonnin	Westmeath	NHA
11	603	Cornaveagh	Roscommon	NHA
12	605	Derrycanan	Roscommon	NHA
13	640	Arragh More	Tipperary	NHA
14	642	Ballymacegan	Tipperary	NHA
15	652	Monaincha/Ballaghmore	Tipperary, Laois	NHA
16	674	Ballynagrenia	Westmeath	NHA
17	674	Ballinderry	Westmeath	NHA
18	691	Rinn River	Leitrim, Longford	NHA
19	694	Wooddown	Westmeath	NHA
20	921	Screggan	Offaly	NHA
21	937	Scohaboy	Tipperary	NHA
22	1254	Derrinlough Bog	Galway	NHA
23	1303	Moorfield	Galway	NHA
24	1324	Jamestown	Meath	NHA
25	1420	Corracramph	Leitrim	NHA
26	1448	Forthill	Longford	NHA
27	1450	Mount Jessop	Longford	NHA
28	1623	Carrickynaghtan	Roscommon	NHA
29	1853	Nore Valley -Timoney	Tipperary	NHA
30	2323	Milltown Pass	Westmeath	NHA

Table 4.12. NHAs requiring short term cessation response according to option B.2

	Code	Site Name	County	Designation
1	254	Crit Island	Galway	NHA
2	284	Kilnaborris (Killeragh)	Galway	NHA
3	310	Meneen	Galway	NHA
4	422	Aghnamona	Leitrim, Longford	NHA
5	570	Blackcastle	Offaly	NHA
6	1244	Castlefrench East	Galway	NHA
7	1405	Cashel	Leitrim	NHA
8	1423	Cloonageeher Bog	Leitrim, Longford	NHA
9	2344	Annaghbeg	Galway	NHA

Table 4.13. NHAs requiring medium term cessation response according to option B.2

	Code	Site Name	County	Designation
1	333	Anna More	Kerry	NHA
2	677	Cloncrow Bog (New Forest)	Westmeath	NHA
3	684	Lough Derravaragh	Westmeath	NHA
4	1227	Aughrim	Galway	NHA
5	2355	Hawkswood	Offaly	NHA

Table 4.16. NHAs requiring immediate cessation response according to option B.3

	Code	Site Name	County	Designation
1	235	Bracklagh	Galway	NHA
2	249	Cloonoolish	Galway	NHA
3	283	Kilmore	Galway	NHA
4	570	Blackcastle	Offaly	NHA
5	603	Cornaveagh	Roscommon	NHA
6	642	Ballymacegan	Tipperary	NHA
7	674	Ballinderry	Westmeath	NHA
8	684	Lough Derravaragh	Westmeath	NHA
9	691	Rinn River	Leitrim, Longford	NHA
10	1244	Castlefrench East	Galway	NHA
11	1324	Jamestown	Meath	NHA
12	1853	Nore Valley -Timoney	Tipperary	NHA
13	2323	Milltown Pass	Westmeath	NHA

5. CONCLUSIONS

A number of conclusions can be made regarding the findings of this project.

1. Two agreements have been reached between the Government and the farmers and turf cutting organisations in relation to the implementation of the Habitats Directive and the cessation of turf cutting. The first agreement signed by the Minister for Arts, Heritage, Gaeltacht and the Islands, Sile de Valera TD in 1999 comes to an end in 2008. This arrangement prohibited commercial cutting on SACs from the 1999 season. It allowed domestic turf cutting to continue for up to ten years, because it considered that "the damage caused by an individual in a year is small in most situations". A new agreement between the Government and the Farming Organisation was reached in 2004. According to this new agreement, save in exceptional circumstances, people will be allowed to continue domestic cutting on their plots for up to 10 years. Furthermore, after the 10 years period the DEHLG will review whether there are particular circumstances in which domestic turf cutting can continue on raised bogs without damaging the bogs. In the particular case of those sites designated in 1997 (31 raised bogs in 31 SACs), for which the derogation of domestic cutting in the year 2008 was proposed in the previous agreement (1999), the cessation of all cutting would be reviewed in 2008.

   Since the signing of the first agreement, except for commercial developments the DEHLG turf cutting cessation policy has been based on the voluntary purchasing of land and turbary plots from the owners. Two turf cutting cessation schemes have been introduced since 1999 by the Department. A total of 374 plots were acquired in the 5 years period of the first scheme. The second scheme, initiated in July 2004, considerably increased the financial incentives and has resulted in a much larger number of applications. However, the more stringent legal requirements has slowed down the process of these applications significantly. At current rates decades would be needed to acquire all turbary. As discussed in the introduction (section 1.4) we consider that the current cutting cessation policy is likely to have a relatively small impact on decreasing the negative effects of current domestic cutting on raised bog priority habitats and that these impacts will continue to decrease the areas and quality of priority habitats for the foreseeable future. It will appear that the above current turbary cessation schemes have been relatively successful in dealing with obvious commercial activity (i.e. moss peat developments). Indeed, 6 moss peat operations were reported and all of them have ceased, either having been acquired or their acquisition being negotiated by NPWS. The cessation schemes have been much less successful in dealing with small scale, semi commercial to commercial fuel peat operations and have had almost negligibly impact on domestic cutting (less than 400 out of 20000 turbary right owners).

2. It is now apparent that the overall impacts of turf cutting on raised bogs is very severe and that a considerable amount of damage is caused by domestic cutting. The Raised Bog Monitoring Project (Fernandez *et al*., 2005) assessed the conservation status of 48 designated raised bogs and found that there has been a 36.80% decrease in extent of active peat forming, priority habitats (Active Raised Bog habitat - 7110 and Bog Woodland - 91D0) in the period 1995-2004/05. The overall conservation status of Active Raised Bog habitat was assessed as "Unfavourable bad" in EU monitoring terminology. Furthermore, 1% of the original high bog extent has been irreversibly lost in the 10 years period due to turf cutting. The study confirmed that peat cutting, mostly domestic (as commercial is not longer allowed on designated sites), combined with drainage and burning are the most negatively impacting activities on the raised bogs surveyed. These results confirmed the incompatibility of raised bog conservation and peat cutting activity of any nature. They also stated, that as a result of the previous and ongoing damage caused by cutting and associated activities (i.e. burning, drainage), the long term conservation requires not just the cessation of these activities but active intervention (i.e. restoration works) to prevent further deterioration and achieve favourable conservation status. It is important to note that the 48 raised bogs cover almost 50% of the national resource and, having a relatively high proportion of uncut bogs, will tend to understate rather than overstate the impact of turf cutting.

3. Under the terms of the Habitats Directive (92/43/EEC), EU Member States are required to maintain the habitats listed in the Directive in favourable conservation status. This means that the overall status of the national resource (i.e. including those outside the Natura 2000 network, e.g. NHAs) of annexed habitats is maintained and where necessary enhanced. As the current status of Active Raised bog (priority habitat) is already considered to be "Unfavourable bad" (Fernandez *et al*., 2005), any further deterioration would be opposed by the EU.

4. The total number of designated raised bogs is 139 (see Appendix XXII), in 127 designated sites, of which 64 are SACs and 75 NHAs. Turf cutting was recorded at 117 (84.2%) of the 139 bogs in 2003 (68 NHAs and 49 SACs). Priority habitats (Active Raised Bog and Bog Woodland) are present at 112 of the 139 bogs, but its extent is considered insignificant at three of these bogs. The results indicate that the percentage of NHAs currently cut (90.7%) is higher than the percentage of SACs (76.6%). This difference arises from the original selection process for SACs rather than any subsequent change in cutting trend following designation.

5. This survey confirmed the trend of increasing mechanization of cutting noted by Feehan *et al*.(1996). This makes cutting on small to medium size bogs economically profitable, as well as increasing the amount of peat harvested per plot. Mechanisation facilitates an upgrading of former domestic turf cutting to a commercial or semi-commercial level. The mechanisation of the cutting and the use of contractors to carry out this work makes it difficult in many cases to distinguish between legitimate domestic cutting and small scale commercial operations. This project's survey noted that while the length of margin cut has been reduced, particularly in the last ten years, the intensity of cutting appears to be higher. The increasing mechanization, which is almost always coupled with intensified drainage of the cutover and high bog, also increases the negative effects of this activity in comparison to traditional domestic cutting and poses a major threat to priority habitats.

6. Although cutting for domestic purposes is the most common, fuel peat and moss peat cutting of a commercial nature appears to have occurred within the last ten years at 17 of the 93 bogs where an impact assessment was done. The total number of sites affected by commercial cutting is likely to be higher as there are 24 bogs where cutting occurs but, as a comprehensive cutting survey was not carried out, undetected commercial cutting may also be present. Moss peat operations were recorded at 6 bogs, all of which have ceased and have been acquired by, or are under negotiations with, NPWS. The remaining bogs possibly with commercial cutting are those where long face-banks and high rates of cutting indicate the commercial nature of this activity. It appears that hand cutting is no longer practised on designated sites and Difco surface cutting is now rarely practised. The most widespread technique consists of mechanical cutting using Hopper machinery for fuel peat. This technique varies from ordinary facebank where machinery works from the cutover to lateral or pit cutting where it works from the high bog, causing serious damage to the high bog vegetation. These latter techniques are more frequently found on western sites.

7. Comprehensive turf cutting impact potential assessments were carried out at the 93 bogs where priority habitats are present and cutting was recorded in 2003. These assessments noted that 2660 turf cutting plots were currently cut in 2003 on these bogs. The calculated average width of a turf cutting plot is 34m. According to the "impact potential assessment methodology" 29% of these plots require immediate term cessation, 20% short term and 51% medium term cessation. It was also found that 75% of these bogs at least have one turf plot currently cut that requires immediate cessation. 37.68% of the high bog margin at these 93 bogs is deemed as sensitive, thus cutting at this margin is likely to have some negative effects on the priority habitats. It was also found that 23.07% of this sensitive margin is currently cut, which on its own indicates the high impacting nature of current cutting. It is important to note that an estimated 20000 turbary rights exist on all designated sites and that only a small proportion of those are currently cut.

8. The main outcome of this project is series of ten turf cutting cessation options for all the designated raised bogs. Nine of these options go from those proposing the immediate complete cessation of cutting at all sites (option A.1), to those where a cessation of individual plots is considered (option C.1). The tenth option, of continuing with the current turf cutting cessation policy of the Department of Environment, Heritage and Local Government (DEHLG), is also explored. The nine options assume that all cutting in designated raised bogs will be phased out at the latest within 10 years of the 2004 Agreement. For those sites designated in 1997, we recommend that, as a minimum, the original 1999 Agreement, which requires phasing out of all cutting by 2008, be retained. Thus by 2013, at the latest all cutting at all sites will have ceased under the 9 options while some cutting may be allowed if the current cessation policy continues.

9. All turf cutting cessation requires the effective extinguishment of both current cutting and all turbary rights. The estimated number of turbary right owners on designated sites is greater than 20000. A immediate cessation of turf cutting on designated sites would require the largest number of extinguishments in the short term. However, any of the options would proceed with the extinguishment of all turbary rights at the latest by 2013 with associated controversy. Furthermore, a phased approach would involve allowing recommencement of cutting by turbary right owners who are currently not cutting. This would involve either allowing further damage to occur or the carrying out of individual impact assessments which will be very resource demanding and also will give arise to significant levels of controversy.

10. The first turf cutting cessation option given, which consists of the immediate cessation of turf cutting on all SACs and NHAs (option A.1), is the most appropriate from the nature conservation point of view. This option maximises the protection of 100% of the priority habitats and the long term ability of high bog to support priority habitats. It eliminates damage associated with turf cutting as well as allows restoration activity to commence at the earliest possible date. A complete cessation of turf cutting treats all the cutters and owners of turbary rights equally and in addition is the simplest to implement and monitor. Although it may have higher cost in the immediate term, the cost in the medium and long term are likely to be lower as no new assessments would be required. Moreover, if cutting continues the cost involved in the restoration of the ecosystem would also increase, while the positive effects will decrease. These costs do not take into consideration the substantial economical implications that non compliance with the Habitats Directive could have, arising from the failure to achieve favourable conservation status for the priority habitats. Currently these habitats are declining rapidly as shown by Fernandez *et al*. (2005). The second most favourable option is A.2 and the major difference between it and A.1 is the fact that turf cutting can continue in 30 bogs in the medium term which will have adverse effects on the long term ability to support priority habitat. This difference is important as, because the residual drying out effects continue for several decades after turf cutting ceases, one can expect further declines in the current area of priority habitat to continue. These declines will have to be offset by restoration activities to meet the requirements of the Habitats Directive. Such activities will be delayed by ongoing turf cutting and the area ultimately restorable will decrease.

11. The adoption of a phasing out approach as proposed by other options (i.e. A.3,B.1, B.2,B.3,B.4,B.5 and C.1) or the option of continuing with the current DEHLG policy, will be associated with significant further losses of priority habitat. Therefore the adoption of any of these option is not recommended from a nature conservation perspective. However, it should be decided to go for a phase out option we would consider that the distinctions between sites with or without priority habitat (A.2) and between SACs and NHAs (A.3) will be the most defensible.

12. If some phasing out approach was being adopted a high priority should be given to immediate cessation on 26 bogs which were found to be particularly threatened (see option B.3 and Appendix XXIV). These sites area subject to highly impacting cutting and, either the high bog area is at lower limit which can support priority habitats, or they are specially important for preserving the natural range (i.e. geographical variation) of these habitats. Furthermore, 8 raised bogs contained large vulnerable areas of high quality priority habitat (see option B.5 and Appendix XXIV). 5 of these 8 bogs are already included in the 26 bogs mentioned above.

13. In the short term option A.l involves the largest number of management agreements/acquisitions and has the highest economic cost. However, a delay in the cessation of cutting from an immediate to a medium term as proposed in the other options, will also have severe economic implications. These are as follows.

    - Possible economic sanctions from the EU, as Ireland will not achieve favourable conservation status of Habitats Directive annexed habitats.
    - Increase in the restoration costs as further damage would be done. To achieve the same area of restored bog will become increasingly expensive as more peat is removed. For example, it may require the construction of complex structures (i.e. dams) which is much more expensive to design, built and maintain than simply blocking current drainage. It is does not seam logical to allow damage to occur and then trying to reverse it at great expense.
    - If the recommencement of cutting on sites with priority habitat is allowed, new assessments of the potential impact of turf cutting would be necessary which will have considerable economical cost and staff requirements.
    - A phasing out process of cessation will involve more complex monitoring associated with higher cost.
    - A delay in the acquisition of turbary rights may result in an eventual increase in their cost. It is important to remember that the cost of acquisition under all these different options will be at least as high as for option A.1 in the medium term unless people are allowed to continue cutting indefinitely.

14. If domestic turf cutting is to be allowed to continue there are needs to be further considerations and streamlining of the procedure for carrying out impact assessments. For example, facebank height could not be assessed prior to the commencement of turf cutting.

15. Turf cutting has broken the link between the peat body and local topography, climate and local hydrology. The long term conservation of raised bogs requires that this link be re-established as far as possible. After the cessation of turf cutting it is essential to proceed to restore the hydrology of the bog, so that it can retain current priority habitats and/or encourage the formation of new priority habitats.

16. Unless urgent steps are taken to prevent further deterioration of the remaining examples of this priority habitat, including the cessation of all turf cutting and the development of a comprehensive restoration program Ireland is in danger of losing these invaluable habitats in the next few decades.

6. GLOSSARY

ACROTELM - The living, actively growing upper layer of a raised bog, the surface of which is composed mainly of living Bog Mosses (*Sphagnum* spp.). The presence of the acrotelm is vital to a raised bog as this is the peat forming layer and water storing layer of the bog. This layer forms the Active Raised Bog habitat.

ALTITUDE - Vertical height above sea level.

ANNEX I - of the EU Habitats Directive, lists habitats including priority habitats for which SACs have to be designated.

ANNEX II - of the EU Habitats Directive is a list of species for which SACs have to be designated.

ANNEX V - of the EU Habitats Directive lists animal and plant species of Community interest whose taking in the wild and exploitation may be subject to management measures.

AQUIFER - A body of permeable rock that is capable of storing significant volumes of water, that is underlain by impermeable material and through which groundwater moves.

BIODIVERSITY - A general term used to describe all aspects of biological diversity, including: the number of species present in a given environment; the genetic diversity present within a species; the number of different ecosystems present within a given environment.

CALCAREOUS - Made of or containing calcium carbonate ($CaCO_3$) and therefore alkaline: limestone for example.

CALLOWS - Species rich grasslands in river floodplains that are flooded during the winter.

CARR - Shrub or woodland communities growing in waterlogged ground.

CATCHMENT - An area of land draining to a defined point. The term river catchment refers to the area of land that drains into a particular river system.

COLONISATION - The entry and spread of a species into an area, habitat or population from which it was formerly absent.

COMMERCIAL FOREST - An NPW habitat classification which applies to plantations of coniferous trees, primarily Sitka Spruce, Lodgepole Pine, Douglas Fir, Japanese Larch and Norway Spruce. More than 90% of the canopy is formed by coniferous trees, although there may be broad-leaved trees, especially Birch present along the plantation edges.

COMMUNITY - a well-defined assemblage of plants and/or animals, clearly distinguishable from other such assemblages.

COMMUNITY COMPLEX – This is the most simple level of vegetation classification described within this survey. A community-complex is made up of a homogeneous mosaic of stands of different community types. They are identified by the dominance of one to three plant species; acrotelm; *Sphagnum* cover and the presence of pools. The community complexes are pooled into ecotope types.

CONSERVATION STATUS - The sum of the influences acting on a habitat and its typical species that may affect its long term distribution, structure and functions. Also refers to the long-term survival of its typical species within the European territory of the Member States.

CUTAWAY BOG - This term describes areas where peat has been removed systematically by industrial means. Any peat remaining can no longer be considered as economically removable (Irish Peatland Conservation Council).

CUTOVER BOG – An NPWS habitat classification that describes areas of bog which have been previously cut (by hand or by mechanical means), although not down to the marl layer or bedrock. Remaining peat can still be an economic reserve. Cut-over areas are normally a mosaic of cut areas, face banks, pools, drainage ditches, uncut areas of peat, scrub, grassland etc.

DEHLG - Department of Environment, Heritage and Local Government

DESICCATION - Drying out.

DEVELOPMENT PLANS - Local Authorities (Co. Councils & Corporations) are obliged under statute to produce a document which sets out the planned development of their areas for a given number of years. In the future Local Authorities will be asked to incorporate designated NHAs, SACs and SPAs classifications into their development plans.

DIVERSITY - see biodiversity.

DOMESTIC PURPOSES - Used in relation to the cutting of peat. Peat that is cut for domestic purposes is not for commercial sale and is cut at the rate of one year's supply for a household per year.

DRAINAGE DITCHES - An NPWS habitat classification which refers to water channel systems with moving or stagnant water bodies, artificial in origin. Most ditches are cleared cyclically, although this category also includes ditches that are overgrown with wetland plants.

ECOLOGY - The study of the interactions between organisms, and their physical, chemical and biological environment.

ECOTOPE - The abiotic environment or habitat of a particular biotic system (Kulcher, 1967; Whittaker et al., 1973). According to work carried out by Kelly (1993) on Clara and Raheenmore raised bogs Active Raised Bog habitat and Degraded Raised Bog are divided into four ecotopes. Sub-central and central ecotopes within Active Raised Bog and Marginal and Sub-marginal ecotopes within Degraded Raised Bog habitat. However a third ecotope (Face bank ecotope) has been considered as part of Degraded Raised Bog habitat within this current survey.

ELEVATION - The height of something above a given place, usually above sea level.

ENCROACHMENT - The invasion of a species (usually plants) into areas previously uncolonised. This term is often used when an undesirable species advances at the expense of a desirable species or habitat.

ENVIRONMENT – The biological and physical conditions in which an organism lives.

EROSION - The processes whereby the materials of the Earth's crust are dissolved, or worn away and simultaneously moved from one place to another by natural agencies which include weathering, solution, corrosion and transportation.

EUROPEAN BIRDS DIRECTIVE (79/ 409/ 2nd April 1979) - See Birds Directive.

EVAPOTRANSPORATION - Water loss to the atmosphere from soil (evaporation) and vegetation (transpiration). The potential evapotranspiration may be calculated from physical features of the environment such as wind speed and temperature. The actual evapotranspiration will commonly fall below the potential depending on the availability of water from precipitation and soil storage.

EXOTIC SPECIES - Are those species which are considered to be non native.

FAUNA - Animal life.

FAVOURABLE CONSERVATION STATUS - The conservation status of a natural habitat will be taken as "favourable" when: its natural range and areas it covers within that range are stable or increasing, and the specific structure and functions which are necessary for its long term maintenance exist and are likely to continue to exist for the foreseeable future, and the conservation status of its typical species is favourable.

FEE SIMPLE – Practical definition for the purposes of this report means that the owner owns the land but not the turbary right (see Freehold).

FENS AND FLUSHES - An NPWS habitat classification. Fens are peatlands fed by calcium rich water, either from groundwater or from inflowing surface water. Flushes are wet areas maintained by the seepage of water down slopes of various gradient, and are usually local features. Both are characterised by an abundance of small sedge forming species-rich mosaics with other species. Orchid species are particularly noticeable in fens and butterworts are more typical of flushes. According to Cross (1990) flushes are areas where nutrient enrichment occurs, usually as a result of more concentrated horizontal water movement. They are particularly common near the bog margin and at the base of low mineral ridges and are characterised by the presence of *Molinia caerulea*, *Myrica gal*e and often *Sphagnum recurvum*.

FLORA - plant life.

FORMATION – A geological term for a body of rocks having easily recognised boundaries that can be traced in the field, and large enough to be represented on a geological map as a practical and convenient unit for mapping and description.

FREEHOLD – Practical definition for the purposes of this report means that the owner owns both the land and the turbary rights (see Fee Simple).

FRAGILITY - Refers to how robust a site/habitat/species is.

GEOMORPHOLOGY – The study of the form and structure of the landscape, which is shaped by the underlying geology. There is a range of raised bog types, which developed under different hydro-geomorphological conditions. These types are: Broad Floodplain, Ridge River, Basin, Ridge Basin and Blanket (Dromy and Kelly, 1995).

- Broad Floodplain – This type of bog occurs in a wide low gradient floodplain where the underlying subsoils are low permeability clays.
- Ridge River - This bog type lies at the bottom of a slope adjacent to a river or lake.
- Basin - This is the most common bog type and occurs in depressions and typically form great convex masses of peat which grow above the fluctuations of the original groundwater-table.
- Ridge Basin - These bogs lie intermediate between the domed mires of basins and the blanket bogs of western Ireland.
- Blanket - These develop directly on the mineral soil and up to a considerable slope in a response to a wetter climate.

GEO-REFERENCED MAP -Kelly *et al.* (1995) vegetation maps were geo-referenced in some of the sites by Fernandez *et al*. (2005). This process was carried out using ArcInfo and Arcview GIS packages. Vegetation maps were scanned and geographical references were given in order to project this image over the aerial images. By means of this process Kelly *et al.* (1995) ecotope and complexes areas were calculated to enable a more accurate comparison to the area obtain within the 2004/05 survey. The geo-referenced maps were also used as a base map during the surveys by converting them to transparent format (Arcview) and superposing them on the 2000 ortho-rectified image.

HABITAT - Refers to the environment defined by specific abiotic and biotic factors, in which a species lives at any stage of its biological cycle. In general terms it is a species home. In the Habitats Directive this term is used more loosely to mean plant communities and areas to be given protection.

HABITATS DIRECTIVE - (Council Directive 92/43/EEC). The Directive on the conservation of Natural Habitats and of Wild Flora and Fauna. This Directive seeks to legally protect wildlife and its habitats. It was transposed into Irish legislation by the EU (Natural Habitats) Regulations, 1997.

HAND CUTTING OF PEAT. - Refers to traditional cutting of peat using a slean or spade.

HIGH BOG – this is the area of bog which have not been previously cut and generally its vegetation is characterised by the presence of ericoid and *Cyperaceae* species and an abundant of *Sphagnum* species.

HUMMOCK - A small hillock/mound. Often used to describe the surface of active bogs where the ground forms a pattern of mounds, hollows and pools. Such hummocks commonly comprise bog mosses.

HYDROLOGY - The movement of water through a catchment area including freshwater and seawater inputs, water level changes and drainage mechanisms which are all influenced by the underlying geology.

KNOLL - A small rounded hill.

LAGG - a term used to describe the transition from bog to mineral soil around a raised bog.

LATITUDE – The angular distance measured in degrees north or south of the equator.

LEVELLING - A process carried out to establish the gradient of sloping ground.

LIMESTONE - Sedimentary rock composed predominantly of calcium carbonate, often containing fossils.

LOCAL – A term used in ecology which is applied to distribution of species when assessed on a national grid reference system. The assessment is made on the basis of the number of occupied 10km National Grid squares. Local applies to 26-75, 10km squares in this context.

LOWLAND WET GRASSLAND - An NPW habitat classification which refers to grasslands which normally below the 100m contour, with a vegetation characteristic of waterlogged soil. This category also includes rushy fields.

MANAGEMENT - a) Controlling processes within a site (this can be actively carrying out work or can be doing nothing), preferably in accordance with a conservation plan. - b) The practical implementation of the management plan. - c) Undertaking any task or project identified in the management plan, including the identification of new opportunities.

MANAGEMENT AGREEMENTS - The Wildlife Act, 1976, enables DEHLG to enter into voluntary management agreements with private landowners. Under these agreements landowners will manage their lands to ensure that desirable wildlife habitats and species are protected. Payment for such responsible management may be agreed. However, the number and type of such agreements will vary depending on the resources available to the National Parks and Wildlife at the time.

MARGINAL VEGETATION - At or near the margin or border, often used to describe the vegetation at the edge of a lake or river.

MARGIN WITH HIGH SENSITIVITY TO CUTTING (or HIGH SENSITIVE MARGIN)- Section of high bog margin that is within 250m of priority habitat (i.e. Active Raised Bog or Bog Woodland).

MARGIN WITH LOW SENSITIVITY TO CUTTING (or NONE SENSITIVE MARGIN)- Section of high bog margin that is within more than 250m of priority habitat (i.e. Active Raised Bog or Bog Woodland).

MECHANICAL PEAT EXTRACTION - Refers to the use of machinery to cut peat. This includes extrusion cutting such as by sausage machine (e.g. Difco) or any other type of mechanical cutter (e.g. Hopper).

MICROTOPOGRAPHY – This is the small scale variation in surface level and the following terms used by Kelly (1993) and Schouten (2002) are used to describe it:

- Pools - Depressions in the bog surface where the water table remains above surface level all year round or below surface level for only very short periods of time. They are characterised by the presence of aquatic plant species such as *Sphagnum cuspidatum* and *Cladopodiella fluitans*.
- Hollows - These are shallow depressions in the bog surface where surface water collects, or where the water table reaches ground level or lies just above ground level, depending on seasonal conditions. Marginal hollows tend to be elongated as they are focus points for surface water run off. They are often dominated by *Narthecium ossifragum*. On the high bog they take many forms but are often eye shaped.
- Lawns - These are shallow hollows or flat areas where one species dominates to form a lawn. This is frequently a *Sphagnum* species, such as *Sphagnum magellanicum*, which can completely fill in a hollow to form a small lawn.
- Flats - These are more or less flat areas which are intermediate between hollow and hummock communities. They tend to be drier than the above situations.
- Hummocks - These are mounds on the bog surface which can range from a few centimetres to more than a metre in height. They are usually composed mainly of *Sphagnum* species, such as *Sphagnum magellanicum, S. capillifolium, S. imbricatum* and *S. fuscum* but other bryophyte species such as *Hypnum jutlandicum* and *Leucobryum glaucum* are also important, especially as the hummock grows taller and becomes drier. *Calluna vulgaris* is another important element, as it flourishes where the water table is not at surface level.

MONITORING – A repeat or repeats of a survey using the same methodology. Designed to look for or measure specific changes and the rate or extent of change. Used to check the “health” quantity or quality of a habitat or species.

NATIONAL PARKS AND WILDLIFE SERVICE (NPWS) – the section of the Environment Infrastructure and Services division of the Department of Environment, Heritage and Local Government with responsibility for nature conservation and implementation of Government conservation policy as enunciated by the Minister for the Environment, Heritage and Local Government.

NATURA 2000 - A network of sites across the European Community, selected for the purpose of conserving natural habitats and species of plants and animals which are rare, endangered or vulnerable in the European Community. SACs and SPAs form the Natura 2000 network.

NATURAL HABITAT - Can be aquatic or terrestrial areas distinguished by geographic, abiotic and biotic features, whether entirely natural or semi-natural.

NATURALNESS - Refers to how much or little a site/habitat/species has been modified by mankind.

NHAs - Proposed Natural Heritage Areas. These are areas that are important for wildlife conservation. Some of these sites are small, such as roosting areas for rare bats; others can be large such as a blanket bog or a sand dune system.

NOTABLE SPECIES - Plants or animals which are worthy of mentioning either because they are particularly typical of a habitat, or because they are rare/ scarce/ atypical.

NOTIFIABLE ACTIONS - Actions specified under the cSAC regulations and are listed in the appendices of a conservation plan. These are actions which could cause damage to the site, and for which prior approval is required before they can be carried out.

NPWS - National Parks and Wildlife Service

OLIGOTROPHIC - Applied to waters that are relatively low in nutrients, as in lakes which are low in dissolved minerals and which can only support limited plant growth.

ORTHO-RECTIFIED IMAGE – The 2000 Ordnance Survey flight colour images were used as part of this project. These images were used in TIF format and were ortho-rectified. These images have been used as base data to produce the high bog boundaries, vegetation, drainage and turf plot location maps.

OS – Ordnance Survey

PATROL MONITORING - Regular monitoring of a site usually carried out by the Conservation Ranger to check for damaging activities and to carry out other activities such as to assess the vegetation, to assess the effectiveness of the management regime on the condition of the site, etc.

PEAT CUTTING BY HAND. - See hand cutting of peat.

PEAT CUTTING BY MACHINE - See mechanical peat extraction.

PERIPHERY - Distant from the centre, on the fringe/edge.

PERMEABILITY - The capacity of a rock to transmit fluid.

PHRAGMITES RIDGES - Low ridges of relatively dry peat occur on several bogs. They appear to mark underlying ridges in the mineral soil and are typically covers in dense *Calluna vulgaris* with *Phragmites australis* and sometimes *Myrica gale*. The occurrence of these last two species is probably due to increased availability of nutrients from the mineral soil, even though the peat may be several metres deep (Cross, 1990).

PRECIPITATION - Water moving from the atmosphere to the ground in the form of rain, fog, mist, snow or hail.

PRIMARY VEGETATION - According to Kelly *et al*. (1995) this is taken as undisturbed high bog vegetation that occurs naturally on the high bog. This includes central ecotope on the high bog which has been undisturbed by human impacts such as drainage and peat-cutting. It also includes marginal ecotopes that occur on natural internal slopes and ridges and also those associated with the natural margins of the bog, such as stream margins.

PRIORITY HABITAT - A subset of the habitats listed in Annex I of the EU Habitats Directive. These are habitats which are in danger of disappearance and whose natural range mainly falls within the territory of the European Union. These habitats are of the highest conservation status and require measures to ensure that their favourable conservation status is maintained.

RAISED BOG - An NPWS habitat classification characterised by an elevated dome of peat, the surface of which is isolated from the surrounding ground water table and receiving water solely from precipitation. The peat surface is wet, often with pools and hummock hollow systems and is usually dominated by *Sphagnum* mosses and bushy heather, with Deer-grass, Bog Cottons and other associated species. Raised bogs can be distinguished from blanket bogs by their paucity of grasses which typify blanket bog.

RARE - An ecological term applied to distribution of species when assessed on a national grid reference system. The assessment is made on the basis of the number of occupied 10 km National Grid squares. A species is described as rare if has been recorded in to 3-10, 10 km squares.

RARITY - Refers to how common or scarce a site/habitat/species is.

RECHARGE - The downward movement of water from the soil to the water table.

RED DATA BOOK – A register of threatened species that includes definitions of degrees of threat.

RED DATA BOOK 1 (vascular plants) This Red Data Book deals with rare and threatened flowering plants and ferns of Ireland with an account of their present distributions and conservation status.

RED DATA BOOK 2 (mammals, birds, amphibians and fish) - identifies those species threatened in Ireland or those species whose populations are considered to be of international importance, though not necessarily threatened in Ireland. It details the current state of Irish vertebrates and provides a concise summary of the various legislation for each species.

REPS - Rural Environmental Protection Scheme. This is an Agri-Environmental programme which seeks to draw up agreements with farmers, according to the type of farming, landscape and features on the land. The overall

objectives of REPS are to achieve: the use of farming practices which reduce the polluting effects of agriculture by minimising nutrient loss- an environmentally favourable extensification of crop farming, and sheep farming and cattle farming; - ways of using agricultural land which are compatible with protection and improvement of the environment, the countryside, the landscape, natural resources the soil and genetic diversity; - long-term set-aside of agricultural land for reasons connected with the environment; - land management for public access;- education and training for farmers in types of farming compatible with the requirements of environmental protection and upkeep of the countryside.

REPTILES - Cold-blooded vertebrates, most of which are terrestrial, having dry horny skin with scales or plates. Most reptiles lay eggs that have a leathery skin, although some are ovoviviparous.

RIVERS AND STREAMS - An NPWS habitat classification describing linear channels of moving water. These are natural features that distinguish them from ditches and drainage channels.

SACs - Special Areas of Conservation have been selected from the prime examples of wildlife conservation areas in Ireland. Their legal basis from which selection is derived is The Habitats Directive (92/43/EEC of the 21st May 1992). SAC's have also been known as cSAC's which stands for "candidate Special Areas of Conservation", and pcSAC's which stands for "proposed candidate Special Areas of Conservation."

SCARCE - This is an ecological term, which is applied to distribution of species when assessed on a national grid reference system. The assessment is made on the basis of the number of occupied 10 km National Grid squares. Scarce applies to 11-25, 10 km squares in this context.

SCIENTIFIC MONITORING - this is carried out by the monitoring section of the NPWS, whose function here is to ensure that the favourable conservation status of the site is maintained and where possible improved.

SCRUB – An NPWS habitat classification which comprises areas with more than 50% cover of shrubs or small trees. There may be scattered standard trees, but in general the canopy height is 5m or less. This category does not apply to stands of young trees which will eventually grow to a height of more than 5m.

SECONDARY VEGETATION - According to Kelly *et al*. (1995) this consists of all the vegetation affected by human impacts. This includes the marginal, sub-marginal and sub-central ecotopes affected by drainage and cutaway. It also can include central ecotopes, where these have been created in wet hollows associated with subsidence, caused by human activity.

SOAKS - These are extensive flushed areas usually characterized by small lakes, poor fen communities and scattered birch or pine (Cross, 1990). They are characterized by a species-rich, well developed bryophyte community dominated by Sphagna, principally *S. palustre, S. recurvum* var. *mucratum* and occasionally S. *fimbriatum* and *S. squarrosum. Juncus bulbosus, S. effuses* and *Eriophorum angustifolium* are often present also. On the slightly drier margins, *Aulacomnium palustre, Eriophorum vaginatum, Polytrichum commune, Pleurozium schreberi* and *Vaccinium oxycoccus* occur and sometimes *Empetrum nigrum* and *V. myrtillus*. Pools of open water small lakes may also occur. Many soaks are marked by the presence of birch (*Betula pubescens*) and Scot's pine (*Pinus sylvestris*), usually scattered individuals, but occasionally these trees species form small patches of woodland.

SPAs - Special Protection Areas for Birds are areas which have been designated to ensure the conservation of certain categories of birds. Ireland is required to conserve the habitats of two categories of wild birds under the European Birds Directive (Council Directive 79/ 409/ 2nd April 1979). The NPW is responsible for ensuring that such areas are protected from significant damage.

SPECIES - the lowest unit of classification normally used for plants and animals.

STRATEGY - A course of action or a broad approach towards achieving an objective. It is the general thrust of management towards achieving an objective. It is a description of how the objective is to be achieved.

STREAMS AND SWALLOW HOLES - The fists occur when the horizontal flow of water becomes more concentrated. They area characterized by a narrow band of *Molinia caerulea*, with *Myrica gale*, ferns such as *Osmunda regalis, Dryopteris dilatata* and herbs such as *Angelica sylvestris, Succisa pratensis* and sometimes woody plants such as *Betula pubescens* and *Rubus fruticosus*. These stream may go underground and at such points the overlying peat may collapse and create swallow holes (Cross, 1990).

SURVEY - a) Study/visit to produce an inventory of what is present / record a situation.- b) Establishing a baseline (study).

TILL - Unconsolidated, unsorted glacial deposits.

TURBARY – Turbary is the term used to describe the ancient right to cut turf on a particular area of bog. These rights came about with the resettlement of confiscated land or by prescription. Prescription is a legal term meaning that if a person is able to demonstrate that they cut turf without secrecy, without permission and without force continuously for a period of 30 years they have a turbary right. This implies that not all turbary rights will be formally registered.

TYPICALITY - Assessment of whether a site is typical of the habitat it represents.

UNDERSTOREY - The plant layer below the tree canopy in a woodland.

WETLAND - An area habitually saturated with water, and which may be partially or wholly covered permanently, occasionally, or periodically by fresh or salt water up to a depth of 6 m, and which includes bogs, fens, marsh, shallow ponds, river estuaries, and intertidal mud flats.

ZONING - The division of a nature conservation site (& neighbouring lands) into a number of sub-units. Within each zone the management prescriptions will be reasonably uniform and will differ in type or intensity from the other zones in the plan.

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ALL RAISED BOGS LIST

	Site Code	Name	Designation	Survey	County	Year of designation
1	**6**	**Killyconny**	SAC	Kelly *et al*. (1995)	Cavan, Meath	1997
2	**220**	**Lough Namucka**	NHA	2003	Galway	2003
3	**222**	**River Suck Callows**	NHA	2003	Galway, Roscommon	2005
4	**229**	**Ballygar**	NHA	Derwin & MacGowan (2000)	Galway	2003
5	**231**	**Barroughter**	SAC	Kelly *et al*. (1995)	Galway	1997
6	**235**	**Bracklagh**	NHA	2003	Galway	2003
7	**245**	**Clooncullaun**	NHA	Kelly *et al*. (1995)	Galway	2003
8	**247**	**Slieve (Cloonmore - Cloon Felly)**	NHA	Derwin & MacGowan (2000)	Galway	2003
9	**248**	**Cloonmoylan**	SAC	Kelly *et al*. (1995)	Galway	1997
10	**249**	**Cloonoolish**	NHA	2003	Galway	2003
11	**254**	**Crit Island**	NHA	2003	Galway	2003
12	**267**	**Funshin**	NHA	2003	Galway	2003
13	**280**	**Castlefrench West**	NHA	2003	Galway	2003
14	**281**	**Keeloges**	NHA	2003	Galway	2003
15	**283**	**Kilmore**	NHA	2003	Galway	2003
16	**284**	**Kilnaborris (Killeragh)**	NHA	Derwin & MacGowan (2000)	Galway	2003
17	**285**	**Kilsallagh**	SAC	Kelly *et al*. (1995)	Galway	1997
18	**292**	**Leaha Bog**	NHA	2003	Galway	2003
19	**296**	**Lisnageeragh**	SAC	Kelly *et al*. (1995)	Galway	1997
20	**297**	**Addergoole**	SAC	Kelly *et al*. (1995)	Galway	1997
21	**301**	**Lough Lurgeen**	SAC	Kelly *et al*. (1995)	Galway	1997
22	**307**	**Lough Tee**	NHA	2003	Galway	2003
23	**310**	**Meneen**	NHA	2003	Galway	2003
24	**321**	**Raford River**	NHA	Dromey & Douglas (1995)	Galway	2003
25	**326**	**Shankill West**	SAC	Kelly *et al*. (1995)	Galway	1997
26	**333**	**Anna More**	NHA	2003	Kerry	2003
27	**337**	**Doon Lough**	NHA	2003	Clare	2005
28	**382**	**Sheheree**	SAC	Kelly *et al*. (1995)	Kerry	1997
29	**391**	**Ballynafagh**	SAC	Kelly *et al*. (1995)	Kildare	1997
30	**422**	**Aghnamona**	NHA	2003	Leitrim, Longford	2003
31	**497**	**Flughany**	SAC	Kelly *et al*. (1995)	Mayo/Sligo	1997
32	**564**	**River Little Brosna**	NHA	2003	Offaly	2003
33	**565**	**Clonydonnin**	NHA	Derwin & MacGowan (2000)	Westmeath	2003
34	**566**	**All Saint's Bog**	SAC	Kelly *et al*. (1995)	Offaly	1997
35	**570**	**Blackcastle**	NHA	Kelly *et al*. (1995)	Offaly	2003
36	**572**	**Clara**	SAC	Kelly (1992)	Offaly	1997
37	**575**	**Ferbane**	SAC	Kelly *et al*. (1995)	Offaly	1997
38	**580**	**Mongan**	SAC	Kelly *et al*. (1995)	Offaly	1997
39	**581**	**Moyclare**	SAC	Kelly *et al*. (1995)	Offaly	1997
40	**582**	**Raheenmore**	SAC	Kelly (1992)	Offaly	1997
41	**585**	**Sharavogue**	SAC	Kelly *et al*. (1995)	Offaly	1997
42	**591**	**Bella Bridge**	NHA	2003	Roscommon	2003
43	**592**	**Bellanagare**	SAC	Kelly *et al*. (1995)	Roscommon	1997
44	**595**	**Callow (part of Lough Gara)**	SAC	Kelly *et al*. (1995)	Roscommon, Sligo	2003
45	**597**	**Carrowbehy**	SAC	Kelly *et al*. (1995)	Roscommon	1997
46	**600**	**Cloonchambers**	SAC	Kelly *et al*. (1995)	Roscommon	1997
47	**603**	**Cornaveagh**	NHA	2003	Roscommon	2003
48	**604**	**Derrinea**	SAC	Kelly *et al*. (1995)	Roscommon	1997
49	**605**	**Derrycanan**	NHA	Derwin & MacGowan (2000)	Roscommon	2003

	Site Code	Name	Designation	Survey	County	Year of designation
50	614	Cloonshanville	SAC	Kelly *et al*. (1995)	Roscommon	1997
51	640	Arragh More	NHA	2003	Tipperary	2003
52	641	Clonfinane	SAC	Kelly *et al*. (1995)	Tipperary	1997
53	641	Ballyduff	SAC	Kelly *et al*. (1995)	Tipperary	1997
54	642	Ballymacegan	NHA	2003	Tipperary	2003
55	647	Firville	SAC	Kelly *et al*. (1995)	Tipperary	1997
56	647	Kilcarren	SAC	Kelly *et al*. (1995)	Tipperary	1997
57	648	Killeen	NHA	2003	Tipperary	2003
58	652	Monaincha - Ballaghmore	NHA	2003	Tipperary, Laois	2005
59	674	Ballinderry	NHA	Derwin & MacGowan (2000)	Westmeath	2005
60	674	Ballynagrenia	NHA	Derwin & MacGowan (2000)	Westmeath	2005
61	677	Cloncrow Bog (New Forest)	NHA	2003	Westmeath	2005
62	679	Garriskil	SAC	Kelly *et al*. (1995)	Westmeath	1997
63	684	Lough Derravaragh	NHA	2003	Westmeath	2003
64	691	Rinn River	NHA	2003	Leitrim, Longford	2005
65	694	Wooddown	NHA	2003	Westmeath	2003
66	890	Cangort Bog	NHA	Unsurveyed	Offaly, Tipperary	2003
67	921	Screggan	NHA	2003	Offaly	2005
68	937	Scohaboy	NHA	Derwin & MacGowan (2000)	Tipperary	2005
69	985	Lough Kinale	NHA	Unsurveyed	Longford, Cavan, Westmeath	2005
70	993	Ayle Lower Bog	NHA	2003	Clare	2003
71	1020	Loughanilloon Bog	NHA	Unsurveyed	Clare	2003
72	1227	Aughrim	NHA	Derwin & MacGowan (2000)	Galway	2003
73	1240	Capira - Derrew	NHA	2003	Galway	2005
74	1242	Carrownagappul	SAC	Kelly *et al*. (1995)	Galway	1997
75	1244	Castlefrench East	NHA	2003	Galway	2003
76	1254	Derrinlough Bog	NHA	2003	Galway	2003
77	1255	Derrynagran	NHA	2003	Galway	2005
78	1264	Eskerboy	NHA	Derwin & MacGowan (2000)	Galway	2003
79	1280	Killaclogher	NHA	2003	Galway	2003
80	1283	Killure	NHA	2003	Galway	2003
81	1303	Moorfield	NHA	2003	Galway	2003
82	1324	Jamestown	NHA	2003	Meath	2005
83	1352	Bunnaruddee Bog	NHA	2003	Kerry	2003
84	1388	Carbury	NHA	2003	Kildare	2005
85	1393	Hodgestown Bog	NHA	2003	Kildare	2005
86	1405	Cashel	NHA	2003	Leitrim	2003
87	1420	Corracramph	NHA	2003	Leitrim	2003
88	1423	Cloonageeher Bog	NHA	2003	Leitrim, Longford	2003
89	1448	Forthill	NHA	2003	Longford	2003
90	1450	Mount Jessop	NHA	2003	Longford	2003
91	1580	Girley	NHA	Derwin & MacGowan (2000)	Meath	2003
92	1582	Molerick Bog	NHA	2003	Meath	2003
93	1623	Carrickynaghtan	NHA	2003	Roscommon	2003
94	1652	Tullaghan	NHA	2003	Roscommon	2003
95	1684	Lorrha	NHA	2003	Tipperary	2003
96	1725	Nure Bog	NHA	2003	Westmeath	2005
97	1812	Lough Garr	NHA	2003	Westmeath	2003
98	1818	Ballykenny	SAC	Kelly *et al*. (1995)	Longford	1997
99	1818	Fisherstown	SAC	Kelly *et al*. (1995)	Longford	1997

	Site Code	Name	Designation	Survey	County	Year of designation
100	**1853**	**Nore Valley - Timoney**	NHA	Derwin & MacGowan (2000)	Tipperary	2003
101	**2033**	**Daingean**	NHA	Derwin & MacGowan (2000)	Offaly	2005
102	**2072**	**Lisnanarriagh**	NHA	2003	Roscommon	2003
103	**2110**	**Cloonfelliv**	SAC	Fernandez *et al*. (2005)	Roscommon	1997
104	2110	**Corliskea**	SAC	Kelly *et al*. (1995)	Roscommon, Galway	1997
105	2110	**Moorfield Bog - Farm Cottage**	SAC	Fernandez *et al*. (2005)	Galway	2003
106	2110	**Trien**	SAC	Kelly *et al*. (1995)	Roscommon	1997
107	2298	**Kilgarriff (River Moy)**	SAC	Derwin & MacGowan (2000)	Mayo	2003
108	2298	**Tawnaghbeg (River Moy)**	SAC	Kelly *et al*. (1995)	Mayo	1997
109	**2298**	**Cloongoonagh (River Moy)**	SAC	Derwin & MacGowan (2000)	Sligo	2003
110	2298	**Derrynabrock (River Moy)**	SAC	Kelly *et al*. (1995)	Mayo, Roscommon	1997
111	2298	**Gowlaun (River Moy)**	SAC	Derwin & MacGowan (2000)	Mayo	2003
112	**2307**	**Cloonloum More**	NHA	Derwin & MacGowan (2000)	Clare	2003
113	**2310**	**Lough Ree (Clooncraff-Cloonlarge)**	SAC	2003	Roscommon	2003
114	**2323**	**Milltown Pass**	NHA	2003	Westmeath	2003
115	**2331**	**Mouds**	SAC	Derwin & MacGowan (2000)	Kildare	2003
116	**2332**	**Coolrain**	SAC	Derwin & MacGowan (2000)	Laois	2003
117	**2333**	**Knockacoller**	SAC	Kelly *et al*. (1995)	Laois	2003
118	**2336**	**Carn Park**	SAC	Derwin & MacGowan (2000)	Westmeath	2003
119	**2337**	**Crosswood**	SAC	Kelly *et al*. (1995)	Westmeath	2003
120	**2338**	**Drumalough West**	SAC	2003	Roscommon	2003
121	**2339**	**Ballynamona & Corkip Lough**	SAC	Derwin & MacGowan (2000)	Roscommon	2003
122	**2340**	**Lough Sheelin (Clare Island)**	SAC	Derwin & MacGowan (2000)	Cavan, Meath, Westmeath	2003
123	2340	**Lough Sheelin (Moneybeg)**	SAC	Derwin & MacGowan (2000)	Cavan, Meath, Westmeath	2003
124	**2341**	**Ardagullion - Cloonshannagh**	SAC	Derwin & MacGowan (2000)	Longford	2003
125	**2342**	**Mount Hevey**	SAC	Derwin & MacGowan (2000)	Meath, Westmeath	2003
126	**2343**	**Tullaher Lough/Monmore**	SAC	Derwin & MacGowan (2000)	Clare	2003
127	**2344**	**Annaghbeg**	NHA	2003	Galway	2003
128	**2346**	**Brown Bog**	SAC	Kelly *et al*. (1995)	Longford	2003
129	**2347**	**Camderry**	SAC	Kelly *et al*. (1995)	Galway	2003
130	**2348**	**Clooneen**	SAC	Derwin & MacGowan (2000)	Longford	2003
131	**2349**	**Corbo**	SAC	Kelly *et al*. (1995)	Roscommon	2003
132	**2350**	**Curraghlehanagh**	SAC	Kelly *et al*. (1995)	Galway	2003
133	**2351**	**Moanveanlagh**	SAC	Kelly *et al*. (1995)	Kerry	2003
134	**2352**	**Monivea**	SAC	Kelly *et al*. (1995)	Galway	2003
135	**2353**	**Redwood**	SAC	Kelly *et al*. (1995)	Tipperary	2003
136	**2354**	**Tullaghanrock**	SAC	Derwin & MacGowan (2000)	Roscommon	2003
137	**2355**	**Hawskwood**	NHA	2003	Offaly	2003
138	**2356**	**Ardgraigue**	SAC	2003	Galway	2003
139	**2357**	**Clonreher Bog**	NHA	2003	Laois	2005

Note
This list includes a total of 139 raised bogs amalgamated into 127 designated sites (74 NHAs and 53 SACs)

ORKRAISED BOG SORTED ACCORDING TO PRESENCE OF PRIORITY HABITATS (ACTIVE RAISED BOG AND BOG WOODLAND) AND OCCURRENCE OF TURF CUTTING IN 2003

Table 2.1 Raised bogs where priority habitat is present and turf cutting was recorded in 2003
(Ayler Lower NHA 993, Killure NHA 1283 and Girley NHA 1580 have insignificant amount of priority habitat)

	Code	Name	Designation	Priority habitat present	Turf Cutting present (2003)	Survey	County
1	**231**	**Barroughter**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway
2	**235**	**Bracklagh**	NHA	Yes	Yes	2003	Galway
3	**245**	**Clooncullaun**	NHA	Yes	Yes	Kelly *et al*. (1995)	Galway
4	**248**	**Cloonmoylan**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway
5	**249**	**Cloonoolish**	NHA	Yes	Yes	2003	Galway
6	**254**	**Crit Island**	NHA	Yes	Yes	2003	Galway
7	**280**	**Castlefrench West**	NHA	Yes	Yes	2003	Galway
8	**281**	**Keeloges**	NHA	Yes	Yes	2003	Galway
9	**283**	**Kilmore**	NHA	Yes	Yes	2003	Galway
10	**284**	**Kilnaborris (Killeragh)**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Galway
11	**285**	**Kilsallagh**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway
12	**296**	**Lisnageeragh**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway
13	**297**	**Addergoole**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway
14	**301**	**Lough Lurgeen**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway
15	**307**	**Lough Tee**	NHA	Yes	Yes	2003	Galway
16	**310**	**Meneen**	NHA	Yes	Yes	2003	Galway
17	**321**	**Raford River**	NHA	Yes	Yes	Dromey & Douglas (1995)	Galway
18	**326**	**Shankill West**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway
19	**333**	**Anna More**	NHA	Yes	Yes	2003	Kerry
20	**391**	**Ballynafagh**	SAC	Yes	Yes	Kelly *et al*. (1995)	Kildare
21	**422**	**Aghnamona**	NHA	Yes	Yes	2003	Leitrim, Longford
22	**497**	**Flughany**	SAC	Yes	Yes	Kelly *et al*. (1995)	Mayo/Sligo
23	**564**	**River Little Brosna**	NHA	Yes	Yes	2003	Offaly
24	**565**	**Clonydonnin**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Westmeath
25	**566**	**All Saint's Bog**	SAC	Yes	Yes	Kelly *et al*. (1995)	Offaly
26	**570**	**Blackcastle**	NHA	Yes	Yes	Kelly *et al*. (1995)	Offaly
27	**572**	**Clara**	SAC	Yes	Yes	Kelly (1992)	Offaly
28	**575**	**Ferbane**	SAC	Yes	Yes	Kelly *et al*. (1995)	Offaly
29	**580**	**Mongan**	SAC	Yes	Yes	Kelly *et al*. (1995)	Offaly
30	**581**	**Moyclare**	SAC	Yes	Yes	Kelly *et al*. (1995)	Offaly
31	**585**	**Sharavogue**	SAC	Yes	Yes	Kelly *et al*. (1995)	Offaly
32	**592**	**Bellanagare**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon
33	**595**	**Callow (part of Lough Gara)**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon, Sligo
34	**600**	**Cloonchambers**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon
35	**603**	**Cornaveagh**	NHA	Yes	Yes	2003	Roscommon
36	**605**	**Derrycanan**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Roscommon
37	**614**	**Cloonshanville**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon
38	**640**	**Arragh More**	NHA	Yes	Yes	2003	Tipperary
39	**641**	**Ballyduff**	SAC	Yes	Yes	Kelly *et al*. (1995)	Tipperary
40	**642**	**Ballymacegan**	NHA	Yes	Yes	2003	Tipperary

41	647	**Kilcarren**	SAC	Yes	Yes	Kelly *et al*. (1995)	Tipperary
42	**652**	**Monaincha/Ballaghmore**	NHA	Yes	Yes	2003	Tipperary, Laois
43	**674**	**Ballinderry**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Westmeath
44	674	**Ballynagrenia**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Westmeath
45	**677**	**Cloncrow Bog (New Forest)**	NHA	Yes	Yes	2003	Westmeath
46	**684**	**Lough Derravaragh**	NHA	Yes	Yes	2003	Westmeath
47	**691**	**Rinn River**	NHA	Yes	Yes	2003	Leitrim, Longford
48	**694**	**Wooddown**	NHA	Yes	Yes	2003	Westmeath
49	**921**	**Screggan**	NHA	Yes	Yes	2003	Offaly
50	**937**	**Scohaboy**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Tipperary
51	**993**	**Ayle Lower Bog**	NHA	Yes	Yes	2003	Clare
52	**1227**	**Aughrim**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Galway
53	**1242**	**Carrownagappul**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway
54	**1244**	**Castlefrench East**	NHA	Yes	Yes	2003	Galway
55	**1254**	**Derrinlough Bog**	NHA	Yes	Yes	2003	Galway
56	**1283**	**Killure**	NHA	Yes	Yes	2003	Galway
57	**1303**	**Moorfield**	NHA	Yes	Yes	2003	Galway
58	**1324**	**Jamestown**	NHA	Yes	Yes	2003	Meath
59	**1405**	**Cashel**	NHA	Yes	Yes	2003	Leitrim
60	**1420**	**Corracramph**	NHA	Yes	Yes	2003	Leitrim
61	**1423**	**Cloonageeher Bog**	NHA	Yes	Yes	2003	Leitrim, Longford
62	**1448**	**Forthill**	NHA	Yes	Yes	2003	Longford
63	**1450**	**Mount Jessop**	NHA	Yes	Yes	2003	Longford
64	**1580**	**Girley**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Meath
65	**1623**	**Carrickynaghtan**	NHA	Yes	Yes	2003	Roscommon
66	**1853**	**Nore Valley/Timoney**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Tipperary
67	**2110**	**Cloonfelliv**	SAC	Yes	Yes	Fernandez *et al*. (2005)	Roscommon
68	2110	**Corliskea**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon, Galway
69	2110	**Moorfield Bog – Farm Cottage**	SAC	Yes	Yes	Fernandez *et al*. (2005)	Galway
70	2110	**Trien**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon
71	**2298**	**Cloongoonagh (River Moy)**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Sligo
72	2298	**Derrynabrock**	SAC	Yes	Yes	Kelly *et al*. (1995)	Mayo, Roscommon
73	2298	**Gowlaun (River Moy)**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Mayo
74	**2310**	**Lough Ree (Clooncraff-Cloonlarge)**	SAC	yes	Yes	2003	Roscommon
75	**2323**	**Milltown Pass**	NHA	Yes	Yes	2003	Westmeath
76	**2331**	**Mouds**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Kildare
77	**2332**	**Coolrain**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Laois
78	**2333**	**Knockacoller**	SAC	Yes	Yes	Kelly *et al*. (1995)	Laois
79	**2336**	**Carn Park**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Westmeath
80	**2337**	**Crosswood**	SAC	Yes	Yes	Kelly *et al*. (1995)	Westmeath
81	**2338**	**Drumalough West**	SAC	Yes	Yes	2003	Roscommon
82	**2339**	**Ballynamona & Corkip Lough**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Roscommon
83	**2340**	**Lough Sheelin (Clare Island)**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Cavan, Meath, Westmeath
84	**2340**	**Lough Sheelin (Moneybeg)**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Cavan, Meath, Westmeath
85	**2341**	**Ardagullion - Cloonshannagh**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Longford
86	**2342**	**Mount Hevey**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Meath, Westmeath

87	**2344**	**Annaghbeg**	NHA	Yes	Yes	2003	Galway
88	**2347**	**Camderry**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway
89	**2348**	**Clooneen**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Longford
90	**2349**	**Corbo**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon
91	**2350**	**Curraghlehanagh**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway
92	**2351**	**Moanveanlagh**	SAC	Yes	Yes	Kelly *et al*. (1995)	Kerry
93	**2352**	**Monivea**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway
94	**2353**	**Redwood**	SAC	Yes	Yes	Kelly *et al*. (1995)	Tipperary
95	**2355**	**Hawskwood**	NHA	Yes	Yes	2003	Offaly
96	**2356**	**Ardgraigue**	SAC	Yes	Yes	2003	Galway

Table 2.2 Raised bogs where priority habitat is present and turf cutting was absent in 2003

	Code	Name	Designation	Priority habitat present	Turf Cutting present (2003)	Survey	County
1	**6**	**Killyconny**	SAC	Yes	No	Kelly *et al*. (1995)	Cavan, Meath
2	**229**	**Ballygar**	NHA	Yes	No	Derwin & MacGowan (2000)	Galway
3	**382**	**Sheheree**	SAC	Yes	No	Kelly *et al*. (1995)	Kerry
4	**582**	**Raheenmore**	SAC	Yes	No	Kelly (1992)	Offaly
5	**597**	**Carrowbehy**	SAC	Yes	No	Kelly *et al*. (1995)	Roscommon
6	**604**	**Derrinea**	SAC	Yes	No	Kelly *et al*. (1995)	Roscommon
7	**641**	**Clonfinane**	SAC	Yes	No	Kelly *et al*. (1995)	Tipperary
8	**647**	**Firville**	SAC	Yes	No	Kelly *et al*. (1995)	Tipperary
9	**679**	**Garriskil**	SAC	Yes	No	Kelly *et al*. (1995)	Westmeath
10	**1818**	**Ballykenny**	SAC	Yes	No	Kelly *et al*. (1995)	Longford
11	**1818**	**Fisherstown**	SAC	Yes	No	Kelly *et al*. (1995)	Longford
12	**2298**	**Kilgarriff (River Moy)**	SAC	Yes	No	Derwin & MacGowan (2000)	Mayo
13	**2298**	**Tawnaghbeg**	SAC	Yes	No	Kelly *et al*. (1995)	Mayo
14	**2343**	**Tullaher Lough - Monmore**	SAC	Yes	No	Derwin & MacGowan (2000)	Clare
15	**2346**	**Brown Bog**	SAC	Yes	No	Kelly *et al*. (1995)	Longford
16	**2354**	**Tullaghanrock**	SAC	Yes	No	Derwin & MacGowan (2000)	Roscommon

Table 2.3 Raised bogs where the presence of priority habitat is unknown and turf cutting was absent in 2003

	Code	Name	Designation	Priority habitat present	Turf Cutting present (2003)	Survey	County
1	**890**	**Cangort Bog**	NHA	Unknown	No	Un-surveyed	Offaly, Tipperary
2	**985**	**Lough Kinale**	NHA	Unknown	No	Un-surveyed	Longford, Cavan, Westmeath
3	**1020**	**Loughanilloon Bog**	NHA	Unknown	No	Un-surveyed	Clare

Table 2.4 Raised bogs where priority habitat is absent and turf cutting was recorded in 2003

	Code	Name	Designation	Priority habitat present	Turf Cutting present (2003)	Survey	County
1	**220**	**Lough Namucka**	NHA	No	Yes	2003	Galway
2	**222**	**River Suck Callows**	NHA	No	Yes	2003	Galway, Roscommon
3	**247**	**Slieve (Cloonmore – Cloon Felly)**	NHA	No	Yes	Derwin & MacGowan (2000)	Galway
4	**267**	**Funshin**	NHA	No	Yes	2003	Galway
5	**292**	**Leaha Bog**	NHA	No	Yes	2003	Galway
6	**591**	**Bella Bridge**	NHA	No	Yes	2003	Roscommon
7	**648**	**Killeen**	NHA	No	Yes	2003	Tipperary
8	**1240**	**Capira/Derrew**	NHA	No	Yes	2003	Galway
9	**1255**	**Derrynagran**	NHA	No	Yes	2003	Galway
10	**1264**	**Eskerboy**	NHA	No	Yes	Derwin & MacGowan (2000)	Galway
11	**1280**	**Killaclogher**	NHA	No	Yes	2003	Galway
12	**1352**	**Bunnaruddee Bog**	NHA	No	Yes	2003	Kerry
13	**1393**	**Hodgestown Bog**	NHA	No	Yes	2003	Kildare
14	**1582**	**Molerick Bog**	NHA	No	Yes	2003	Meath
15	**1652**	**Tullaghan**	NHA	No	Yes	2003	Roscommon
16	**1684**	**Lorrha**	NHA	No	Yes	2003	Tipperary
17	**1725**	**Nure Bog**	NHA	No	Yes	2003	Westmeath
18	**1812**	**Lough Garr**	NHA	No	Yes	2003	Westmeath
19	**2072**	**Lisnanarriagh**	NHA	No	Yes	2003	Roscommon
20	**2307**	**Cloonloum More**	NHA	No	Yes	Derwin & MacGowan (2000)	Clare
21	**2357**	**Clonreher Bog**	NHA	No	Yes	2003	Laois

Table 2.5 Raised bogs where priority habitat is absent and turf cutting was absent in 2003

	Code	Name	Designation	Priority habitat present	Turf Cutting present (2003)	Survey	County
1	**337**	**Doon Lough**	NHA	No	No	2003	Clare
2	**1388**	**Carbury**	NHA	No	No	2003	Kildare
3	**2033**	**Daingean**	NHA	No	No	Derwin & MacGowan (2000)	Offaly

LIST OF SITES FLOWN

	Site code	Site name	Designation	Cutting present
Flight 1: 11/6/2003				
1	**391**	Ballynafagh	SAC	Yes
2	**2331**	Mouds	SAC	Yes
3	**2332**	Coolrain	SAC	Yes
4	**572**	Clara	SAC	Yes
5	**570**	Blackcastle	NHA	Yes
6	**2342**	Mount Hevey	SAC	Yes
Flight 2: 25/7/2003				
7	**2333**	Knockacoller	SAC	Yes
8	**652**	Monaincha	NHA	Yes
9	**1853**	Nore Valley/Timoney	NHA	Yes
10	**566**	All Saints	SAC	Yes
11	**564**	River Little Brosna	NHA	Yes
12	**640**	Arraghmore	NHA	Yes
13	**641**	Clonfinane	SAC	Yes
14	**647**	Kilcarren	SAC	Yes
15	**1684**	Lorrha	NHA	Yes
16	**648**	Killeen	NHA	Yes
Flight 3: 30/7/2003				
17	**6**	Killyconny	SAC	No
18	**1580**	Girley	NHA	Yes
19	**1324**	Jamestown	NHA	Yes
20	**1582**	Molerick	NHA	Yes
21	**694**	Woodown	NHA	Yes
22	**684**	Lough Derravaragh	NHA	Yes
23	**679**	Garriskil	SAC	No
24	**1812**	Lough Garr	NHA	Yes
25	**2341**	Cloonshannagh	SAC	Yes
26	**985**	Lough Kinale	NHA	No
27	**2340**	Lough Sheelin	SAC	Yes
Flight 4: 5/8/2003				
28	**281**	Keelogues	NHA	Yes
29	**267**	Funshin	NHA	Yes
30	**245**	Clooncullaun	NHA	Yes
31	**292**	Leaha	NHA	Yes
32	**283**	Kilmore	NHA	Yes
33	**1227**	Aughrim	NHA	Yes
34	**229**	Ballygar	NHA	No
35	**1244**	Castleffrench East	NHA	Yes
36	**280**	Castleffrench West	NHA	Yes
37	**254**	Crit Island	NHA	Yes
38	**1283**	Killure	NHA	Yes
39	**222**	River Suck Callows	NHA	Yes
Flight 5: 12/8/2003				
40	**1405**	Cashel	NHA	Yes
41	**1420**	Corracramph	NHA	Yes
42	**422**	Aghnamona	NHA	Yes
43	**691**	Rinn River	NHA	Yes
44	**1423**	Cloonageeher	NHA	Yes
45	**2348**	Clooneen	pSAC	Yes
46	**2346**	Brown Bog	pSAC	No
47	**1450**	Mt Jessop	NHA	Yes
48	**1448**	Forthill	NHA	Yes
49	**605**	Derrycanan	NHA	Yes
50	**2349**	Corbo	pSAC	Yes
Flight 6: 20/8/2003				
51	**2323**	Milltown Pass	NHA	Yes
52	**677**	Cloncrow Bog	NHA	Yes
53	**1725**	Nure Bog	NHA	Yes

54	**674**	Ballynagrenia & Ballinderry	NHA	Yes
55	**2336**	Carn Park	pSAC	Yes
56	**565**	Clonydonnin	NHA	Yes
57	**2337**	Crosswood	pSAC	Yes
58	**921**	Screggan	NHA	Yes
59	**575**	Ferbane	SAC	Yes
60	**581**	Moyclare	SAC	Yes
61	**580**	Mongan	SAC	Yes
62	**1623**	Carrickynaghtan	NHA	Yes
Flight 7: 26/8/2003				
63	**2298**	River Moy	SAC	Yes
64	**497**	Flughany	SAC	Yes
65	**2354**	Tullaghanrock	pSAC	No
66	**595**	Callow	pSAC	Yes
67	**603**	Cornaveagh	NHA	Yes
68	**1652**	Tullaghan	NHA	Yes
69	**591**	Bella Bridge	NHA	Yes
70	**614**	Cloonshanville	SAC	Yes
71	**592**	Bellanagare	SAC	Yes
Flight 8: 2/9/2003				
72	**604**	Derrinea	SAC	No
73	**2338**	Drumalough East	pSAC	No
73	**2338**	Drumalough West	pSAC	Yes
74	**597**	Carrowbehy	SAC	No
75	**600**	Cloonchambers	SAC	Yes
76	**221**	Moorfield Bog/Farm cottage	NHA	Yes
77	**220**	Lough Namucka	NHA	Yes
78	**235**	Bracklagh	NHA	Yes
79	**285**	Killsallagh	SAC	Yes
80	**296**	Lisnageeragh	SAC	Yes
81	**247**	Slieve	NHA	Yes
82	**457**	Derrynabrock	SAC	Yes
83	**301**	Lough Lurgeen	SAC	Yes
Flight 9: 10/9/2003				
84	**2110**	Corliskea/Cloonfelliv/Trien	SAC	Yes
85	**2347**	Camderry	pSAC	Yes
86	**2350**	Curraghlehanagh	pSAC	Yes
87	**1242**	Carrownagappul	SAC	Yes
88	**326**	Shankill West	SAC	Yes
89	**1254**	Derrinlough	NHA	Yes
90	**1255**	Derrynagran	NHA	Yes
91	**1280**	Killaclogher	NHA	Yes
92	**2352**	Monivea	pSAC	Yes
93	**307**	Lough Tee	NHA	Yes
94	**321**	Raford River	NHA	Yes
95	**2344**	Annaghbeg	NHA	Yes
96	**297**	Addergoole	SAC	Yes
Flight 10: 16/9/2003				
97	**1264**	Eskerboy	NHA	Yes
98	**249**	Cloonoolish	NHA	Yes
99	**1303**	Moorfield	NHA	Yes
100	**284**	Kilnaborris (Killereagh)	NHA	Yes
101	**310**	Meneen	NHA	Yes
102	**642**	Ballymacegan	NHA	Yes
103	**1240**	Capira/Derrew	NHA	Yes
104	**231**	Barroughter	SAC	Yes
105	**248**	Cloonmoylan	SAC	Yes
106	**890**	Cangort	NHA	No
107	**585**	Sharavogue	SAC	Yes
108	**647**	Firville	SAC	No
109	**2356**	Ardgraigue	NHA	Yes
110	**2353**	Redwood	pSAC	Yes

Flight 11: 25/9/2003				
111	**993**	Ayle Lower Bog	NHA	Yes
112	**1020**	Loughanilloon Bog	NHA	No
113	**2307**	Cloonloummore	NHA	Yes
114	**337**	Doon Lough	NHA	Yes
115	**1352**	Bunnaruddee Bog	NHA	Yes
116	**2351**	Moanveanlagh	pSAC	Yes
117	**333**	Anna More	NHA	Yes
Flight 12: 3/10/2003				
118	**440**	Clooncraff-Cloonlarge	SAC	Yes
119	**2072**	Lisnanarriagh	NHA	Yes
120	**2339**	Ballynamona	SAC	Yes
121	**2355**	Hawkswood	NHA	Yes
13	**641**	Ballyduff	SAC	Yes
Total:		**121 sites flown**		

RAISED BOGS WHERE AN IMPACT ASSESSMENT OF TURF CUTTING HAS BEEN CARRIED OUT (93 BOGS), SORTED ACCORDING TO THE DIFFERENT DATA SOURCES DATE

4.1 - Distance of turf cutting (i.e. facebank) recorded in 2003 from priority habitat using 1995 vegetation maps produced by Kelly *et al* .(1995).

Code	Name	Designation	Fernandez *et al*. (2005) data used [1]
231	**Barroughter**	SAC	No
297	**Addergoole**	SAC	No
301	**Lough Lurgeen**	SAC	No
326	**Shankill West**	SAC	No
575	**Ferbane**	SAC	No
580	**Mongan**	SAC	No
595	**Callow (part of Lough Gara)**	SAC	Yes
600	**Cloonchambers**	SAC	No
614	**Cloonshanville**	SAC	No
641	**Ballyduff**	SAC	Yes
647	**Kilcarren**	SAC	No
2110	**Trien**	SAC	No
2298	**Derrynabrock**	SAC	No
2333	**Knockacoller**	SAC	Yes
2337	**Crosswood**	SAC	No
2349	**Corbo**	SAC	Yes
2351	**Moanveanlagh**	SAC	No
2353	**Redwood**	SAC	Yes
Total Number of Raised Bogs		**18**	

Note
[1] Fernandez *et al.* (2005) vegetation map was also considered to asses the impact of turf cutting.

4.2 - Distance of turf cutting (i.e. facebank) recorded in 2003 from priority habitat using 1995 vegetation maps (Kelly *et al.*,1995) that were revised as part of the Fernandez *et al.* (2005) project to ensure consistency in vegetation mapping.

Code	Name	Designation	Fernandez *et al*. (2005) data used [1]
245	**Clooncullaun**	NHA	Yes
248	**Cloonmoylan**	SAC	Yes
285	**Kilsallagh**	SAC	Yes
296	**Lisnageeragh**	SAC	Yes
391	**Ballynafagh**	SAC	Yes
497	**Flughany**	SAC	Yes
566	**All Saint's Bog**	SAC	Yes
570	**Blackcastle**	NHA	Yes
581	**Moyclare**	SAC	Yes
585	**Sharavogue**	SAC	Yes
592	**Bellanagare**	SAC	Yes
1242	**Carrownagappul**	SAC	Yes
2110	**Corliskea**	SAC	Yes

2347	**Camderry**	SAC	Yes
2350	**Curraghlehanagh**	SAC	Yes
2352	**Monivea**	SAC	Yes
Total Number of Raised Bogs		**16**	

Note
[1] Fernandez *et al.* (2005) vegetation map was also considered to asses the impact of turf cutting.

4.3- Distance of turf cutting (i.e. facebank) recorded in 2003 from priority habitat using 1995 vegetation maps produced by other ecologists.

A total of four raised bogs are included in this category:

Raford River (NHA 321) surveyed by Dromey and Douglas in 1995, Clara surveyed by Kelly in 1992 (Clara vegetation description was revised by Fernandez *et al*. (2005)), and Moorfield and Farm Cottage (SAC 2110) and Cloonfeliv (SAC 2110) that were surveyed by Fernandez *et al*. (2005).

4.4 - Distance of turf cutting (i.e. facebank) recorded in 2003 from priority habitat using 2000 vegetation maps (Derwin & MacGowan *et al.*, 2000).

Code	Name	Designation
284	**Kilnaborris (Killeragh)**	NHA
565	**Clonydonnin**	NHA
605	**Derrycanan**	NHA
674	**Ballynagrenia**	NHA
674	**Ballinderry**	NHA
937	**Scohaboy**	NHA
1227	**Aughrim**	NHA
1853	**Nore Valley –Timoney**	NHA
2298	**Cloongoonagh (River Moy)**	SAC
2298	**Gowlaun (River Moy)**	SAC
2331	**Mouds**	SAC
2332	**Coolrain**	SAC
2336	**Carn Park**	SAC
2339	**Ballynamona & Corkip Lough**	SAC
2340	**Lough Sheelin (Clare Island)**	SAC
2340	**Lough Sheelin (Moneybeg)**	SAC
2341	**Ardagullion (Cloonshannagh)**	SAC
2342	**Mount Hevey**	SAC
2348	**Clooneen**	SAC
Total Number of Raised Bogs		**19**

4.5 - Distance of turf cutting (i.e. facebank) recorded in 2003 from priority habitat using 2003 vegetation maps produced as part of this project.

Code	Name	Designation
235	**Bracklagh**	NHA
249	**Cloonoolish**	NHA
254	**Crit Island**	NHA
280	**Castlefrench West**	NHA

281	**Keeloges**	NHA
283	**Kilmore**	NHA
307	**Lough Tee**	NHA
310	**Meneen**	NHA
333	**Anna More**	NHA
422	**Aghnamona**	NHA
564	**River Little Brosna**	NHA
603	**Cornaveagh**	NHA
640	**Arragh More**	NHA
642	**Ballymacegan**	NHA
652	**Monaincha & Ballaghmore**	NHA
677	**Cloncrow Bog (New Forest)**	NHA
684	**Lough Derravaragh**	NHA
691	**Rinn River**	NHA
694	**Wooddown**	NHA
921	**Screggan**	NHA
1244	**Castlefrench East**	NHA
1254	**Derrinlough Bog**	NHA
1303	**Moorfield**	NHA
1324	**Jamestown**	NHA
1405	**Cashel**	NHA
1420	**Corracramph**	NHA
1423	**Cloonageeher Bog**	NHA
1448	**Forthill**	NHA
1450	**Mount Jessop**	NHA
1623	**Carrickynaghtan**	NHA
2310	**Lough Ree (Clooncraff/Cloonlarge)**	SAC
2323	**Milltown Pass**	NHA
2338	**Drumalough West**	SAC
2344	**Annaghbeg**	NHA
2355	**Hawkswood**	NHA
2356	**Ardgraigue**	SAC
Total Number of Raised Bogs		**36**

PHASE 1 RESULTS SUMMARY

The following points are a summary of the findings of Phase 1 of the project, these data have been superseded by the data produced in Phase 2. For instance the number of sites and raised bogs has been revised in Phase 2 (see section 1 Summary Report). The discrepancy in number of sites does not reflect neither sites being added or taken away from the original list.

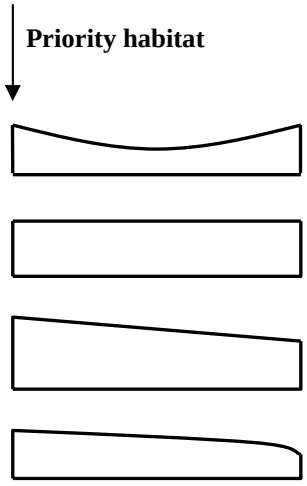
- 130 sites analysed (comprising 144 Bogs).
- Of the 130 sites, 54 are cSACs and the rest (76) are pNHAs.
- A preliminary desk study has found that 21 of the 144 bogs are not being actively cut for turf at present.
- An estimate of 8,974 turf cutters are thought to be actively cutting on 123 bogs.

Summary of data on all raised bog sites in Phase 1 of the project

Total values for all areas	
Total length of perimeters for all sites	992.46 km
Total length of active peat cutting (APC) for all sites	183.06 km
Average percentage of high bog perimeter with APC	19.69 %
Estimated total number of cutters for all sites	8974
Total values for margins of high sensitivity	
Total length of margins of high sensitivity	356.42 km
Total length of APC on margins of high sensitivity	70.34 km
Percentage of total APC in margins of high sensitivity	38.42 %
Total number of cutters along margins of high sensitivity	3517
Total values for margins of low sensitivity	
Total length of margins of low sensitivity	624.89 km
Total length of APC on margins of low sensitivity	109.11 km
Average percentage of total APC in margins of low sensitivity	61.58 %
Total number of cutters along margins of low sensitivity	5457

TURF CUTTING ASSESSMENT FORM (ORIGINAL)

1. Shape of the bog from the area of priority habitat (Active Raised Bog or Bog Woodland) to the face-banks where active peat cutting is taking place.



	Scenario
Active Peat cutting (APC)	A or 1
APC	B or 2
APC	C or 3
APC	D or 4

2. Three categories of age of cutting:
   A. Current……..
   B. within last 5 years…….
   C. more than 5 years old……

3. Height of the facebank

4. Is cracking present on the margins?

Geology/Sub-soils

5. Inspection of the side of drains in the cutaway:

6. A few lines on the general landscape features of the area:

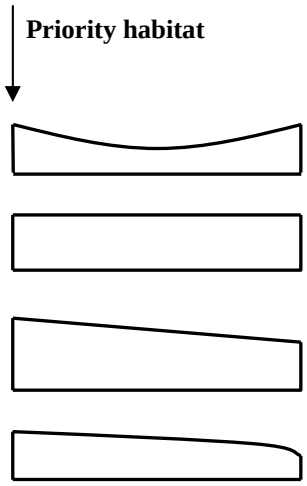
TURF CUTTING ASSESSMENT FORM (MODIFIED)

1. **General location**

   A. North B. South C. East D. West

2. **Face-bank height and width**

3. **Shape of the bog from the area of priority habitat (Active Raised Bog or Bog Woodland) to the face-banks where active peat cutting is taking place.**



	Scenario
Active Peat cutting (APC)	A or 1
APC	B or 2
APC	C or 3
APC	D or 4

4. **Cutover slope**

   A. Sloping away from facebank B. Flat C. Sloping down to facebank

5. **Cutting age**

   A. Current B. within last 5 years C. more than 5 years old

6. **Nature of cutting**

   A. Domestic B. Commercial

7. **Cutting technique**

   A. Hopper B. Lateral cutting C. Pit technique
   D. Difco cutting E. Hand cutting

8. **Cutting age**

   A. Current cutting B. Cut within 5 years C. Cut more than 5 years ago

9. **Ecotope at the edge of the high bog**

   A. Facebank B. Marginal C. Sub-marginal
   D. Sub-central E. Central

10. **Cracking at the edge of the high bog present**

11. **Drains description**
    (Location: high bog or cutover – Depth – Flow direction – Mineral soil visible – Functional or non-functional)

12. **Adjacent landscape description**

RAISED BOGS SORTED ACCORDING TO SURVEY TYPE

Table 7.1- Raised bogs where a vegetation survey was carried out in 2003

	Code	Name	Designation	Presence of priority habitat	Turf Cutting present (2003)	County	Turf cutting surveyed in 2003	Vegetation surveyed in 2003
1	220	Lough Namucka	NHA	No	Yes	Galway	Yes	Yes
2	222	River Suck Callows	NHA	No	Yes	Galway, Roscommon	No	Yes
3	235	Bracklagh	NHA	Yes	Yes	Galway	Yes	Yes
4	249	Cloonoolish	NHA	Yes	Yes	Galway	Yes	Yes
5	254	Crit Island	NHA	Yes	Yes	Galway	Yes	Yes
6	267	Funshin	NHA	No	Yes	Galway	No	Yes
7	280	Castlefrench West	NHA	Yes	Yes	Galway	Yes	Yes
8	281	Keeloges	NHA	Yes	Yes	Galway	Yes	Yes
9	283	Kilmore	NHA	Yes	Yes	Galway	Yes	Yes
10	292	Leaha Bog	NHA	No	Yes	Galway	No	Yes
11	307	Lough Tee	NHA	Yes	Yes	Galway	Yes	Yes
12	310	Meneen	NHA	Yes	Yes	Galway	Yes	Yes
13	333	Anna More	NHA	Yes	Yes	Kerry	Yes	Yes
14	337	Doon Lough	NHA	No	No	Clare	No	Yes
15	422	Aghnamona	NHA	Yes	Yes	Leitrim, Longford	Yes	Yes
16	564	River Little Brosna	NHA	Yes	Yes	Offaly	Yes	Yes
17	591	Bella Bridge	NHA	No	Yes	Roscommon	Yes	Yes
18	603	Cornaveagh	NHA	Yes	Yes	Roscommon	Yes	Yes
19	640	Arragh More	NHA	yes	Yes	Tipperary	Yes	Yes
20	642	Ballymacegan	NHA	Yes	Yes	Tipperary	Yes	Yes
21	648	Killeen	NHA	No	Yes	Tipperary	No	Yes
22	652	Monaincha/Ballaghmore	NHA	Yes	Yes	Tipperary, Laois	Yes	Yes
23	677	Cloncrow Bog (New Forest)	NHA	Yes	Yes	Westmeath	Yes	Yes
24	684	Lough Derravaragh	NHA	Yes	Yes	Westmeath	Yes	Yes
25	691	Rinn River	NHA	Yes	Yes	Leitrim, Longford	Yes	Yes
26	694	Wooddown	NHA	Yes	Yes	Westmeath	Yes	Yes
27	921	Screggan	NHA	Yes	Yes	Offaly	Yes	Yes
28	993	Ayle Lower Bog	NHA	Yes	Yes	Clare	Yes	Yes
29	1240	Capira/Derrew	NHA	No	Yes	Galway	No	Yes
30	1244	Castlefrench East	NHA	Yes	Yes	Galway	Yes	Yes
31	1254	Derrinlough Bog	NHA	Yes	Yes	Galway	Yes	Yes
32	1255	Derrynagran	NHA	No	Yes	Galway	Yes	Yes
33	1280	Killaclogher	NHA	No	Yes	Galway	No	Yes
34	1283	Killure	NHA	Yes	Yes	Galway	Yes	Yes
35	1303	Moorfield	NHA	Yes	Yes	Galway	Yes	Yes
36	1324	Jamestown	NHA	Yes	Yes	Meath	Yes	Yes
37	1352	Bunnaruddee Bog	NHA	No	Yes	Kerry	Yes	Yes
38	1388	Carbury	NHA	No	No	Kildare	No	Yes
39	1393	Hodgestown Bog	NHA	No	Yes	Kildare	No	Yes
40	1405	Cashel	NHA	Yes	Yes	Leitrim	Yes	Yes
41	1420	Corracramph	NHA	Yes	Yes	Leitrim	Yes	Yes
42	1423	Cloonageeher Bog	NHA	Yes	Yes	Leitrim, Longford	Yes	Yes
43	1448	Forthill	NHA	Yes	Yes	Longford	Yes	Yes

44	1450	**Mount Jessop**	NHA	Yes	Yes	Longford	Yes	Yes
45	1582	**Molerick Bog**	NHA	No	Yes	Meath	No	Yes
46	1623	**Carrickynaghtan**	NHA	Yes	Yes	Roscommon	Yes	Yes
47	1652	**Tullaghan**	NHA	No	Yes	Roscommon	No	Yes
48	1684	**Lorrha**	NHA	No	Yes	Tipperary	No	Yes
49	1725	**Nure Bog**	NHA	No	Yes	Westmeath	No	Yes
50	1812	**Lough Garr**	NHA	No	Yes	Westmeath	No	Yes
51	2072	**Lisnanarriagh**	NHA	No	Yes	Roscommon	No	Yes
52	2310	**Lough Ree (Clooncraff/Cloonlarge)**	SAC	yes	Yes	Roscommon	Yes	Yes
53	2323	**Milltown Pass**	NHA	Yes	Yes	Westmeath	Yes	Yes
54	2338	**Drumalough West**	SAC	Yes	Yes	Roscommon	Yes	Yes
55	2344	**Annaghbeg**	NHA	Yes	Yes	Galway	Yes	Yes
56	2355	**Hawskwood**	NHA	Yes	Yes	Offaly	Yes	Yes
57	2356	**Ardgraigue**	SAC	Yes	Yes	Galway	Yes	Yes
58	2357	**Clonreher Bog**	NHA	No	Yes	Laois	No	Yes

Table 7.2- Raised bogs where a turf cutting assessment survey was carried out in 2003

	Code	Name	Designation	Presence of priority habitat	Turf Cutting present (2003)	Survey	County	Turf cutting surveyed in 2003	Vegetation surveyed in 2003
1	220	**Lough Namucka**	NHA	No	Yes	2003	Galway	Yes	Yes
2	231	**Barroughter**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway	Yes	No
3	235	**Bracklagh**	NHA	Yes	Yes	2003	Galway	Yes	Yes
4	245	**Clooncullaun**	NHA	Yes	Yes	Kelly *et al*. (1995)	Galway	Yes	No
5	248	**Cloonmoylan**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway	Yes	No
6	249	**Cloonoolish**	NHA	Yes	Yes	2003	Galway	Yes	Yes
7	254	**Crit Island**	NHA	Yes	Yes	2003	Galway	Yes	Yes
8	280	**Castlefrench West**	NHA	Yes	Yes	2003	Galway	Yes	Yes
9	281	**Keeloges**	NHA	Yes	Yes	2003	Galway	Yes	Yes
10	283	**Kilmore**	NHA	Yes	Yes	2003	Galway	Yes	Yes
11	284	**Kilnaborris (Killeragh)**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Galway	Yes	No
12	285	**Kilsallagh**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway	Yes	No
13	296	**Lisnageeragh**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway	Yes	No
14	297	**Addergoole**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway	Yes	No
15	301	**Lough Lurgeen**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway	Yes	No
16	307	**Lough Tee**	NHA	Yes	Yes	2003	Galway	Yes	Yes
17	310	**Meneen**	NHA	Yes	Yes	2003	Galway	Yes	Yes
18	321	**Raford River**	NHA	Yes	Yes	Dromey & Douglas (1995)	Galway	Yes	No
19	326	**Shankill West**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway	Yes	No
20	333	**Anna More**	NHA	Yes	Yes	2003	Kerry	Yes	Yes
21	391	**Ballynafagh**	SAC	Yes	Yes	Kelly *et al*. (1995)	Kildare	Yes	No
22	422	**Aghnamona**	NHA	Yes	Yes	2003	Leitrim, Longford	Yes	Yes
23	497	**Flughany**	SAC	Yes	Yes	Kelly *et al*. (1995)	Mayo/Sligo	Yes	No
24	564	**River Little Brosna**	NHA	Yes	Yes	2003	Offaly	Yes	Yes
25	565	**Clonydonnin**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Westmeath	Yes	No
26	566	**All Saint's Bog**	SAC	Yes	Yes	Kelly *et al*. (1995)	Offaly	Yes	No
27	570	**Blackcastle**	NHA	Yes	Yes	Kelly *et al*. (1995)	Offaly	Yes	No

28	**572**	**Clara**	SAC	Yes	Yes	Kelly (1992)	Offaly	Yes	No
29	**575**	**Ferbane**	SAC	Yes	Yes	Kelly *et al*. (1995)	Offaly	Yes	No
30	**580**	**Mongan**	SAC	Yes	Yes	Kelly *et al*. (1995)	Offaly	Yes	No
31	**581**	**Moyclare**	SAC	Yes	Yes	Kelly *et al*. (1995)	Offaly	Yes	No
32	**585**	**Sharavogue**	SAC	Yes	Yes	Kelly *et al*. (1995)	Offaly	Yes	No
33	**591**	**Bella Bridge**	NHA	No	Yes	2003	Roscommon	Yes	Yes
34	**592**	**Bellanagare**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon	Yes	No
35	**595**	**Callow (part of Lough Gara)**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon, Sligo	Yes	No
36	**600**	**Cloonchambers**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon	Yes	No
37	**603**	**Cornaveagh**	NHA	Yes	Yes	2003	Roscommon	Yes	Yes
38	**605**	**Derrycanan**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Roscommon	Yes	No
39	**614**	**Cloonshanville**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon	Yes	No
40	**640**	**Arragh More**	NHA	yes	Yes	2003	Tipperary	Yes	Yes
41	641	**Ballyduff**	SAC	Yes	Yes	Kelly *et al*. (1995)	Tipperary	Yes	No
42	**642**	**Ballymacegan**	NHA	Yes	Yes	2003	Tipperary	Yes	Yes
43	647	**Kilcarren**	SAC	Yes	Yes	Kelly *et al*. (1995)	Tipperary	Yes	No
44	**652**	**Monaincha/Ballaghmore**	NHA	Yes	Yes	2003	Tipperary, Laois	Yes	Yes
45	**674**	**Ballinderry**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Westmeath	Yes	No
46	674	**Ballynagrenia**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Westmeath	Yes	No
47	**677**	**Cloncrow Bog (NewForest)**	NHA	Yes	Yes	2003	Westmeath	Yes	Yes
48	**684**	**Lough Derravaragh**	NHA	Yes	Yes	2003	Westmeath	Yes	Yes
49	**691**	**Rinn River**	NHA	Yes	Yes	2003	Leitrim, Longford	Yes	Yes
50	**694**	**Wooddown**	NHA	Yes	Yes	2003	Westmeath	Yes	Yes
51	**921**	**Screggan**	NHA	Yes	Yes	2003	Offaly	Yes	Yes
52	**937**	**Scohaboy**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Tipperary	Yes	No
53	**993**	**Ayle Lower Bog**	NHA	Yes	Yes	2003	Clare	Yes	Yes
54	**1227**	**Aughrim**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Galway	Yes	No
55	**1242**	**Carrownagappul**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway	Yes	No
56	**1244**	**Castlefrench East**	NHA	Yes	Yes	2003	Galway	Yes	Yes
57	**1254**	**Derrinlough Bog**	NHA	Yes	Yes	2003	Galway	Yes	Yes
58	**1255**	**Derrynagran**	NHA	No	Yes	2003	Galway	Yes	Yes
59	**1264**	**Eskerboy**	NHA	No	Yes	Derwin & MacGowan (2000)	Galway	Yes	No
60	**1283**	**Killure**	NHA	Yes	Yes	2003	Galway	Yes	Yes
61	**1303**	**Moorfield**	NHA	Yes	Yes	2003	Galway	Yes	Yes
62	**1324**	**Jamestown**	NHA	Yes	Yes	2003	Meath	Yes	Yes
63	**1352**	**Bunnaruddee Bog**	NHA	No	Yes	2003	Kerry	Yes	Yes
64	**1405**	**Cashel**	NHA	Yes	Yes	2003	Leitrim	Yes	Yes
65	**1420**	**Corracramph**	NHA	Yes	Yes	2003	Leitrim	Yes	Yes
66	**1423**	**Cloonageeher Bog**	NHA	Yes	Yes	2003	Leitrim, Longford	Yes	Yes
67	**1448**	**Forthill**	NHA	Yes	Yes	2003	Longford	Yes	Yes
68	**1450**	**Mount Jessop**	NHA	Yes	Yes	2003	Longford	Yes	Yes
69	**1580**	**Girley**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Meath	Yes	No
70	**1623**	**Carrickynaghtan**	NHA	Yes	Yes	2003	Roscommon	Yes	Yes
71	**1853**	**Nore Valley/Timoney**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Tipperary	Yes	No
72	**2110**	**Cloonfelliv**	SAC	Yes	Yes	Fernandez *et al*. (2005)	Roscommon	Yes	No
73	2110	**Moorfield Bog/Farm Cottage**	SAC	Yes	Yes	Fernandez *et al*. 2005)	Galway	Yes	No
74	2110	**Corliskea**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon, Galway	Yes	No
75	2110	**Trien**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon	Yes	No
76	2298	**Gowlaun (River Moy)**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Mayo	Yes	No

77	2298	**Cloongoonagh (River Moy)**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Sligo	Yes	No
78	2298	**Derrynabrock**	SAC	Yes	Yes	Kelly *et al*. (1995)	Mayo, Roscommon	Yes	No
79	2307	**Cloonloum More**	NHA	No	Yes	Derwin & MacGowan (2000)	Clare	Yes	No
80	2310	**Lough Ree (Clooncraff/Cloonlarge)**	SAC	yes	Yes	2003	Roscommon	Yes	Yes
81	2323	**Milltown Pass**	NHA	Yes	Yes	2003	Westmeath	Yes	Yes
82	2331	**Mouds**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Kildare	Yes	No
83	2332	**Coolrain**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Laois	Yes	No
84	2333	**Knockacoller**	SAC	Yes	Yes	Kelly *et al*. (1995)	Laois	Yes	No
85	2336	**Carn Park**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Westmeath	Yes	No
86	2337	**Crosswood**	SAC	Yes	Yes	Kelly *et al*. (1995)	Westmeath	Yes	No
87	2338	**Drumalough West**	SAC	Yes	Yes	2003	Roscommon	Yes	Yes
88	2339	**Ballynamona & Corkip Lough**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Roscommon	Yes	No
89	2340	**Lough Sheelin (Clare Island)**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Cavan, Meath, Westmeath	Yes	No
90	2340	**Lough Sheelin (Moneybeg)**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Cavan, Meath, Westmeath	Yes	No
91	2341	**Ardagullion - Cloonshannagh**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Longford	Yes	No
92	2342	**Mount Hevey**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Meath, Westmeath	Yes	No
93	2344	**Annaghbeg**	NHA	Yes	Yes	2003	Galway	Yes	Yes
94	2347	**Camderry**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway	Yes	No
95	2348	**Clooneen**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Longford	Yes	No
96	2349	**Corbo**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon	Yes	No
97	2350	**Curraghlehanagh**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway	Yes	No
98	2351	**Moanveanlagh**	SAC	Yes	Yes	Kelly *et al*. (1995)	Kerry	Yes	No
99	2352	**Monivea**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway	Yes	No
100	2353	**Redwood**	SAC	Yes	Yes	Kelly *et al*. (1995)	Tipperary	Yes	No
101	2355	**Hawskwood**	NHA	Yes	Yes	2003	Offaly	Yes	Yes
102	2356	**Ardgraigue**	SAC	Yes	Yes	2003	Galway	Yes	Yes

Table 7.3- Raised bogs where either a vegetation survey or a turf cutting assessment survey were carried out in 2003

	Code	Name	Designation	Presence of priority habitat	Turf Cutting present (2003)	Survey	County	Turf cutting surveyed in 2003	Vegetation surveyed in 2003
1	220	**Lough Namucka**	NHA	No	Yes	2003	Galway	Yes	Yes
2	222	**River Suck Callows**	NHA	No	Yes	2003	Galway, Roscommon	No	Yes
3	231	**Barroughter**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway	Yes	No
4	235	**Bracklagh**	NHA	Yes	Yes	2003	Galway	Yes	Yes
5	245	**Clooncullaun**	NHA	Yes	Yes	Kelly *et al*. (1995)	Galway	Yes	No
6	248	**Cloonmoylan**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway	Yes	No
7	249	**Cloonoolish**	NHA	Yes	Yes	2003	Galway	Yes	Yes
8	254	**Crit Island**	NHA	Yes	Yes	2003	Galway	Yes	Yes
9	267	**Funshin**	NHA	No	Yes	2003	Galway	No	Yes
10	280	**Castlefrench West**	NHA	Yes	Yes	2003	Galway	Yes	Yes
11	281	**Keeloges**	NHA	Yes	Yes	2003	Galway	Yes	Yes
12	283	**Kilmore**	NHA	Yes	Yes	2003	Galway	Yes	Yes

13	**284**	**Kilnaborris (Killeragh)**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Galway	Yes	No
14	**285**	**Kilsallagh**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway	Yes	No
15	**292**	**Leaha Bog**	NHA	No	Yes	2003	Galway	No	Yes
16	**296**	**Lisnageeragh**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway	Yes	No
17	**297**	**Addergoole**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway	Yes	No
18	**301**	**Lough Lurgeen**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway	Yes	No
19	**307**	**Lough Tee**	NHA	Yes	Yes	2003	Galway	Yes	Yes
20	**310**	**Meneen**	NHA	Yes	Yes	2003	Galway	Yes	Yes
21	**321**	**Raford River**	NHA	Yes	Yes	Dromey & Douglas (1995)	Galway	Yes	No
22	**326**	**Shankill West**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway	Yes	No
23	**333**	**Anna More**	NHA	Yes	Yes	2003	Kerry	Yes	Yes
24	**337**	**Doon Lough**	NHA	No	No	2003	Clare	No	Yes
25	**391**	**Ballynafagh**	SAC	Yes	Yes	Kelly *et al*. (1995)	Kildare	Yes	No
26	**422**	**Aghnamona**	NHA	Yes	Yes	2003	Leitrim, Longford	Yes	Yes
27	**497**	**Flughany**	SAC	Yes	Yes	Kelly *et al*. (1995)	Mayo/Sligo	Yes	No
28	**564**	**River Little Brosna**	NHA	Yes	Yes	2003	Offaly	Yes	Yes
29	**565**	**Clonydonnin**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Westmeath	Yes	No
30	**566**	**All Saint's Bog**	SAC	Yes	Yes	Kelly *et al*. (1995)	Offaly	Yes	No
31	**570**	**Blackcastle**	NHA	Yes	Yes	Kelly *et al*. (1995)	Offaly	Yes	No
32	**572**	**Clara**	SAC	Yes	Yes	Kelly (1992)	Offaly	Yes	No
33	**575**	**Ferbane**	SAC	Yes	Yes	Kelly *et al*. (1995)	Offaly	Yes	No
34	**580**	**Mongan**	SAC	Yes	Yes	Kelly *et al*. (1995)	Offaly	Yes	No
35	**581**	**Moyclare**	SAC	Yes	Yes	Kelly *et al*. (1995)	Offaly	Yes	No
36	**585**	**Sharavogue**	SAC	Yes	Yes	Kelly *et al*. (1995)	Offaly	Yes	No
37	**591**	**Bella Bridge**	NHA	No	Yes	2003	Roscommon	Yes	Yes
38	**592**	**Bellanagare**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon	Yes	No
39	**595**	**Callow (part of Lough Gara)**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon, Sligo	Yes	No
40	**600**	**Cloonchambers**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon	Yes	No
41	**603**	**Cornaveagh**	NHA	Yes	Yes	2003	Roscommon	Yes	Yes
42	**605**	**Derrycanan**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Roscommon	Yes	No
43	**614**	**Cloonshanville**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon	Yes	No
44	**640**	**Arragh More**	NHA	yes	Yes	2003	Tipperary	Yes	Yes
45	641	**Ballyduff**	SAC	Yes	Yes	Kelly *et al*. (1995)	Tipperary	Yes	No
46	**642**	**Ballymacegan**	NHA	Yes	Yes	2003	Tipperary	Yes	Yes
47	647	**Kilcarren**	SAC	Yes	Yes	Kelly *et al*. (1995)	Tipperary	Yes	No
48	**648**	**Killeen**	NHA	No	Yes	2003	Tipperary	No	Yes
49	**652**	**Monaincha/Ballaghmore**	NHA	Yes	Yes	2003	Tipperary, Laois	Yes	Yes
50	**674**	**Ballinderry**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Westmeath	Yes	No
51	674	**Ballynagrenia**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Westmeath	Yes	No
52	**677**	**Cloncrow Bog (New Forest)**	NHA	Yes	Yes	2003	Westmeath	Yes	Yes
53	**684**	**Lough Derravaragh**	NHA	Yes	Yes	2003	Westmeath	Yes	Yes
54	**691**	**Rinn River**	NHA	Yes	Yes	2003	Leitrim, Longford	Yes	Yes
55	**694**	**Wooddown**	NHA	Yes	Yes	2003	Westmeath	Yes	Yes
56	**921**	**Screggan**	NHA	Yes	Yes	2003	Offaly	Yes	Yes
57	**937**	**Scohaboy**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Tipperary	Yes	No
58	**993**	**Ayle Lower Bog**	NHA	Yes	Yes	2003	Clare	Yes	Yes
59	**1227**	**Aughrim**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Galway	Yes	No
60	**1240**	**Capira/Derrew**	NHA	No	Yes	2003	Galway	No	Yes
61	**1242**	**Carrownagappul**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway	Yes	No
62	**1244**	**Castlefrench East**	NHA	Yes	Yes	2003	Galway	Yes	Yes

63	1254	**Derrinlough Bog**	NHA	Yes	Yes	2003	Galway	Yes	Yes
64	1255	**Derrynagran**	NHA	No	Yes	2003	Galway	Yes	Yes
65	1264	**Eskerboy**	NHA	No	Yes	Derwin & MacGowan (2000)	Galway	Yes	No
66	1280	**Killaclogher**	NHA	No	Yes	2003	Galway	No	Yes
67	1283	**Killure**	NHA	Yes	Yes	2003	Galway	Yes	Yes
68	1303	**Moorfield**	NHA	Yes	Yes	2003	Galway	Yes	Yes
69	1324	**Jamestown**	NHA	Yes	Yes	2003	Meath	Yes	Yes
70	1352	**Bunnaruddee Bog**	NHA	No	Yes	2003	Kerry	Yes	Yes
71	1388	**Carbury**	NHA	No	No	2003	Kildare	No	Yes
72	1393	**Hodgestown Bog**	NHA	No	Yes	2003	Kildare	No	Yes
73	1405	**Cashel**	NHA	Yes	Yes	2003	Leitrim	Yes	Yes
74	1420	**Corracramph**	NHA	Yes	Yes	2003	Leitrim	Yes	Yes
75	1423	**Cloonageeher Bog**	NHA	Yes	Yes	2003	Leitrim, Longford	Yes	Yes
76	1448	**Forthill**	NHA	Yes	Yes	2003	Longford	Yes	Yes
77	1450	**Mount Jessop**	NHA	Yes	Yes	2003	Longford	Yes	Yes
78	1580	**Girley**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Meath	Yes	No
79	1582	**Molerick Bog**	NHA	No	Yes	2003	Meath	No	Yes
80	1623	**Carrickynaghtan**	NHA	Yes	Yes	2003	Roscommon	Yes	Yes
81	1652	**Tullaghan**	NHA	No	Yes	2003	Roscommon	No	Yes
82	1684	**Lorrha**	NHA	No	Yes	2003	Tipperary	No	Yes
83	1725	**Nure Bog**	NHA	No	Yes	2003	Westmeath	No	Yes
84	1812	**Lough Garr**	NHA	No	Yes	2003	Westmeath	No	Yes
85	1853	**Nore Valley/Timoney**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Tipperary	Yes	No
86	2072	**Lisnanarriagh**	NHA	No	Yes	2003	Roscommon	No	Yes
87	2110	**Cloonfelliv**	SAC	Yes	Yes	Fernandez *et al.* (2005)	Roscommon	Yes	No
88	2110	**Moorfield Bog/Farm Cottage**	SAC	Yes	Yes	Fernandez *et al.* (2005)	Galway	Yes	No
89	2110	**Corliskea**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon, Galway	Yes	No
90	2110	**Trien**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon	Yes	No
91	2298	**Gowlaun (River Moy)**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Mayo	Yes	No
92	2298	**Cloongoonagh (River Moy)**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Sligo	Yes	No
93	2298	**Derrynabrock**	SAC	Yes	Yes	Kelly *et al*. (1995)	Mayo, Roscommon	Yes	No
94	2307	**Cloonloum More**	NHA	No	Yes	Derwin & MacGowan (2000)	Clare	Yes	No
95	2310	**Lough Ree (Clooncraff/Cloonlarge)**	SAC	yes	Yes	2003	Roscommon	Yes	Yes
96	2323	**Milltown Pass**	NHA	Yes	Yes	2003	Westmeath	Yes	Yes
97	2331	**Mouds**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Kildare	Yes	No
98	2332	**Coolrain**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Laois	Yes	No
99	2333	**Knockacoller**	SAC	Yes	Yes	Kelly *et al*. (1995)	Laois	Yes	No
100	2336	**Carn Park**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Westmeath	Yes	No
101	2337	**Crosswood**	SAC	Yes	Yes	Kelly *et al*. (1995)	Westmeath	Yes	No
102	2338	**Drumalough West**	SAC	Yes	Yes	2003	Roscommon	Yes	Yes
103	2339	**Ballynamona & Corkip Lough**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Roscommon	Yes	No
104	2340	**Lough Sheelin (Clare Island)**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Cavan, Meath, Westmeath	Yes	No
105	2340	**Lough Sheelin (Moneybeg)**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Cavan, Meath, Westmeath	Yes	No
106	2341	**Ardagullion - Cloonshannagh**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Longford	Yes	No
107	2342	**Mount Hevey**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Meath, Westmeath	Yes	No
108	2344	**Annaghbeg**	NHA	Yes	Yes	2003	Galway	Yes	Yes
109	2347	**Camderry**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway	Yes	No
110	2348	**Clooneen**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Longford	Yes	No

111	**2349**	**Corbo**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon	Yes	No
112	**2350**	**Curraghlehanagh**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway	Yes	No
113	**2351**	**Moanveanlagh**	SAC	Yes	Yes	Kelly *et al*. (1995)	Kerry	Yes	No
114	**2352**	**Monivea**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway	Yes	No
115	**2353**	**Redwood**	SAC	Yes	Yes	Kelly *et al*. (1995)	Tipperary	Yes	No
116	**2355**	**Hawskwood**	NHA	Yes	Yes	2003	Offaly	Yes	Yes
117	**2356**	**Ardgraigue**	SAC	Yes	Yes	2003	Galway	Yes	Yes
118	**2357**	**Clonreher Bog**	NHA	No	Yes	2003	Laois	No	Yes

Table 7.4- Raised bogs not surveyed in 2003

	Code	Name	Designation	Presence of priority habitat	Turf Cutting present (2003)	Survey	County	Turf cutting surveyed in 2003	Vegetation surveyed in 2003
1	**6**	**Killyconny**	SAC	Yes	No	Kelly *et al*. (1995)	Cavan, Meath	No	No
2	**229**	**Ballygar**	NHA	Yes	No	Derwin & MacGowan (2000)	Galway	No	No
3	**247**	**Slieve(Cloonmore/Cloon Felly)**	NHA	No	Yes	Derwin & MacGowan (2000)	Galway	No	No
4	**382**	**Sheheree**	SAC	Yes	No	Kelly *et al*. (1995)	Kerry	No	No
5	**582**	**Raheenmore**	SAC	Yes	No	Kelly (1992)	Offaly	No	No
6	**597**	**Carrowbehy**	SAC	Yes	No	Kelly *et al*. (1995)	Roscommon	No	No
7	**604**	**Derrinea**	SAC	Yes	No	Kelly *et al*. (1995)	Roscommon	No	No
8	**641**	**Clonfinane**	SAC	Yes	No	Kelly *et al*. (1995)	Tipperary	No	No
9	**647**	**Firville**	SAC	Yes	No	Kelly *et al*. (1995)	Tipperary	No	No
10	**679**	**Garriskil**	SAC	Yes	No	Kelly *et al*. (1995)	Westmeath	No	No
11	**890**	**Cangort Bog**	NHA	Unknown	No	Un-surveyed	Offaly, Tipperary	No	No
12	**985**	**Lough Kinale**	NHA	Unknown	No	Un-surveyed	Longford, Cavan, Westmeath	No	No
13	**1020**	**Loughanilloon Bog**	NHA	Unknown	No	Un-surveyed	Clare	No	No
14	**1818**	**Ballykenny**	SAC	Yes	No	Kelly *et al*. (1995)	Longford	No	No
15	1818	**Fisherstown**	SAC	Yes	No	Kelly *et al*. (1995)	Longford	No	No
16	**2033**	**Daingean**	NHA	No	No	Derwin & MacGowan (2000)	Offaly	No	No
17	2298	**Kilgarriff (River Moy)**	SAC	Yes	No	Derwin & MacGowan (2000)	Mayo	No	No
18	2298	**Tawnaghbeg**	SAC	Yes	No	Kelly *et al*. (1995)	Mayo	No	No
19	**2343**	**Tullaher Lough/Monmore**	SAC	Yes	No	Derwin & MacGowan (2000)	Clare	No	No
20	**2346**	**Brown Bog**	SAC	Yes	No	Kelly *et al*. (1995)	Longford	No	No
21	**2354**	**Tullaghanrock**	SAC	Yes	No	Derwin & MacGowan (2000)	Roscommon	No	No

VEGETATION KEY

Plant communities of the High Bog (adapted from Kelly & Schouten 2003)

Vegetation Types listed in order of decreasing wetness:

2A, 3Ba, 1, 3a, 3Bb, 3c, 3Bb, 3D, 3E, 4A, 4B, 4C, 4D, 4E, 4F, 4G.

POOLS
Depressions on the bog surface where the water table drops below surface level for only very short periods of time. They are characterised by the presence of aquatic plant species such as *Sphagnum cuspidatum* and *Cladopodiella fluitans* (looks like black strings). *Eriophorum angustifolium* & *Rynchospora alba*

Type	Local name	Physical characteristics	Diagnostic species assemblage
2	Community of *Sphagnum cuspidatum* & *Eriophorum angustifolium*	Permanent pools & wet hollows on the high bog. Occurs only where water table remains above ground level all year.	***Sphagnum cuspidatum***, *Eriophorum angustifolium* and *Rhynchospora alba*.
2A	Typical variant	Permanent pools & wet hollows on the high bog. Occurs only where water table remains above ground level all year.	
2B	Variant with *Rhynchospora fusca* This variant is a rarity.	Species-poor shallow pools & hollows at marginal areas. Presence of algal mat indicates a fluctuation water table.	Differential species: *Rhynchospora fusca*
2C	Variant with *Molinia caerulea* This variant is a rarity.	Pools & hollows on cutaway or marginal areas. Slightly nutrient-enriched due to ground-water influence or water movement. Presence indicates very wet conditions.	Differential species: *Molinia caerulea*, *Juncus bulbosus* & *Sphagnum recurvum*
	Algal pools	Pools occurring more often in marginal and submarginal areas with algae dominating the vegetation indicating fluctuation in water levels.	Algae

HOLLOWS

Shallow depressions on the bog surface where surface water collects, or where the water table reaches ground level or lies just above ground level, depending on seasonal conditions. Marginal hollows tend to be elongated as they are focus points for surface water run-off. They are often dominated by *Narthecium ossifragum*. On the high bog they take many forms but are often eye-shaped.

Type	Local name	Physical characteristics	Diagnostic species assemblage
1	Community of *Rhynchospora alba* & **Algal mats**	Confined to hollows & erosion channels on the bog margins. Surface rub-off is high during periods of high rainfall. Narrow, linear features with the long axis corresponding to the direction of flow. Moss cover low (<20%), algal cover high (52%.)	*Rhynchospora alba*, **Algal mat** and *Narthecium ossifragum*
3a	Typical variant: Community of *Narthecium ossifragum, Sphagnum papillosum* & *S. magellanicum*	Damp, elongated hollows holding water during periods of high rainfall. Herb cover 25%:dwarf shrub cover 28%: moss cover >60% suggesting that hollows remain damp for a long period of time.	*Narthecium ossifragum, Rhynchospora alba, Sphagnum papillosum, S. magellanicum* and *S. tenellum*

LAWNS

These are shallow hollows or flat areas where one species dominates to form a lawn. This is frequently a *Sphagnum* species, such as *Sphagnum magellanicum*, which can completely fill a hollow to form a small lawn.

Type	Local name	Physical characteristics	Diagnostic species assemblage
3B	Sociation of *Sphagnum magellanicum*	Confined to pools or very wet hollows which are completely infilled & remain wet throughout the year.	Dominant species: ***Sphagnum magellanicum***
3Ba	Sub-variant with *Sphagnum cuspidatum*	Wettest lawn in central ecotope	Differential species: *Sphagnum cuspidatum*, *Cladopodiella fluitans*, *Menyanthes trifoliata* and *Drosera anglica*
3Bb	Sub-variant with *Sphagnum capillifolium*	Dry lawn grading into low hummock (Drier than other lawn types).	***Sphagnum capillifolium***, *Eriophorum vaginatum* & *Calluna vulgaris*
3Bc	Sub-variant with *Molinia caerulea*	Only occurs in flushes or soaks.	Differential species: ***Molinia caerulea*** and *Potentilla erecta*
3C	Sociation of *Sphagnum papillosum*	Hollows to low hummocks – Central ecotope.	Dominant species: ***Sphagnum papillosum*** in large amounts.

FLATS

These are more or less flat areas which are intermediate between hollow & hummock communities. They tend to be drier than the above situations.

Type	Local name	Physical characteristics	Diagnostic species assemblage
4	Community of *Calluna vulgaris, Sphagnum capillifolium* & *Cladonia portentosa*		***Calluna vulgaris***, *Sphagnum capillifolium, Cladonia portentosa*, ***Dicranium scoparium*** & *Hypnum jutlandicum*
4A	Typical variant: Community of *Calluna vulgaris, Sphagnum capillifolium* & *Cladonia portentosa*	Found in either Flats or Hummocks – no specific dominant species.	***Calluna vulgaris***, *Sphagnum capillifolium,* ***Cladonia portentosa***, ***Dicranium scoparium*** & ***Hypnum jutlandicum***
4D	Sociation of *Cladonia portentosa*	Found in all ecotopes, although more widespread in drier ecotopes. Lichen cover high (86%), moss cover only intermediate (45%).	Dominant species: ***Cladonia portentosa***

HUMMOCKS

These are mounds on the bog surface which can range from a few cms to more than a metre in height. They are usually composed mainly of *Sphagnum* species such as *Sphagnum magellanicum, S. capillifolium, S. imbricatum* & *S. fuscum* but other bryophytes species such as *Hypnum jutlandicum* & *Leucobryum glaucum* are also important, especially as the hummock grows taller and becomes drier. *Calluna vulgaris* is another important element, as it flourishes where the water table is not at surface level.

Type	Local name	Physical characteristics	Diagnostic species assemblage
4A	Typical variant: Community of *Calluna vulgaris, Sphagnum capillifolium* & *Cladonia portentosa*	Hummocks where no specific moss species dominates.	*Calluna vulgaris, Sphagnum capillifolium, Cladonia portentosa, Dicranium scoparium* & *Hypnum jutlandicum*
4C	Sociation of ***Leucobryum glaucum***	Dwarf shrub cover on these hummocks is relatively high indicating comparatively dry conditions.	Dominant species: ***Leucobryum glaucum***
4D	Sociation of ***Cladonia portentosa***	Moss cover only intermediate.	Dominant species: *Cladonia portentosa*
4E	Sociation of ***Sphagnum capillifolium***	Relatively low hummocks (<30cm tall) & dwarf shrub cover is high usually around 55%.	Dominant species: *Sphagnum capillifolium*
4F	Sociation of *Sphagnum imbricatum*	Tall hummocks (50-100cm) & shrub cover high (55%).	Dominant species: *Sphagnum imbricatum*

FACEBANK		
Type	**Local name**	**Diagnostic species assemblage**
4G		*Calluna vulgaris* & *Hypnum jutlandicum* dominated.

DISTURBED AREA
Areas where draining and/or burning has detrimentally affected the vegetation. Bare peat is characteristic.

Type	Local name	Physical characteristics	Diagnostic species assemblage
3D	Variant with *Campylopus paradoxus* & **Algal mats**	Originally Lawns damaged by draining and or burning.	Differential species: *Campylopus paradoxus*, ***C. introflexus*** & **Algal mats**
3E	Variant with ***Trichophorum caespitosum***	Originally lawns, now damaged.	Differential species: ***Trichophorum caespitosum***
4B	Variant with ***Campylopus introflexus***	Burnt and/or drained former Flats or Hummock area.	Differential species: *Campylopus introflexus, Cladonia. paradoxus, Cladonia furcata*, and *Cladoinia uncialis* subsp. *Biuncialis*.
4E	Sociaition of *Sphagnum capillifolium*		Dominant species: *Sphagnum capillifolium*
4G	Consociaiton of *Calluna vulgaris* & *Hypnum jutlandicum*		Dominant species: *Calluna vulgaris* & *Hypnum jutlandicum*

RAISED BOGS SORTED ACCORDING TO THE NECESSITY OF CARRYING OUT A TURF CUTTING IMPACT ASSESSMENT

Table 9.1 Raised bogs where priority habitat (Active Raised Bog and Bog Woodland) is present and active cutting was absent in 2003 - No Turf Cutting Impact Assessment

	Code	Name	Designation	Active Raised Bog habitat present	Turf Cutting present (2003)	Survey	County
1	**6**	**Killyconny**	SAC	Yes	No	Kelly *et al*. (1995)	Cavan, Meath
2	**229**	**Ballygar**	NHA	Yes	No	Derwin & MacGowan (2000)	Galway
3	**382**	**Sheheree**	SAC	Yes	No	Kelly *et al*. (1995)	Kerry
4	**582**	**Raheenmore**	SAC	Yes	No	Kelly (1992)	Offaly
5	**597**	**Carrowbehy**	SAC	Yes	No	Kelly *et al*. (1995)	Roscommon
6	**604**	**Derrinea**	SAC	Yes	No	Kelly *et al*. (1995)	Roscommon
7	**641**	**Clonfinane**	SAC	Yes	No	Kelly *et al*. (1995)	Tipperary
8	**647**	**Firville**	SAC	Yes	No	Kelly *et al*. (1995)	Tipperary
9	**679**	**Garriskil**	SAC	Yes	No	Kelly *et al*. (1995)	Westmeath
10	**1818**	**Ballykenny**	SAC	Yes	No	Kelly *et al*. (1995)	Longford
11	**1818**	**Fisherstown**	SAC	Yes	No	Kelly *et al*. (1995)	Longford
12	**2298**	**Kilgarriff (River Moy)**	SAC	Yes	No	Derwin & MacGowan (2000)	Mayo
13	**2298**	**Tawnaghbeg**	SAC	Yes	No	Kelly *et al*. (1995)	Mayo
14	**2343**	**Tullaher Lough - Monmore**	SAC	Yes	No	Derwin & MacGowan (2000)	Clare
15	**2346**	**Brown Bog**	SAC	Yes	No	Kelly *et al*. (1995)	Longford
16	**2354**	**Tullaghanrock**	SAC	Yes	No	Derwin & MacGowan (2000)	Roscommon

Table 9.2 Raised bogs where priority habitat is present and active cutting was noted in 2003 – Turf Cutting Impact Assessment carried out
(Ayler Lower NHA 993, Killure NHA 1283 and Girley NHA 1580 have insignificant amount of priority habitat, thus are excluded from this list and a Turf Cutting Impact Assessment was not carried out)

	Code	Name	Designation	Active Raised Bog habitat present	Turf Cutting present (2003)	Survey	County
1	**231**	**Barroughter**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway
2	**235**	**Bracklagh**	NHA	Yes	Yes	2003	Galway
3	**245**	**Clooncullaun**	NHA	Yes	Yes	Kelly *et al*. (1995)	Galway
4	**248**	**Cloonmoylan**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway
5	**249**	**Cloonoolish**	NHA	Yes	Yes	2003	Galway
6	**254**	**Crit Island**	NHA	Yes	Yes	2003	Galway
7	**280**	**Castlefrench West**	NHA	Yes	Yes	2003	Galway
8	**281**	**Keeloges**	NHA	Yes	Yes	2003	Galway
9	**283**	**Kilmore**	NHA	Yes	Yes	2003	Galway
10	**284**	**Kilnaborris (Killeragh)**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Galway
11	**285**	**Kilsallagh**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway
12	**296**	**Lisnageeragh**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway
13	**297**	**Addergoole**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway
14	**301**	**Lough Lurgeen**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway
15	**307**	**Lough Tee**	NHA	Yes	Yes	2003	Galway
16	**310**	**Meneen**	NHA	Yes	Yes	2003	Galway
17	**321**	**Raford River**	NHA	Yes	Yes	Dromey & Douglas (1995)	Galway

18	**326**	**Shankill West**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway
19	**333**	**Anna More**	NHA	Yes	Yes	2003	Kerry
20	**391**	**Ballynafagh**	SAC	Yes	Yes	Kelly *et al*. (1995)	Kildare
21	**422**	**Aghnamona**	NHA	Yes	Yes	2003	Leitrim, Longford
22	**497**	**Flughany**	SAC	Yes	Yes	Kelly *et al*. (1995)	Mayo/Sligo
23	**564**	**River Little Brosna**	NHA	Yes	Yes	2003	Offaly
24	**565**	**Clonydonnin**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Westmeath
25	**566**	**All Saint's Bog**	SAC	Yes	Yes	Kelly *et al*. (1995)	Offaly
26	**570**	**Blackcastle**	NHA	Yes	Yes	Kelly *et al*. (1995)	Offaly
27	**572**	**Clara**	SAC	Yes	Yes	Kelly (1992)	Offaly
28	**575**	**Ferbane**	SAC	Yes	Yes	Kelly *et al*. (1995)	Offaly
29	**580**	**Mongan**	SAC	Yes	Yes	Kelly *et al*. (1995)	Offaly
30	**581**	**Moyclare**	SAC	Yes	Yes	Kelly *et al*. (1995)	Offaly
31	**585**	**Sharavogue**	SAC	Yes	Yes	Kelly *et al*. (1995)	Offaly
32	**592**	**Bellanagare**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon
33	**595**	**Callow (part of Lough Gara)**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon, Sligo
34	**600**	**Cloonchambers**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon
35	**603**	**Cornaveagh**	NHA	Yes	Yes	2003	Roscommon
36	**605**	**Derrycanan**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Roscommon
37	**614**	**Cloonshanville**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon
38	**640**	**Arragh More**	NHA	Yes	Yes	2003	Tipperary
39	**641**	**Ballyduff**	SAC	Yes	Yes	Kelly *et al*. (1995)	Tipperary
40	**642**	**Ballymacegan**	NHA	Yes	Yes	2003	Tipperary
41	647	**Kilcarren**	SAC	Yes	Yes	Kelly *et al*. (1995)	Tipperary
42	**652**	**Monaincha/Ballaghmore**	NHA	Yes	Yes	2003	Tipperary, Laois
43	**674**	**Ballinderry**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Westmeath
44	674	**Ballynagrenia**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Westmeath
45	**677**	**Cloncrow Bog (New Forest)**	NHA	Yes	Yes	2003	Westmeath
46	**684**	**Lough Derravaragh**	NHA	Yes	Yes	2003	Westmeath
47	**691**	**Rinn River**	NHA	Yes	Yes	2003	Leitrim, Longford
48	**694**	**Wooddown**	NHA	Yes	Yes	2003	Westmeath
49	**921**	**Screggan**	NHA	Yes	Yes	2003	Offaly
50	**937**	**Scohaboy**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Tipperary
51	**1227**	**Aughrim**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Galway
52	**1242**	**Carrownagappul**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway
53	**1244**	**Castlefrench East**	NHA	Yes	Yes	2003	Galway
54	**1254**	**Derrinlough Bog**	NHA	Yes	Yes	2003	Galway
55	**1303**	**Moorfield**	NHA	Yes	Yes	2003	Galway
56	**1324**	**Jamestown**	NHA	Yes	Yes	2003	Meath
57	**1405**	**Cashel**	NHA	Yes	Yes	2003	Leitrim
58	**1420**	**Corracramph**	NHA	Yes	Yes	2003	Leitrim
59	**1423**	**Cloonageeher Bog**	NHA	Yes	Yes	2003	Leitrim, Longford
60	**1448**	**Forthill**	NHA	Yes	Yes	2003	Longford
61	**1450**	**Mount Jessop**	NHA	Yes	Yes	2003	Longford
62	**1623**	**Carrickynaghtan**	NHA	Yes	Yes	2003	Roscommon
63	**1853**	**Nore Valley/Timoney**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Tipperary
64	**2110**	**Cloonfelliv**	SAC	Yes	Yes	Fernandez *et al*. (2005)	Roscommon
65	2110	**Corliskea**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon, Galway
66	2110	**Moorfield Bog –**	SAC	Yes	Yes	Fernandez *et al*. (2005)	Galway

		Farm Cottage					
67	2110	**Trien**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon
68	**2298**	**Cloongoonagh (River Moy)**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Sligo
69	2298	**Derrynabrock (River Moy)**	SAC	Yes	Yes	Kelly *et al*. (1995)	Mayo, Roscommon
70	2298	**Gowlaun (River Moy)**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Mayo
71	**2310**	**Lough Ree (Clooncraff-Cloonlarge)**	SAC	yes	Yes	2003	Roscommon
72	**2323**	**Milltown Pass**	NHA	Yes	Yes	2003	Westmeath
73	**2331**	**Mouds**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Kildare
74	**2332**	**Coolrain**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Laois
75	**2333**	**Knockacoller**	SAC	Yes	Yes	Kelly *et al*. (1995)	Laois
76	**2336**	**Carn Park**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Westmeath
77	**2337**	**Crosswood**	SAC	Yes	Yes	Kelly *et al*. (1995)	Westmeath
78	**2338**	**Drumalough West**	SAC	Yes	Yes	2003	Roscommon
79	**2339**	**Ballynamona & Corkip Lough**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Roscommon
80	**2340**	**Lough Sheelin (Clare Island)**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Cavan, Meath, Westmeath
81	2340	**Lough Sheelin (Moneybeg)**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Cavan, Meath, Westmeath
82	**2341**	**Ardagullion - Cloonshannagh**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Longford
83	**2342**	**Mount Hevey**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Meath, Westmeath
84	**2344**	**Annaghbeg**	NHA	Yes	Yes	2003	Galway
85	**2347**	**Camderry**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway
86	**2348**	**Clooneen**	SAC	Yes	Yes	Derwin & MacGowan (2000)	Longford
87	**2349**	**Corbo**	SAC	Yes	Yes	Kelly *et al*. (1995)	Roscommon
88	**2350**	**Curraghlehanagh**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway
89	**2351**	**Moanveanlagh**	SAC	Yes	Yes	Kelly *et al*. (1995)	Kerry
90	**2352**	**Monivea**	SAC	Yes	Yes	Kelly *et al*. (1995)	Galway
91	**2353**	**Redwood**	SAC	Yes	Yes	Kelly *et al*. (1995)	Tipperary
92	**2355**	**Hawkswood**	NHA	Yes	Yes	2003	Offaly
93	**2356**	**Ardgraigue**	SAC	Yes	Yes	2003	Galway

Table 9.3 Raised Bogs with absent or insignificant amount of priority habitat and active cutting was present in 2003 - No Turf Cutting Impact Assessment

	Code	Name	Designation	Active Raised Bog habitat present	Turf Cutting present (2003)	Survey	County
1	**220**	**Lough Namucka**	NHA	No	Yes	2003	Galway
2	**222**	**River Suck Callows**	NHA	No	Yes	2003	Galway, Roscommon
3	**247**	**Slieve (Cloonmore – Cloon Felly)**	NHA	No	Yes	Derwin & MacGowan (2000)	Galway
4	**267**	**Funshin**	NHA	No	Yes	2003	Galway
5	**292**	**Leaha Bog**	NHA	No	Yes	2003	Galway
6	**591**	**Bella Bridge**	NHA	No	Yes	2003	Roscommon
7	**648**	**Killeen**	NHA	No	Yes	2003	Tipperary
8	**993**	**Ayle Lower Bog**	NHA	Yes	Yes	2003	Clare
9	**1240**	**Capira/Derrew**	NHA	No	Yes	2003	Galway
10	**1255**	**Derrynagran**	NHA	No	Yes	2003	Galway
11	**1264**	**Eskerboy**	NHA	No	Yes	Derwin & MacGowan (2000)	Galway
12	**1280**	**Killaclogher**	NHA	No	Yes	2003	Galway

13	**1283**	**Killure**	NHA	Yes	Yes	2003	Galway
14	**1352**	**Bunnaruddee Bog**	NHA	No	Yes	2003	Kerry
15	**1393**	**Hodgestown Bog**	NHA	No	Yes	2003	Kildare
16	**1580**	**Girley**	NHA	Yes	Yes	Derwin & MacGowan (2000)	Meath
17	**1582**	**Molerick Bog**	NHA	No	Yes	2003	Meath
18	**1652**	**Tullaghan**	NHA	No	Yes	2003	Roscommon
19	**1684**	**Lorrha**	NHA	No	Yes	2003	Tipperary
20	**1725**	**Nure Bog**	NHA	No	Yes	2003	Westmeath
21	**1812**	**Lough Garr**	NHA	No	Yes	2003	Westmeath
22	**2072**	**Lisnanarriagh**	NHA	No	Yes	2003	Roscommon
23	**2307**	**Cloonloum More**	NHA	No	Yes	Derwin & MacGowan (2000)	Clare
24	**2357**	**Clonreher Bog**	NHA	No	Yes	2003	Laois

Table 9.4 Raised bogs where priority habitat (Active Raised Bog and Bog Woodland) is absent and active cutting was absent in 2003 - No Turf Cutting Impact Assessment

	Code	Name	Designation	Active Raised Bog habitat present	Turf Cutting present (2003)	Survey	County
1	**337**	**Doon Lough**	NHA	No	No	2003	Clare
2	**1388**	**Carbury**	NHA	No	No	2003	Kildare
3	**2033**	**Daingean**	NHA	No	No	Derwin & MacGowan (2000)	Offaly

Table 9.5 Raised bogs where the presence of priority habitat is unknown and active cutting was absent in 2003 - No Turf Cutting Impact Assessment

	Code	Name	Designation	Active Raised Bog habitat present	Turf Cutting present (2003)	Survey	County
1	**890**	**Cangort Bog**	NHA	Unknown	No	Un-surveyed	Offaly, Tipperary
2	**985**	**Lough Kinale**	NHA	Unknown	No	Un-surveyed	Longford, Cavan, Westmeath
3	**1020**	**Loughanilloon Bog**	NHA	Unknown	No	Un-surveyed	Clare

IDENTIFICATION OF AREAS WHERE TURF CUTTING CAUSES MINIMAL IMPACTS

The approach outlined below was developed by an NPWS working group and was aimed at identifying the least sensitive areas, i.e. areas where continued turf cutting would not cause long term problems. This is in contrast to the present approach which seeks to identify the most sensitive sites i.e. areas where turf cutting needs to be phased out to avoid long-term damage to "Priority habitat" areas.

Note
The wording "Active Bog" below should be understood as including the other priority habitat "Bog Woodland" as well.

1. Section 1: Long Version

The following text is an edited and revised version of an Impact Assessment of cutting on Raised Bogs by a National Parks & Wildlife working group led by Mr Jim Ryan.

Draft Impact Assessment of Turf Cutting on SAC Raised Bogs

Technical constraints

This section will deal briefly with how bogs function in hydrological terms, how they are damaged and how they can be restored and the implications of this for identifying areas where the impacts of turf cutting would be restricted to the extraction site.

A raised bog is essentially a mound (dome) of water which supports and is retained by the peat deposit. The height of this mound is determined by the permeability of the peat, the climate and the area and shape of the mound – the more it approximates to a circle the greater the relative height of the dome can be for any given area under natural conditions. When the climate is stable the amount of water entering and leaving the mound (bog dome) over a year is in equilibrium. Anything which significantly increases the long term rate at which water leaves the mound will cause the bog to dry out and shrink until a new equilibrium between water input and output is reached. The main reasons for such losses are a as follows:

(1) Drainage on the high bog, alone or associated with turf cutting, increases the speed of water movement from the dome to the bog margin.
(2) Drainage and/or turf cutting on the margin increases the rate of water losses from the dome by increasing the relative difference in water tables height and therefore the gradient between the dome and cutaway margin.
(3) Marginal drainage and/or turf cutting, particularly if it cuts into the mineral soil, may reduce water pressures in soil underlying the bog and thus increase water losses from the bottom of the bog.
(4) Turf cutting can speed up water losses by removing the more humified (and less permeable) peat which forms on the margins of raised bogs.
(5) Turf cutting as it advances onto the bog from the original margin increases the gradient between the dome and the new facebank and thus increases water losses.
(6) Peat shrinkage associated with drying out from drainage or turf cutting increases surface slopes thus increasing surface runoff rates and decreasing infiltration.

(7) Fires, which are often associated with turf cutting can cause drying out by sealing the bog surface with fine ash particles thus increasing runoff rates and decreasing infiltration onto the bog. *(Note – in comparison with drainage and turf cutting fires only have short term effects).*

During the drying out process peat formation ceases and species and communities characteristic of the wetter parts of the bog may be lost. The bog will thus move from the "active" to the "degraded" Habitats Directive bog category i.e. from a priority to a non priority category. Theoretical considerations predict that increased water loss from one part of the dome will, to a greater or lesser extent, lower water levels everywhere else in that dome. Research work in Ireland has shown that drainage and turf cutting can dry out and lower the surface of a bog by several metres up to at least 600m away from the drainage or extraction site. Thus practical experience supports the theoretical predictions mentioned above. For the purposes of this study 250m is the figure used to assess the sensitivity of a bog margin to turf cutting – i.e. if an area of "active bog" is within 250m of the high bog margin, then this margin will be highly sensitive to cutting. The figure of 250m was used as research on Clara Bog in Co. Offaly over the past two decades has shown the long term, severe impacts of drainage on "active bog" habitat within this range.

Reversing damage caused by turf cutting is much more difficult than for drainage because while it is relatively easy to block drains it is not practicable to replace all the peat which has been extracted. The peat removed reduces the effective area of the bog and thus the height of the water mound it can support. The only possibilities in that case are either to let the bog dry out over decades to centuries and hopefully come to a new equilibrium, possibly mitigated by the creation of new wet areas on the cutovers, or to try to prevent the drying out by building large dams at the cut margins to replace the hydrological functions of the extracted peat. These dams are unsightly, very expensive (€760/m), relatively unstable and even if stable will require some ongoing maintenance. In addition dams will not completely offset the impacts of turf cutting. It can be seen that using drains for restoration means that the costs associated with restoring damage caused by the average turbary plot of 20m long would be a minimum of €15,200. It should be pointed out that such restoration is rarely completely successful and thus in terms of "favourable conservation status" allowing damage to occur and then trying to reverse it will inevitably result in an overall decline in that status. A more sustainable long term option probably is the restoration of the cutaway to offset to some extent the drying out of the dome resulting from previous turf cutting and this is now the preferred option.

It is essential therefore, as an immediate priority to minimise and eventually phase out any turf cutting which could effect the water mound of the active raised bog either directly or indirectly or where it could cause problems for essential rehabilitation measures for the bog.

Criteria for Selecting Potential Turf Cutting Areas

The main causes of drying out have already been identified above (points 1-7) and obviously these situations should be avoided. However, rather than concentrating on avoiding these situations the detailed justification of which at the individual turbary

level would require much more information and resources than we have to hand, a more fruitful approach would be to concentrate on areas where the potential impacts from turf cutting are minimal.

These areas which:
(a) are physically separated from the active raised bog or if connected are topographically higher than it and therefore their exploitation would not cause drainage effects on the rest of the bog.
(b) are not active raised bog.
(c) are damaged bog which cannot technically be restored to active raised bog within 30 years i.e. cannot be considered as the Habitats Directive Annex Habitat "Degraded Raised Bog".
(d) cannot usefully be used to achieve the favourable conservation status of the site.
(e) whose exploitation will not prevent or slow down essential rehabilitation measures for the bog.

Turf cutting on any site which meets all of the above criteria should not have widespread significant adverse impacts on the conservation value of a raised bog SAC. The next section then uses these criteria as the basis for a field assessment technique. The usefulness of the technique requires some field trials and possible refinements. It is suggested that it be used in conjunction with the management plans when these are available and the Raised Bog Restoration Reports (Kelly *et al*. 1995 and Derwin & MacGowan 2000) for each site and the most recent aerial photography.

It should also be noted that turf cutting on raised bogs is a non-sustainable activity and should be phased out as soon as possible. This approach tries to reduce the impacts of turf cutting to a minimum but while cutting continues the peat archive function, i.e. the records of its own and its surrounding development over thousands of years, is being lost.

Identification of possible Turf Cutting areas in SAC Raised Bogs

Field Assessment Key:

1. Is active bog present?

Yes – proceed to 2
No – proceed to 3

2. Could the turf cutting have any subsequent adverse hydrological effects on it?
Note 1: Only 2 types of situations are envisaged where there will not be hydrological effects from turf cutting (a) where areas have become separated from the main bog, (b) where they are connected but topographically higher than the main dome.

For the first situation (a) the water mounds are totally separate and therefore cutting this area away cannot impact on the active bog unless drains associated with the turf cutting lower the ground water levels close to the active bog. For this reason it would be sensible to restrict cutting and the associated drainage to the side away from the "active bog" unless it is topographically higher or more than 100m away from the main margin of the active bog.

In the second situation (b) even though these areas are part of the ground water mound cutting them away can only have a localised effect presuming that runoff from these areas does not make a significant input of water to the main bog (see 4a below). This is because as they are at a topographical high point water can only drain away from them not towards them.

Note 2: When assessing whether an area is topographically higher than the main bog it is essential to take into account the depth of peat which will be removed. It is the relationship between the main bog and the cutting area after peat removal which is important. When uncertain a simple topographical survey of less than one day will solve the problem.

Yes – Could there will be effects on the active bog – no cutting is to be allowed.
No – no effects on active bog – proceed to 3.

3. Is the area all dried out – with no features of obvious interest whose maintenance could be endangered by significant hydrological changes?
(Note: definition of dried out is equal to sub-marginal and marginal ecotopes of Kelly et al. *(1995) and Derwin & MacGowan (2000), see Raised Bog Restoration Report for each site where these ecotopes are shown on the ecotope map. If other ecotopes are present within 250m of the cutting margin, do not consider it to be dried out. For features of interest use Kelly* et al. *(1995) or Derwin & MacGowan (2000), local knowledge and the management plan.*

Yes – proceed to 4
No – area active raised bog or of other hydrologically sensitive feature of obvious conservation value within 250m of high bog margin – no cutting allowed.

4. Can the area be restored to active bog?

Yes – if it is connected to and at the same level or lower than the rest of the bog.
No – if it is connected to but higher than the raised bog and lacks drains.
No – if it is isolated from the rest of the bog i.e. separated by more than 50m of cutover, small i.e. <20ha surrounded by facebanks of >1m tall and lacks surface drains.
Possibly yes – if it is isolated but lacking some of the above features.
Yes or possibly yes – area is degraded raised bog, then no cutting allowed.
No – proceed to 5.

5. Is the area needed to provide support for the maintenance of favourable conservation status for the site by:
(a) Contributing significant amounts of water to the "active bog".
(b) By acting as a refuge for wildlife threatened on the "active bog".

Note 5(a) To carry out the water supply function the dried out area must be higher than the "active bog" and must be connected to it so that rain falling on the area will

flow into the active bog. Drains between the 2 areas do not present a problem as they can be clocked up. However, if the flow would not go onto the active bog but would flow elsewhere even if the drains were blocked this function can be ignored. It can also be ignored if the area involved is very small relative to the main bog and the active bog is in good condition. However, in the opposite case the maintenance of this function would be essential.

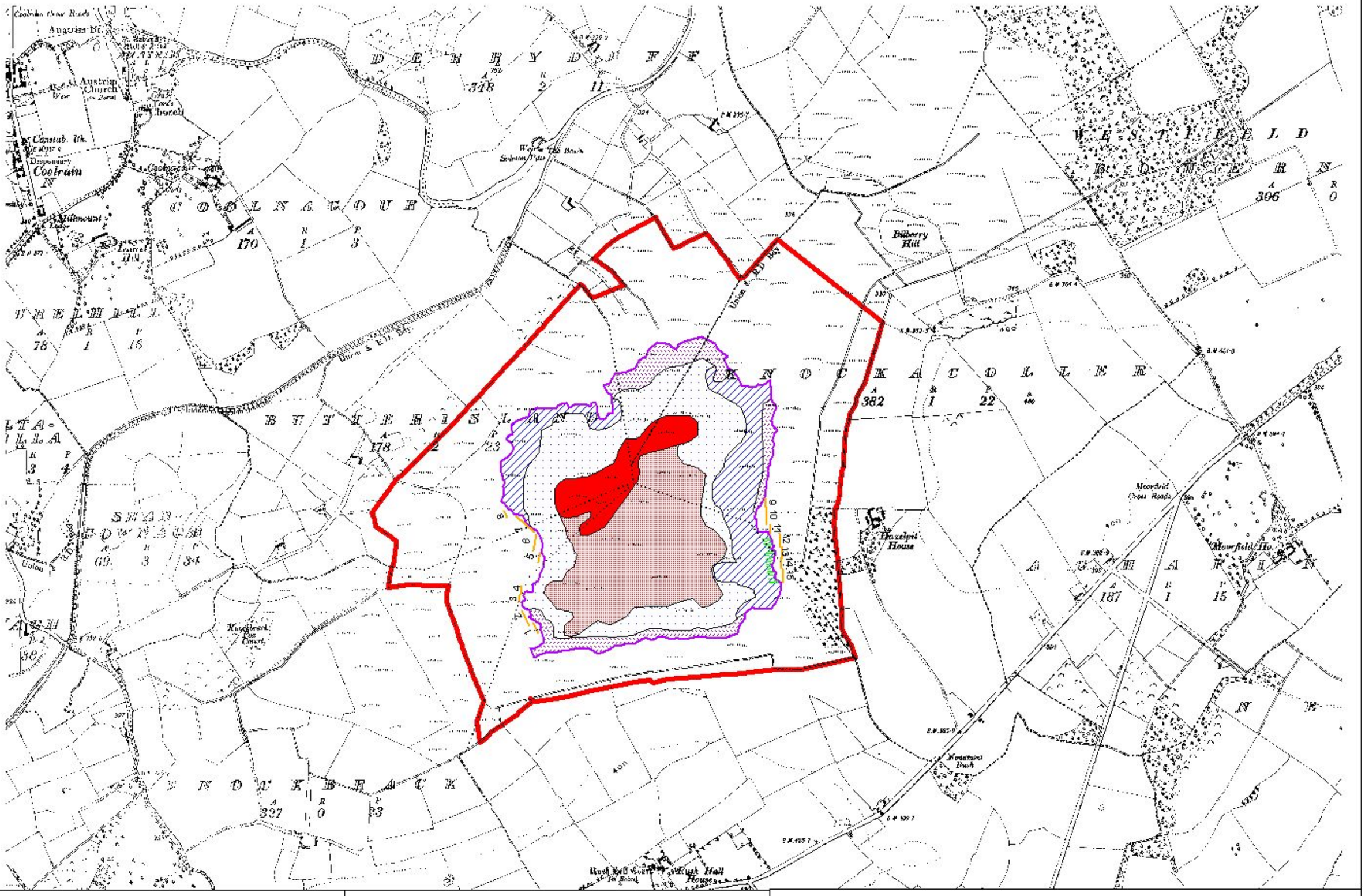
Note 5(b) The refuge function is only relevant if the area of active bog is very small (less than 100ha) and/or highly disturbed so that sensitive species of plants or animals characteristic of the bog may have difficulty maintaining populations there. Remember that as the area is dried out it cannot support species requiring wet conditions!

Yes – no cutting allowed.
No – proceed to 6.

6. Would turf cutting in that area slow down or prevent essential rehabilitation works for the bog?

Note: This is only likely to be a problem in situations where the turf cutting is likely to go on for more than five years and where the drains from the cutting and spreading areas and access roads pass through low lying areas within 100m of the active raised bog. Drains that penetrate into the mineral soil are a particular cause of concern in such situations. Where the base of areas being cut lie above the general level of the cutaway then there should be sufficient fall to allow restoration work without flooding out the turf cuttings. However, access roads and spread grounds need to be carefully looked at. Where cutting involves isolated raised bog remnants at the same level or lower than the "active bog" then problems are likely to occur unless drainage and access routes are well removed from the "active bog" margin. In addition consideration should be made of whether the cutting away of that area might remove the only nearby source of peat for restoration works. (This applies in particular where dam building may be required).

Yes – no turf cutting to be allowed unless it is possible to redirect drainage etc to avoid future conflicts and if sufficient turf is readily available for restoration works.
No – turf cutting can proceed.



Assessment of impacts of turf cutting on designated Raised Bogs 2003-06

Map 1 of 1

Knockacoller SAC 2333
Co. Laois 6" Sheets Ls 16

Map 1 : Ecotopes, turf cutting & high bog drains

Based on interpretation of ortho-rectified aerial imagery.
There may be some discrepancies between 6" map features and aerial images.

0 0.2 0.4 0.6 0.8 Kilometers

Scale 1: 10,560

N

Legend

- Turf plot currently cut (2003)
- HB functional drains
- HB margin within 250m of active bog
- Central ecotope
- Submarginal ecotope
- Submarginal ecotope
- Marginal ecotope
- Facebank ecotope
- HB boundary
- SAC boundary

BOG NAME…, CO. …				
Grid reference				
Status	NHA/SAC	(Cross 1990)		
Area:	Recent	1800s	Perimeter	
	ha (2003)	ha	km (2003)	
Altitude (m OD):	Minimum	Maximum	Mean	
Geology				
Sub-soil				
ECOLOGY				
Ecotopes	**Comments**		**Area (ha) (GIS 2003)**	**% Feature in High Bog (GIS 2003)**
Facebank				
Marginal				
Sub-marginal				
Sub-central				
Central				
Flushes				
Wooded				
Open water				
Swallow-holes				
Molinia	(Inactive) - (Active)			
Other	(Inactive) - (Active)			
HUMAN IMPACT				
Burning record				
Original Dome (1848) remaining intact:				
Length of functional drains (high bog):				
Threat to active bog from high bog drains:				
Invasive species and forestry on high bog:				
Ownership:				
Special features:				
Length of margin				
Length of margin currently cut				
Length of margin cut in past (more than 5 years ago)				
Area of current surface cutting				
Industrial cutting				
Length of highly sensitive margin				
Length of less sensitive margin				
Length of highly sensitive margin currently cut (within last 5 years)				
Total number of surveyed current plots				
Estimated number of unsurveyed current plots				
Number of current plots along highly sensitive margin				
Number of plots requiring immediate action				
Number of plots requiring action in the short term				
Number of plots requiring action in the medium term				

Raised Bog Name…, CO…

1. SUMMARY OF SITE DETAILS

SAC or NHA no.:		6" Sheet:	
Grid Ref.:		1:50,000 Sheet:	
High bog area (ha):	(GIS 2003)	Dates of Visit:	
Aerial Photos			
Verticals:	**1973**: **1995**: **2000**:	Obliques	**1993**: **2003**:
Slide images			
Townlands:			

This contains information on the following:

SAC or NHA No. This corresponds to the code of the site to which the raised bog belong to (e.g. SAC 674 consists of two raised bogs surveyed independently: a) Ballinderry and b) Ballynagrenia.)

Grid Ref: Positions the site using the National Grid reference.

Map numbers: Gives the relevant numbers of the 6" (1:10,560) and discovery Map 1:50,000.

High Bog area (ha): This corresponds to the area of high bog of each raised bog that was measured in 2003 using the 2000 OI and with the aid of Arcview 3.2.

Date(s) of Visit: The site was visited one or more days depending on the size and complexity.

Aerial Photos: This section enumerates photographs taken during different periods. Two types of photos are considered: vertical and oblique.

Slide images: List of slides numbers per raised bog and box where these slides are found. This slides were taken as part of the aerial survey carried out within this project. Appendix XIII.

Townlands: This gives the townland names for the site which are indicated on the 6" sheet.

2. INTRODUCTION

2.1 SURVEY HISTORY

This section contains a brief description of current and previous surveys of the site.

2.2 LOCATION AND ACCESS

This section contains information regarding the geographical location of the site. It also describes the location in relation to other raised bog designated sites and access to the high bog.

3. GEOMORPHOLOGY

3.1 BOG TYPE

Raised bog sites has been grouped on small when they high bog area is less that 100ha, medium between 100-250ha and large greater than 250ha.

It also includes the type of high bog at two different levels: 1) Hydro-geomorphological (i.e. Broad Floodplain, Ridge River, Basin and Ridge Basin) and 2) Ecological (i.e. Western or Intermediate and True Midland).

3.2 SHAPE

This section describes the shape of the high bog and number of peat bodies that compose the raised bog.

3.3 % HIGH BOG REMAINING

A percentage of high bog remaining since the 1800s is given here.

3.4 TOPOGRAPHY OF THE HIGH BOG

This section contains a brief description of the topography of the high bog derived from observations in the field or previous reports.

3.4.1 Slopes of the High Bog

A brief description of the high bog slopes is given here. A slopes map is given for many of the sites, either derived from previous surveys or from current survey.

3.5 TOPOGRAPHY OF HIGH BOG MARGINS

Any topographical description given here is either taken from previous years reports or 6" maps.

4. HYDROLOGICAL SYSTEM

4.1 GEOLOGY/HYDROLOGY

4.1.1 Bedrock

This section contains a brief description of the bedrock underlying the raised bog.

4.1.2 Sub-soils

This section includes a contains a brief note about the sub-soils underlying the raised bog. This information is unavailable in the majority of the sites. Some information on sub-soils can be obtained from the geological maps produced in the 1840s

4.2 HYDROLOGY

This section provides a detailed description of the drainage on the high bog and peripheral drainage. Drainage is generally depicted on map 1 attached to each Site Report. For those sites surveyed prior to this project where detailed maps on drainage and hydrochemistry were produced, a copy of these maps is generally attached to the Site Report.

4.2.1 High Bog Hydrology

4.2.2 Bog Margin Hydrology

5. VEGETATION

5.1 VEGETATION SUMMARY

This section of the report provides a summarised description of the high bog vegetation.

5.2 DETAILED VEGETATION OF HIGH BOG

Here a comprehensive description of the high bog vegetation is given on a community complex level for both those sites surveyed by Kelly *et al*. (1995) and Derwin & MacGowan (2000). These community complexes are pooled into ecotope types. Time constraints in Phase 2 meant that a detailed survey of vegetation communities complexes was impractical for the sites surveyed as part of this

project. Thus only ecotope surveys were undertake. Vegetation ecotopes are depicted on Map 1. A back up of Kelly *et al*. (1995) and Derwin & MacGowan (2000) community complexes map is also attached.

5.2.1 Ecotope Descriptions

5.2.1.1 Facebank Ecotopes
5.2.1.2 Marginal Ecotopes
5.2.1.3 Sub-Marginal Ecotopes
5.2.1.4 Sub-Central Ecotopes
5.2.1.5 Central Ecotopes
5.2.1.6 Flushes

6. PEAT CUTTING ASSESSMENT

6.1 OVERVIEW OF CUTTING ACTIVITIES

This section of the report summarise the evolution of cutting activities on the site since the 1800s. However it mainly concentrates on current cutting taking place on the raised bog. It also describes current landuse on and around the high bog and activities associated with peat cutting (e.g. drainage, burning).

6.2 CONCLUSIONS

This part of the report describes in detail turf cutting at the raised bog, enumerating turf plots and reporting type of cutting according to technique employed and turf plot age. It also contains length of margin currently cut and percentage of this margin considered sensitive (i.e. within 250m from Active raised Bog habitat).

This section finalise outlining the process followed to assign Impact Potential scores according to data included in Table 6.1 below. Once Impact Potential scores given and other consideration described in section 2.3.2.3 of the report are taken into account a turf cessation priority program is drawn.

Table 6.1: Cutting Assessment table (see accompanying Map 1)

Plot no.	Location	Height (m)	Width (m)	Slope*	Age	Distance from active bog habitat	Ecotope at edge	Cracking	Drains	Landscape	Impact Potential
1											Done using according to process outlined in section 2.3.2.3.
2											

*Numbers refer to the shape of the edge of the high bog adjacent to the facebank (see Appendix VI).

SLIDES LIST

Code	Name	Designation	County	Box	Number
6	**Killyconny**	SAC	Cavan, Meath	**No slides**	
220	**Lough Namucka**	NHA	Galway	**21**	23-36
222	**River Suck Callows**	NHA	Galway, Roscommon	**4**	1-12
229	**Ballygar**	NHA	Galway	**5**	1-4
231	**Barroughter**	SAC	Galway	**25**	19-30
235	**Bracklagh**	NHA	Galway	**20**	1-6
245	**Clooncullaun**	NHA	Galway	**5;6**	29-36;1-7
247	**Slieve (Cloonmore/Cloon Felly)**	NHA	Galway	**19;20**	1-14;33-34
248	**Cloonmoylan**	SAC	Galway	**23;25**	1-10;31-36
249	**Cloonoolish**	NHA	Galway	**14**	7-17
254	**Crit Island**	NHA	Galway	**2;3**	33-36;1-36
267	**Funshin**	NHA	Galway	**6**	17-36
280	**Castlefrench West**	NHA	Galway	**4**	20-36
281	**Keeloges**	NHA	Galway	**7**	1-2,9-25
283	**Kilmore**	NHA	Galway	**5**	11-28
284	**Kilnaborris (Killeragh)**	NHA	Galway	**27**	16-27
285	**Kilsallagh**	SAC	Galway	**20**	7-24
292	**Leaha Bog**	NHA	Galway	**6**	8-16
296	**Lisnageeragh**	SAC	Galway	**7;20**	3-8;25-32
297	**Addergoole**	SAC	Galway	**18**	15-24
301	**Lough Lurgeen**	SAC	Galway	**19**	15-25
307	**Lough Tee**	NHA	Galway	**17**	12-36
310	**Meneen**	NHA	Galway	**22**	1-19
321	**Raford River**	NHA	Galway	**17**	1-11
326	**Shankill West**	SAC	Galway	**26**	4-5
333	**Anna More**	NHA	Kerry	**28**	15-17
337	**Doon Lough**	NHA	Clare	**24**	14-18
382	**Sheheree**	SAC	Kerry	**No slides**	
391	**Ballynafagh**	SAC	Kildare	**34**	1-9
422	**Aghnamona**	NHA	Leitrim, Longford	**11**	23-25
497	**Flughany**	SAC	Mayo/Sligo	**15**	13-20
564	**River Little Brosna**	NHA	Offaly	**36;37**	24-36;1-8
565	**Clonydonnin**	NHA	Westmeath	**10**	6-10
566	**All Saint's Bog**	SAC	Offaly	**36**	17-23
570	**Blackcastle**	NHA	Offaly	**32;34**	1-37;24-30
572	**Clara**	SAC	Offaly	**35**	1-36
575	**Ferbane**	SAC	Offaly	**10**	14-15
580	**Mongan**	SAC	Offaly	**10**	12-13
581	**Moyclare**	SAC	Offaly	**10**	16-20
582	**Raheenmore**	SAC	Offaly	**No slides**	
585	**Sharavogue**	SAC	Offaly	**23**	25
591	**Bella Bridge**	NHA	Roscommon	**16**	4-15
592	**Bellanagare**	SAC	Roscommon	**8**	1-36
595	**Callow (part of Lough Gara)**	SAC	Roscommon, Sligo	**15;16**	1-5;28-30
597	**Carrowbehy**	SAC	Roscommon	**No slides**	
600	**Cloonchambers**	SAC	Roscommon	**21**	5-16

603	**Cornaveagh**	NHA	Roscommon	**16**	16-22
604	**Derrinea**	SAC	Roscommon	**No slides**	
605	**Derrycanan**	NHA	Roscommon	**9**	1-8
614	**Cloonshanville**	SAC	Roscommon	**16**	1-3
640	**Arragh More**	NHA	Tipperary	**37**	15-24
641	**Clonfinane**	SAC	Tipperary	**29**	29-36
641	**Ballyduff**	SAC	Tipperary	**37**	25-28
642	**Ballymacegan**	NHA	Tipperary	**22**	20-23
647	**Firville**	SAC	Tipperary	**No slides**	
647	**Kilcarren**	SAC	Tipperary	**37**	13-14
648	**Killeen**	NHA	Tipperary	**37**	29-33
652	**Monaincha/Ballaghmore**	NHA	Tipperary, Laois	**No slides**	
674	**Ballinderry**	NHA	Westmeath	**12**	19-36
674	**Ballynagrenia**	NHA	Westmeath	**12**	6-18
677	**Cloncrow Bog (New Forest)**	NHA	Westmeath	**12**	1-5
679	**Garriskil**	SAC	Westmeath	**1**	24
684	**Lough Derravaragh**	NHA	Westmeath	**1**	22-23
691	**Rinn River**	NHA	Leitrim, Longford	**11**	7-14
694	**Wooddown**	NHA	Westmeath	**1**	26-28
890	**Cangort Bog**	NHA	Offaly, Tipperary	**No slides**	
921	**Screggan**	NHA	Offaly	**10**	21-36
937	**Scohaboy**	NHA	Tipperary	**23**	11-24
985	**Lough Kinale**	NHA	Longford, Cavan, Westmeath	**No slides**	
993	**Ayle Lower Bog**	NHA	Clare	**24**	1-5
1020	**Loughanilloon Bog**	NHA	Clare	**No slides**	
1227	**Aughrim**	NHA	Galway	**5**	5-10
1240	**Capira/Derrew**	NHA	Galway	**25**	9-18
1242	**Carrownagappul**	SAC	Galway	**26**	8-17
1244	**Castlefrench East**	NHA	Galway	**4**	13-19
1254	**Derrinlough Bog**	NHA	Galway	**26**	6-7
1255	**Derrynagran**	NHA	Galway	**26**	1-3
1264	**Eskerboy**	NHA	Galway	**14**	1-6
1280	**Killaclogher**	NHA	Galway	**18**	25-36
1283	**Killure**	NHA	Galway	**2**	1-32
1303	**Moorfield**	NHA	Galway	**21;27**	17-22;28-36
1324	**Jamestown**	NHA	Meath	**1**	1-9
1352	**Bunnaruddee Bog**	NHA	Kerry	**24**	19-36
1388	**Carbury**	NHA	Kildare	**No slides**	
1393	**Hodgestown Bog**	NHA	Kildare	**No slides**	
1405	**Cashel**	NHA	Leitrim	**11**	15-16
1420	**Corracramph**	NHA	Leitrim	**11**	17-22
1423	**Cloonageeher Bog**	NHA	Leitrim, Longford	**7;11**	32-36;1-6
1448	**Forthill**	NHA	Longford	**9**	12-19
1450	**Mount Jessop**	NHA	Longford	**7**	27-31
1580	**Girley**	NHA	Meath	**No slides**	
1582	**Molerick Bog**	NHA	Meath	**1**	29-34
1623	**Carrickynaghtan**	NHA	Roscommon	**10;13**	1-5;24-36
1652	**Tullaghan**	NHA	Roscommon	**16**	23-27
1684	**Lorrha**	NHA	Tipperary	**37**	9-12
1725	**Nure Bog**	NHA	Westmeath	**9**	25-36
1812	**Lough Garr**	NHA	Westmeath	**1**	25

1818	**Ballykenny**	SAC	Longford	**No slides**	
1818	**Fisherstown**	SAC	Longford	**No slides**	
1853	**Nore Valley/Timoney**	NHA	Tipperary	**36**	1-12
2033	**Daingean**	NHA	Offaly	**No slides**	
2072	**Lisnanarriagh**	NHA	Roscommon	**28**	18-25
2110	**Cloonfelliv**	SAC	Roscommon	**27**	1-15
2110	**Corliskea**	SAC	Roscommon, Galway	**27**	1-15
2110	**Moorfield Bog/Farm Cottage**	SAC	Galway	**No slides**	
2110	**Trien**	SAC	Roscommon	**27**	1-15
2298	**Kilgarriff (River Moy)**	SAC	Mayo	**No slides**	
2298	**Tawnaghbeg**	SAC	Mayo	**No slides**	
2298	**Cloongoonagh (River Moy)**	SAC	Sligo	**15**	21-29
2298	**Derrynabrock**	SAC	Mayo, Roscommon	**15**	30-36
2298	**Gowlaun (River Moy)**	SAC	Mayo	**15**	8-12
2307	**Cloonloum More**	NHA	Clare	**24**	6-13
2310	**Lough Ree (Clooncraff/Cloonlarge)**	SAC	Roscommon	**28;29**	26-36;1-17
2323	**Milltown Pass**	NHA	Westmeath	**9**	20-24
2331	**Mouds**	SAC	Kildare	**34**	10-29
2332	**Coolrain**	SAC	Laois	**30;33**	1-35;1-11,30-33
2333	**Knockacoller**	SAC	Laois	**No slides**	
2336	**Carn Park**	SAC	Westmeath	**13**	1-13
2337	**Crosswood**	SAC	Westmeath	**13**	14-23
2338	**Drumalough West**	SAC	Roscommon	**21**	1-4
2339	**Ballynamona & Corkip Lough**	SAC	Roscommon	**29**	18-28
2340	**Lough Sheelin (Clare Island)**	SAC	Cavan, Meath, Westmeath	**1**	10-17
2340	**Lough Sheelin (Moneybeg)**	SAC	Cavan, Meath, Westmeath	**1**	10-17
2341	**Ardagullion - Cloonshannagh**	SAC	Longford	**1**	18-21
2342	**Mount Hevey**	SAC	Meath, Westmeath	**31;33**	1-37;1-13,31-36
2343	**Tullaher Lough/Monmore**	SAC	Clare	**No slides**	
2344	**Annaghbeg**	NHA	Galway	**19**	26-36
2346	**Brown Bog**	SAC	Longford	**No slides**	
2347	**Camderry**	SAC	Galway	**29**	27-36
2348	**Clooneen**	SAC	Longford	**11**	16-36
2349	**Corbo**	SAC	Roscommon	**9**	9-11
2350	**Curraghlehanagh**	SAC	Galway	**29**	18-26
2351	**Moanveanlagh**	SAC	Kerry	**28**	1-14
2352	**Monivea**	SAC	Galway	**18**	1-14
2353	**Redwood**	SAC	Tipperary	**22;25**	24-36;1-8
2354	**Tullaghanrock**	SAC	Roscommon	**15**	6-7
2355	**Hawskwood**	NHA	Offaly	**23**	26-30
2356	**Ardgraigue**	SAC	Galway	**14**	18-36
2357	**Clonreher Bog**	NHA	Laois	**23**	31-36

TURF CUTTING ASSESSMENT STATISTICS FOR 93 RAISED BOGS (2003 SURVEY)

Percentage colour graduation	
Colour	**%**
	0 -<10
	10 - <20
	20 - <40
	40 - <60
	60 - <80
	80 - <100
	100

Note in table below, that only a total of 189 turf plots were described as not cut within more than 5 years. The recording of this type of plots has not been consistent and there is no accurate data on total numbers. However, when recorded an impact potential assessment has been done for these plots and a cutting cessation term is given, in case cutting recommenced on them. According to our calculations the estimated number of turbary rights is greater than 19000 (see Appendix XVIII), and a large proportion of these turbary right owners exercised their right to cut in the past.

	Code	Name	County	Design.	Last vegetation survey	N° of plots immediate term cessation		N° of plots short term cessation		N° of plots medium term cessation		Plots cut > 5 yrs old (2003)	Totals	% Plots immediate category	Length margin (km)	Total length of currently cut plots (km)	Length margin currently cut (km)	% Margin currently cut	Length margin cut >5 yrs (km)	Length sensitive margin (km)	Length sensitive margin currently cut (km)	% sensitive margin currently cut
						2003	>5yrs old	2003	>5yrs old	2003	>5yrs old											
1	231	Barroughter	Galway	SAC	Kelly *et al.* (1995)	8		15		61		NA	84	9.52	6.15	2.48	4.68	76.10	1.47	3.68	2.10	57.07
2	235	Bracklagh	Galway	NHA	2003	7		5		0		NA	12	58.33	3.82	0.30	0.68	17.80	3.14	2.72	0.68	25.00
3	245	Clooncullaun	Galway	NHA	Kelly *et al.* (1995)	5		3		14		NA	22	22.73	7.24	1.06	1.66	22.93	5.58	1.24	0.44	35.48
4	248	Cloonmoylan	Galway	SAC	Kelly *et al.* (1995)	17	1	9	0	50	3	4	76	22.37	12.83	2.77	4.70	36.63	8.13	7.35	1.37	18.64
5	249	Cloonoolish	Galway	NHA	2003	10		7		10		NA	27	37.04	4.89	1.04	1.97	40.29	2.10	3.03	1.59	52.48
6	254	Crit Island	Galway	NHA	2003	0		13		9		NA	22	0.00	26.20	0.65	3.41	13.02	22.79	4.39	0.58	13.21
7	280	Castlefrench West	Galway	NHA	2003	7	3	2	0	35	10	13	44	15.91	6.98	0.99	2.04	29.23	3.89	2.46	0.31	12.60
8	281	Keeloges	Galway	NHA	2003	3		7		7		NA	17	17.65	16.10	0.59	1.17	7.27	13.40	3.18	0.87	27.36
9	283	Kilmore	Galway	NHA	2003	13	5	25	7	35	11	23	73	17.81	5.22	1.49	2.89	55.36	2.33	3.84	1.96	51.04
10	284	Kilnaborris (Killeragh)	Galway	NHA	Derwin & MacGowan (2000)	0		41		16		NA	57	0.00	6.47	1.90	3.09	47.76	3.38	6.47	3.09	47.76
11	285	Kilsallagh	Galway	SAC	Kelly *et al.* (1995)	0	0	7	1	39	4	5	46	0.00	11.00	1.25	2.31	21.00	8.69	3.00	0.25	8.33
12	296	Lisnageeragh	Galway	SAC	Kelly *et al.* (1995)	0	0	2	0	13	4	4	15	0.00	11.50	0.37	0.67	5.83	10.83	1.18	0.17	14.41
13	297	Addergoole	Galway	SAC	Kelly *et al.* (1995)	32		0		17		NA	49	65.31	11.44	0.46	1.56	13.64	10.10	7.35	0.82	11.16
14	301	Lough Lurgeen	Galway	SAC	Kelly *et al.* (1995)	4		3		18	4	4	25	16.00	31.51	1.02	1.50	4.76	19.68	4.81	0.32	6.65
15	307	Lough Tee	Galway	NHA	2003	7		6		31		NA	44	15.91	19.40	1.76	2.92	15.05	16.47	4.37	1.14	26.09
16	310	Meneen	Galway	NHA	2003	0		5		11	3	3	16	0.00	8.93	0.41	4.73	52.97	4.20	0.90	0.55	61.11
17	321	Raford River	Galway	NHA	Dromey & Douglas (1995)	5		2		11		NA	18	27.78	10.42	0.58	1.58	15.16	8.84	1.97	0.58	29.44
18	326	Shankill West	Galway	SAC	Kelly *et al.* (1995)	4		0		0		NA	4	100.00	4.57	0.07	0.08	1.75	3.55	2.77	0.05	1.81
19	333	Anna More	Kerry	NHA	2003	0		0		2		NA	2	0.00	3.90	0.02	0.04	1.03	3.86	0.81	0.00	0.00
20	391	Ballynafagh	Kildare	SAC	Kelly *et al.* (1995)	6	4	15	35	11	3	42	32	18.75	4.98	1.02	1.68	33.73	3.30	3.65	1.23	33.70
21	422	Aghnamona	Leitrim, Longford	NHA	2003	0	0	6	0	4	0	NA	10	0.00	19.64	0.44	0.79	4.00	18.85	4.43	0.35	7.86
22	497	Flughany	Mayo, Sligo	SAC	Kelly *et al.* (1995)	4		0		1		NA	5	80.00	15.30	0.16	0.31	2.03	6.02	4.26	0.17	3.99
23	564	River Little Brosna	Offaly	NHA	2003	2		8		34	4	4	44	4.55	4.59	1.07	1.21	26.25	3.38	3.16	1.11	35.09
24	565	Clonydonnin	Westmeath	NHA	Derwin & MacGowan (2000)	4		9	2	4	1	3	17	23.53	6.23	0.55	1.06	17.01	5.17	5.33	1.06	19.89
25	566	All Saint's Bog	Offaly	SAC	Kelly *et al.* (1995)	12	9	0	0	2	3	12	14	85.71	7.89	0.57	1.15	14.58	6.74	6.65	1.00	14.96
26	570	Blackcastle	Offaly	NHA	Kelly *et al.* (1995)	0		16		22		NA	38	0.00	5.81	0.67	0.91	15.66	4.91	3.74	0.74	19.79
27	572	Clara	Offaly	SAC	Kelly (1992)	38	1	14		8		1	60	63.33	18.04	1.98	3.38	18.74	15.49	8.45	2.79	33.02
28	575	Ferbane	Offaly	SAC	Kelly *et al.* (1995)	1		0		0		NA	1	100.00	6.04	0.22	0.22	3.64	6.04	3.35	0.22	6.57
29	580	Mongan	Offaly	SAC	Kelly *et al.* (1995)	1		0		0		NA	1	100.00	6.13	0.03	0.03	0.49	6.10	4.12	0.00	0.00
30	581	Moyclare	Offaly	SAC	Kelly *et al.* (1995)	20		5		0			25	80.00	4.68	0.63	0.98	20.94	3.70	4.33	0.77	17.78
31	585	Sharavogue	Offaly	SAC	Kelly *et al.* (1995)	3		0		1		NA	4	75.00	6.69	0.14	0.14	2.09	5.29	4.68	0.09	1.92
32	592	Bellanagare	Roscommon	SAC	Kelly *et al.* (1995)	0	0	4	0	30	4	4	34	0.00	42.68	1.21	3.76	8.81	38.92	7.80	0.78	10.00
33	595	Callow (part of Lough Gara)	Roscommon, Sligo	SAC	Kelly *et al.* (1995)	16		7		23		NA	46	34.78	9.90	2.35	3.46	34.95	6.44	2.45	1.41	57.67
34	600	Cloonchambers	Roscommon	SAC	Kelly *et al.* (1995)	0		1		18		NA	19	0.00	14.79	0.40	0.52	3.52	12.84	2.36	0.01	0.42
35	603	Cornaveagh	Roscommon	NHA	2003	6		5		7		NA	18	33.33	4.75	0.78	0.97	20.42	3.78	1.66	0.35	21.08
36	605	Derrycanan	Roscommon	NHA	Derwin & MacGowan (2000)	9		15	3	37	2	5	61	14.75	23.19	1.94	6.48	27.94	16.71	1.21	1.05	86.78
37	614	Cloonshanville	Roscommon	SAC	Kelly *et al.* (1995)	0		0		1		NA	1	0.00	6.36	0.04	0.07	1.10	5.74	4.95	0.00	0.00
38	640	Arragh More	Tipperary	NHA	2003	3	3	0		3	3	6	6	50.00	13.26	0.10	0.14	1.06	13.12	0.89	0.00	0.00
39	641	Ballyduff	Tipperary	SAC	Kelly *et al.* (1995)	5		14		0		NA	19	26.32	4.20	0.79	1.00	23.81	3.20	1.86	1.00	53.76
40	642	Ballymacegan	Tipperary	NHA	2003	10		0		9		NA	19	52.63	3.63	0.60	0.88	24.21	2.75	1.84	0.83	45.11
41	647	Kilcarren	Tipperary	SAC	Kelly *et al.* (1995)	2		1		3		NA	6	33.33	8.46	0.46	0.55	6.50	7.70	6.84	0.55	8.08
42	652	Monaincha/Ballaghmore	Tipperary, Laois	NHA	2003	6	2	0		0		2	6	100.00	10.78	1.41	1.67	15.49	9.05	2.46	1.43	58.13
43	674	Ballynagrenia	Westmeath	NHA	Derwin & MacGowan (2000)	7		8		18		NA	33	21.21	6.80	1.04	2.43	35.74	4.73	5.07	1.22	24.06
44	674	Ballinderry	Westmeath	NHA	Derwin & MacGowan (2000)	20	5	17	1	4	2	8	41	48.78	3.92	1.39	2.41	61.53	1.51	3.66	1.98	54.02
45	677	Cloncrow Bog (New Forest)	Westmeath	NHA	2003	0		0	2	2		2	2	0.00	8.05	0.06	0.12	1.49	7.93	1.63	0.00	0.00
46	684	Lough Derravaragh	Westmeath	NHA	2003	0		0		9		NA	9	0.00	4.89	0.21	0.37	7.57	4.11	1.93	0.32	16.58

47	691	Rinn River	Leitrim, Longford	NHA	2003	13		15		3		NA	31	41.94	8.52	0.75	1.86	21.84	6.29	6.65	1.59	23.97
48	694	Wooddown	Westmeath	NHA	2003	1		1		6		NA	8	12.50	7.81	0.44	0.80	10.24	7.01	2.62	0.29	11.07
49	921	Screggan	Offaly	NHA	2003	6		9		46		NA	61	9.84	8.92	1.91	3.38	37.89	5.54	1.71	0.70	40.94
50	937	Scohaboy	Tipperary	NHA	Derwin & MacGowan (2000)	7		0		38		NA	45	15.56	9.58	2.19	3.40	35.49	6.18	0.64	0.08	12.50
51	1227	Aughrim	Galway	NHA	Derwin & MacGowan (2000)	0		0		6		NA	6	0.00	12.55	0.16	0.24	1.91	8.83	1.67	0.00	0.00
52	1242	Carrownagappul	Galway	SAC	Kelly *et al.* (1995)	6		10		22		NA	38	15.79	17.56	1.46	2.91	16.57	14.65	5.78	1.28	22.15
53	1244	Castlefrench East	Galway	NHA	2003	0		1		0		NA	1	0.00	4.63	0.02	0.02	0.43	4.63	3.97	0.02	0.50
54	1254	Derrinlough Bog	Galway	NHA	2003	5		0		1		NA	6	83.33	8.90	0.31	0.45	5.06	5.45	2.07	0.12	5.80
55	1303	Moorfield	Galway	NHA	2003	5		2		15		NA	22	22.73	6.43	0.93	1.56	24.26	4.87	0.59	0.28	47.46
56	1324	Jamestown	Meath	NHA	2003	24		48		43		NA	115	20.87	5.20	2.16	3.88	74.62	1.32	3.86	3.86	100.00
57	1405	Cashel	Leitrim	NHA	2003	0		2		8		NA	10	0.00	5.32	0.30	0.51	9.59	4.81	2.41	0.00	0.00
58	1420	Corracramph	Leitrim	NHA	2003	10		0		4		NA	14	71.43	9.42	0.69	1.60	16.99	7.82	1.20	0.58	48.33
59	1423	Cloonageeher Bog	Leitrim, Longford	NHA	2003	0		3	2	33	3	5	36	0.00	10.31	0.78	2.00	19.40	8.31	2.52	0.19	7.54
60	1448	Forthill	Longford	NHA	2003	1		5		23		NA	29	3.45	4.14	1.13	1.68	40.58	1.97	1.90	0.63	33.16
61	1450	Mount Jessop	Longford	NHA	2003	3		1		4		NA	8	37.50	4.70	0.18	0.25	5.32	4.45	1.21	0.15	12.40
62	1623	Carrickynaghtan	Roscommon	NHA	2003	16	5	0		3		5	19	84.21	25.24	0.49	1.06	4.20	24.18	15.57	0.29	1.86
63	1853	Nore Valley -Timoney	Tipperary	NHA	Derwin & MacGowan (2000)	12	1	0		1		1	13	92.31	8.21	2.63	3.28	39.95	4.93	2.83	1.43	50.53
64	2110	Corliskea	Roscommon, Galway	SAC	Kelly *et al.* (1995)	13	6	15	0	15	0	6	43	30.23	16.15	2.01	2.23	13.81	13.93	8.00	1.05	13.13
65	2110	Moorfield Bog-Farm Cottage	Galway	SAC	Fernandez (2005)	2		3		4		NA	9	22.22	6.44	0.47	0.57	8.85	5.87	3.70	0.40	10.70
66	2110	Trien	Roscommon	SAC	Kelly *et al.* (1995)	1	0	0	0	4	5	4	5	20.00	9.34	0.20	0.20	2.14	9.14	4.79	0.06	1.25
67	2110	Clonfelliv	Roscommon	SAC	Fernandez et al (2005)	0	0	0	0	2	0	NA	2	0.00	3.80	0.09	1.20	31.58	2.60	1.17	0.08	6.84
68	2298	Derrynabrock (River Moy)	Mayo, Roscommon	SAC	Kelly *et al.* (1995)	0		0		1		NA	1	0.00	4.31	0.03	0.03	0.70	2.33	3.31	0.00	0.00
69	2298	Gowlaun (River Moy)	Mayo	SAC	2003	12		0		0		NA	12	100.00	15.37	1.01	1.43	9.30	14.28	1.34	0.27	20.15
70	2298	Cloongoonagh (River Moy)	Sligo	SAC	Derwin & MacGowan (2000)	8		0		0		NA	8	100.00	10.67	0.33	0.66	6.19	10.01	2.54	0.00	0.00
71	2310	Lough Ree (Clooncraff/Cloonlarge)	Roscommon	SAC	2003	58		6		74		NA	138	42.03	53.90	4.35	9.69	17.98	25.70	10.90	3.30	30.28
72	2323	Milltown Pass	Westmeath	NHA	2003	2	1	2		7	3	4	11	18.18	4.36	0.45	0.73	16.74	0.08	2.57	0.45	17.51
73	2331	Mouds	Kildare	SAC	Derwin & MacGowan (2000)	48		24		34		NA	106	45.28	13.74	3.01	5.18	37.70	8.56	6.45	3.86	59.84
74	2332	Coolrain	Laois	SAC	Derwin & MacGowan (2000)	32	5	12		0		5	44	72.73	5.25	1.71	2.54	48.38	2.71	5.25	2.54	48.38
75	2333	Knockacoller	Laois	SAC	Kelly *et al.* (1995)	13		2		0		NA	15	86.67	3.56	0.54	0.67	18.82	2.89	3.56	0.67	18.82
76	2336	Carn Park	Westmeath	SAC	Derwin & MacGowan (2000)	16	2	9		5		2	30	53.33	8.89	1.25	1.69	19.01	4.09	2.67	1.37	51.31
77	2337	Crosswood	Westmeath	SAC	Kelly *et al.* (1995)	22		0		22		NA	44	50.00	5.17	1.78	2.83	54.74	2.34	1.95	0.90	46.15
78	2338	Drumalough West	Roscommon	SAC	2003	0		3		5		NA	8	0.00	5.42	0.37	0.53	9.78	4.89	3.82	0.47	12.30
79	2339	Ballynamona & Corkip Lough	Roscommon	SAC	Derwin & MacGowan (2000)	20		18		10		NA	48	41.67	4.34	2.00	2.85	65.67	1.49	3.72	2.81	75.54
80	2340	Lough Sheelin/Clare Island	Cavan, Meath, Westmeath	SAC	Derwin & MacGowan (2000)	1		1		9		NA	11	9.09	5.98	0.21	0.55	9.25	5.43	4.60	0.50	10.87
81	2340	Lough Sheelin/Moneybeg	Cavan, Meath, Westmeath	SAC	Derwin & MacGowan (2000)	14		8		16		NA	38	36.84	7.28	1.05	3.15	43.27	4.13	5.57	2.44	43.81
82	2341	Ardagullion/Cloonshannagh	Longford	SAC	Derwin & MacGowan (2000)	7		4		5		NA	16	43.75	4.18	0.29	0.79	18.90	3.39	3.20	0.76	23.75
83	2342	Mount Hevey	Meath, Westmeath	SAC	Derwin & MacGowan (2000)	13		3		10		NA	26	50.00	16.06	1.17	1.67	10.40	14.39	11.04	0.96	8.70
84	2344	Annaghbeg	Galway	NHA	2003	0		17		7		NA	24	0.00	7.09	0.84	1.73	24.40	5.36	3.12	1.09	34.94
85	2347	Camderry	Galway	SAC	Kelly *et al.* (1995)	1		5		13		NA	19	5.26	10.92	0.73	1.41	12.91	9.50	4.73	0.68	14.38
86	2348	Clooneen	Longford	SAC	Derwin & MacGowan (2000)	6	1	2		5		1	13	46.15	7.36	0.50	1.15	15.63	6.21	4.18	0.72	17.22
87	2349	Corbo	Roscommon	SAC	Kelly *et al.* (1995)	21	7	3	0	28	0	7	52	40.38	9.02	1.79	3.36	37.25	5.66	5.83	2.58	44.25
88	2350	Curraghlehanagh	Galway	SAC	Kelly *et al.* (1995)	14		0		32		NA	46	30.43	8.19	1.17	2.28	27.84	5.91	1.14	0.68	59.65
89	2351	Moanveanlagh	Kerry	SAC	Kelly *et al.* (1995)	0		2		30		NA	32	0.00	7.37	0.68	1.63	22.12	5.74	1.32	0.22	16.67
90	2352	Monivea	Galway	SAC	Kelly *et al.* (1995)	18	2	0	0	77	2	4	95	18.95	9.68	2.20	4.83	49.90	4.85	1.53	0.08	5.23
91	2353	Redwood	Tipperary	SAC	Kelly *et al.* (1995)	13		0		8		NA	21	61.90	9.47	2.62	2.62	27.67	6.85	5.33	1.34	25.14
92	2355	Hawkswood	Offaly	NHA	2003	0		0		4		NA	4	0.00	5.70	0.33	0.40	7.02	5.30	2.43	0.12	4.94
93	2356	Ardgraigue	Galway	SAC	2003	18		0		35		NA	53	33.96	6.51	1.14	2.78	42.70	3.73	2.62	1.05	40.08
					TOTALS	779		533		1348		189	2660		923.21	90.24	168.63		694.55	347.86	80.27	

RAISED BOGS CUTTING CESSATION LIST

This appendix also includes the conservation status assessment of the overall raised bog habitats carried out by Fernandez *et al*. (2005). The conservation status given was classed as follows:

A – Favourable
B - Unfavourable inadequate
C - Unfavourable bad

	Code	Name	County	Design.	Survey	Complete cessation of cutting at raised bog level based on the "Impact potential assessment methodology" (Option B.1)			Complete cessation of cutting according to option B.3	Conservation Status Assessment (Fernandez *et al.* 2005)	Complete cessation of cutting according to option B.5
						Immediate cessation	Short term cessation	Medium term cessation			
1	231	Barroughter	Galway	SAC	Kelly *et al.* (1995)	Yes			Yes	C	
2	235	Bracklagh	Galway	NHA	2003	Yes			Yes	N/A	
3	245	Clooncullaun	Galway	NHA	Kelly *et al.* (1995)	Yes				C	
4	248	Cloonmoylan	Galway	SAC	Kelly *et al.* (1995)	Yes				C	Yes
5	249	Cloonoolish	Galway	NHA	2003	Yes			Yes	N/A	
6	254	Crit Island	Galway	NHA	2003		Yes			N/A	
7	280	Castlefrench West	Galway	NHA	2003	Yes				N/A	
8	281	Keeloges	Galway	NHA	2003	Yes				N/A	
9	283	Kilmore	Galway	NHA	2003	Yes			Yes	N/A	
10	284	Kilnaborris (Killeragh)	Galway	NHA	Derwin & MacGowan (2000)		Yes			N/A	
11	285	Kilsallagh	Galway	SAC	Kelly *et al.* (1995)		Yes			C	
12	296	Lisnageeragh	Galway	SAC	Kelly *et al.* (1995)		Yes			A	
13	297	Addergoole	Galway	SAC	Kelly *et al.* (1995)	Yes			Yes	C	Yes
14	301	Lough Lurgeen	Galway	SAC	Kelly *et al.* (1995)	Yes				N/A	
15	307	Lough Tee	Galway	NHA	2003	Yes				N/A	
16	310	Meneen	Galway	NHA	2003		Yes			N/A	
17	321	Raford River	Galway	NHA	Dromey & Douglas (1995)	Yes				N/A	
18	326	Shankill West	Galway	SAC	Kelly *et al.* (1995)	Yes			Yes	A	Yes
19	333	Anna More	Kerry	NHA	2003			Yes		N/A	
20	391	Ballynafagh	Kildare	SAC	Kelly *et al.* (1995)	Yes			Yes	C	
21	422	Aghnamona	Leitrim, Longford	NHA	2003		Yes			N/A	
22	497	Flughany	Mayo, Sligo	SAC	Kelly *et al.* (1995)	Yes				B	
23	564	River Little Brosna	Offaly	NHA	2003	Yes				N/A	
24	565	Clonydonnin	Westmeath	NHA	Derwin & MacGowan (2000)	Yes				N/A	
25	566	All Saint's Bog	Offaly	SAC	Kelly *et al.* (1995)	Yes				C	Yes
26	570	Blackcastle	Offaly	NHA	Kelly *et al.* (1995)		Yes		Yes	C	
27	572	Clara	Offaly	SAC	Kelly (1992)	Yes			Yes	C	Yes
28	575	Ferbane	Offaly	SAC	Kelly *et al.* (1995)	Yes				B	
29	580	Mongan	Offaly	SAC	Kelly *et al.* (1995)	Yes				A	Yes
30	581	Moyclare	Offaly	SAC	Kelly *et al.* (1995)	Yes				B	
31	585	Sharavogue	Offaly	SAC	Kelly *et al.* (1995)	Yes				A	
32	592	Bellanagare	Roscommon	SAC	Kelly *et al.* (1995)		Yes			C	
33	595	Callow (part of Lough Gara)	Roscommon, Sligo	SAC	Kelly *et al.* (1995)	Yes				C	
34	600	Cloonchambers	Roscommon	SAC	Kelly *et al.* (1995)		Yes			B	
35	603	Cornaveagh	Roscommon	NHA	2003	Yes			Yes	N/A	
36	605	Derrycanan	Roscommon	NHA	Derwin & MacGowan (2000)	Yes				N/A	
37	614	Cloonshanville	Roscommon	SAC	Kelly *et al.* (1995)			Yes		B	
38	640	Arragh More	Tipperary	NHA	2003	Yes				N/A	
39	641	Ballyduff	Tipperary	SAC	Kelly *et al.* (1995)	Yes				C	
40	642	Ballymacegan	Tipperary	NHA	2003	Yes			Yes	N/A	
41	647	Kilcarren	Tipperary	SAC	Kelly *et al.* (1995)	Yes				C	
42	652	Monaincha/Ballaghmore	Tipperary, Laois	NHA	2003	Yes				N/A	
43	674	Ballynagrenia	Westmeath	NHA	Derwin & MacGowan (2000)	Yes				N/A	
44	674	Ballinderry	Westmeath	NHA	Derwin & MacGowan (2000)	Yes			Yes	N/A	
45	677	Cloncrow Bog (New Forest)	Westmeath	NHA	2003			Yes		N/A	

46	684	Lough Derravaragh	Westmeath	NHA	2003			Yes	Yes	N/A	
47	691	Rinn River	Leitrim, Longford	NHA	2003	Yes			Yes	N/A	
48	694	Wooddown	Westmeath	NHA	2003	Yes				N/A	
49	921	Screggan	Offaly	NHA	2003	Yes				N/A	
50	937	Scohaboy	Tipperary	NHA	Derwin & MacGowan (2000)	Yes				N/A	
51	1227	Aughrim	Galway	NHA	Derwin & MacGowan (2000)			Yes		N/A	
52	1242	Carrownagappul	Galway	SAC	Kelly *et al.* (1995)	Yes				C	
53	1244	Castlefrench East	Galway	NHA	2003		Yes		Yes	N/A	
54	1254	Derrinlough Bog	Galway	NHA	2003	Yes				N/A	
55	1303	Moorfield	Galway	NHA	2003	Yes				N/A	
56	1324	Jamestown	Meath	NHA	2003	Yes			Yes	N/A	
57	1405	Cashel	Leitrim	NHA	2003		Yes			N/A	
58	1420	Corracramph	Leitrim	NHA	2003	Yes				N/A	
59	1423	Cloonageeher Bog	Leitrim, Longford	NHA	2003		Yes			N/A	
60	1448	Forthill	Longford	NHA	2003	Yes				N/A	
61	1450	Mount Jessop	Longford	NHA	2003	Yes				N/A	
62	1623	Carrickynaghtan	Roscommon	NHA	2003	Yes				N/A	
63	1853	Nore Valley -Timoney	Tipperary	NHA	Derwin & MacGowan (2000)	Yes			Yes	N/A	
64	2110	Corliskea	Roscommon, Galway	SAC	Kelly *et al.* (1995)	Yes				C	
65	2110	Moorfield Bog-Farm Cottage	Galway	SAC	Fernandez (2005)	Yes				B	
66	2110	Trien	Roscommon	SAC	Kelly *et al.* (1995)	Yes				B	
67	2110	Clonfelliv	Roscommon	SAC	Fernandez et al (2005)			Yes	Yes	B	
68	2298	Derrynabrock	Mayo, Roscommon	SAC	Kelly *et al.* (1995)			Yes		C	
69	2298	Gowlaun (River Moy)	Mayo	SAC	2003	Yes				N/A	
70	2298	Cloongoonagh (River Moy)	Sligo	SAC	Derwin & MacGowan (2000)	Yes				N/A	
71	2310	Lough Ree (Clooncraff/Cloonlarge)	Roscommon	SAC	2003	Yes				N/A	
72	2323	Milltown Pass	Westmeath	NHA	2003	Yes			Yes	N/A	
73	2331	Mouds	Kildare	SAC	Derwin & MacGowan (2000)	Yes			Yes	N/A	
74	2332	Coolrain	Laois	SAC	Derwin & MacGowan (2000)	Yes			Yes	N/A	
75	2333	Knockacoller	Laois	SAC	Kelly *et al.* (1995)	Yes			Yes	C	
76	2336	Carn Park	Westmeath	SAC	Derwin & MacGowan (2000)	Yes				N/A	
77	2337	Crosswood	Westmeath	SAC	Kelly *et al.* (1995)	Yes			Yes	C	
78	2338	Drumalough West	Roscommon	SAC	2003		Yes			N/A	
79	2339	Ballynamona & Corkip Lough	Roscommon	SAC	Derwin & MacGowan (2000)	Yes			Yes	N/A	Yes
80	2340	Lough Sheelin/Clare Island	Cavan, Meath, Westmeath	SAC	Derwin & MacGowan (2000)	Yes				N/A	
81	2340	Lough Sheelin/Moneybeg	Cavan, Meath, Westmeath	SAC	Derwin & MacGowan (2000)	Yes				N/A	Yes
82	2341	Ardagullion/Cloonshannagh	Longford	SAC	Derwin & MacGowan (2000)	Yes			Yes	N/A	
83	2342	Mount Hevey	Meath, Westmeath	SAC	Derwin & MacGowan (2000)	Yes				N/A	
84	2344	Annaghbeg	Galway	NHA	2003		Yes			N/A	
85	2347	Camderry	Galway	SAC	Kelly *et al.* (1995)	Yes				B	
86	2348	Clooneen	Longford	SAC	Derwin & MacGowan (2000)	Yes				N/A	
87	2349	Corbo	Roscommon	SAC	Kelly *et al.* (1995)	Yes				C	
88	2350	Curraghlehanagh	Galway	SAC	Kelly *et al.* (1995)	Yes				C	
89	2351	Moanveanlagh	Kerry	SAC	Kelly *et al.* (1995)		Yes		Yes	B	
90	2352	Monivea	Galway	SAC	Kelly *et al.* (1995)	Yes				B	
91	2353	Redwood	Tipperary	SAC	Kelly *et al.* (1995)	Yes				C	
92	2355	Hawkswood	Offaly	NHA	2003			Yes		N/A	
93	2356	Ardgraigue	Galway	SAC	2003	Yes				N/A	

ALL RAISED BOGS HIGH BOG MARGIN LENGTH

	Code	Name	County	Designation	Last vegetation survey	Length margin (km)	Total length of currently cut plots (km)	Length margin currently cut (km)	% Margin currently cut	Length margin cut >5 yrs (km)
1	**6**	**Killyconny**	Cavan, Meath	SAC	Kelly *et al.* (1995)	6.17	0.00	0.00	0.00	NA
2	**220**	**Lough Namucka**	Galway	NHA	2003	11.24	NA	NA	NA	NA
3	**222**	**River Suck Callows**	Galway, Roscommon	NHA	2003	7.17	NA	NA	NA	NA
4	**229**	**Ballygar**	Galway	NHA	Derwin & MacGowan (2000)	4.55	0.00	0.00	0.00	NA
5	**231**	**Barroughter**	Galway	SAC	Kelly *et al.* (1995)	6.15	2.48	4.68	76.10	1.47
6	**235**	**Bracklagh**	Galway	NHA	2003	3.82	0.30	0.68	17.80	3.14
7	**245**	**Clooncullaun**	Galway	NHA	Kelly *et al.* (1995)	7.24	1.06	1.66	22.93	5.58
8	**247**	**Slieve (Cloonmore - Cloon Felly)**	Galway	NHA	Derwin & MacGowan (2000)	8.10	NA	NA	NA	NA
9	**248**	**Cloonmoylan**	Galway	SAC	Kelly *et al.* (1995)	12.83	2.77	4.70	36.63	8.13
10	**249**	**Cloonoolish**	Galway	NHA	2003	4.89	1.04	1.97	40.29	2.10
11	**254**	**Crit Island**	Galway	NHA	2003	26.20	0.65	3.41	13.02	22.79
12	**267**	**Funshin**	Galway	NHA	2003	7.80	NA	NA	NA	NA
13	**280**	**Castlefrench West**	Galway	NHA	2003	6.98	0.99	2.04	29.23	3.89
14	**281**	**Keeloges**	Galway	NHA	2003	16.10	0.59	1.17	7.27	13.40
15	**283**	**Kilmore**	Galway	NHA	2003	5.22	1.49	2.89	55.36	2.33
16	**284**	**Kilnaborris (Killeragh)**	Galway	NHA	Derwin & MacGowan (2000)	6.47	1.90	3.09	47.76	3.38
17	**285**	**Kilsallagh**	Galway	SAC	Kelly *et al.* (1995)	11.00	1.25	2.31	21.00	8.69
18	**292**	**Leaha Bog**	Galway	NHA	2003	4.78	NA	NA	NA	NA
19	**296**	**Lisnageeragh**	Galway	SAC	Kelly *et al.* (1995)	11.50	0.37	0.67	5.83	10.83
20	**297**	**Addergoole**	Galway	SAC	Kelly *et al.* (1995)	11.44	0.46	1.56	13.64	10.10
21	**301**	**Lough Lurgeen**	Galway	SAC	Kelly *et al.* (1995)	31.51	1.02	1.50	4.76	19.68
22	**307**	**Lough Tee**	Galway	NHA	2003	19.40	1.76	2.92	15.05	16.47
23	**310**	**Meneen**	Galway	NHA	2003	8.93	0.41	4.73	52.97	4.20
24	**321**	**Raford River**	Galway	NHA	Dromey & Douglas (1995)	10.42	0.58	1.58	15.16	8.84
25	**326**	**Shankill West**	Galway	SAC	Kelly *et al.* (1995)	4.57	0.07	0.08	1.75	3.55
26	**333**	**Anna More**	Kerry	NHA	2003	3.90	0.02	0.04	1.03	3.86
27	**337**	**Doon Lough**	Clare	NHA	2003	2.20	0.00	0.00	0.00	NA
28	**382**	**Sheheree**	Kerry	SAC	Kelly *et al.* (1995)	1.13	0.00	0.00	0.00	NA
29	**391**	**Ballynafagh**	Kildare	SAC	Kelly *et al.* (1995)	4.98	1.02	1.68	33.73	3.30
30	**422**	**Aghnamona**	Leitrim, Longford	NHA	2003	19.64	0.44	0.79	4.00	18.85
31	**497**	**Flughany**	Mayo, Sligo	SAC	Kelly *et al.* (1995)	15.30	0.16	0.31	2.03	6.02
32	**564**	**River Little Brosna**	Offaly	NHA	2003	4.59	1.07	1.21	26.25	3.38
33	**565**	**Clonydonnin**	Westmeath	NHA	Derwin & MacGowan (2000)	6.23	0.55	1.06	17.01	5.17
34	**566**	**All Saint's Bog**	Offaly	SAC	Kelly *et al.* (1995)	7.89	0.57	1.15	14.58	6.74
35	**570**	**Blackcastle**	Offaly	NHA	Kelly *et al.* (1995)	5.81	0.67	0.91	15.66	4.91
36	**572**	**Clara**	Offaly	SAC	Kelly (1992)	18.04	1.98	3.38	18.74	15.49
37	**575**	**Ferbane**	Offaly	SAC	Kelly *et al.* (1995)	6.04	0.22	0.22	3.64	6.04
38	**580**	**Mongan**	Offaly	SAC	Kelly *et al.* (1995)	6.13	0.03	0.03	0.49	6.10

39	581	**Moyclare**	Offaly	SAC	Kelly *et al.* (1995)	4.68	0.63	0.98	20.94	3.70
40	582	**Raheenmore**	Offaly	SAC	Kelly (1992)	5.67	0.00	0.00	0.00	NA
41	585	**Sharavogue**	Offaly	SAC	Kelly *et al.* (1995)	6.69	0.14	0.14	2.09	5.29
42	591	**Bella Bridge**	Roscommon	NHA	2003	15.50	NA	NA	NA	NA
43	592	**Bellanagare**	Roscommon	SAC	Kelly *et al.* (1995)	42.68	1.21	3.76	8.81	38.92
44	595	**Callow (part of Lough Gara)**	Roscommon, Sligo	SAC	Kelly *et al.* (1995)	9.90	2.35	3.46	34.95	6.44
45	597	**Carrowbehy**	Roscommon	SAC	Kelly *et al.* (1995)	16.25	0.00	0.00	0.00	NA
46	600	**Cloonchambers**	Roscommon	SAC	Kelly *et al.* (1995)	14.79	0.40	0.52	3.52	12.84
47	603	**Cornaveagh**	Roscommon	NHA	2003	4.75	0.78	0.97	20.42	3.78
48	604	**Derrinea**	Roscommon	SAC	Kelly *et al.* (1995)	4.01	0.00	0.00	0.00	NA
49	605	**Derrycanan**	Roscommon	NHA	Derwin & MacGowan (2000)	23.19	1.94	6.48	27.94	16.71
50	614	**Cloonshanville**	Roscommon	SAC	Kelly *et al.* (1995)	6.36	0.04	0.07	1.10	5.74
51	640	**Arragh More**	Tipperary	NHA	2003	13.26	0.10	0.14	1.06	13.12
52	641	**Ballyduff**	Tipperary	SAC	Kelly *et al.* (1995)	4.20	0.79	1.00	23.81	3.20
53	641	**Clonfinane**	Tipperary	SAC	Kelly *et al.* (1995)	4.60	0.00	0.00	0.00	NA
54	642	**Ballymacegan**	Tipperary	NHA	2003	3.63	0.60	0.88	24.21	2.75
55	647	**Kilcarren**	Tipperary	SAC	Kelly *et al.* (1995)	8.46	0.46	0.55	6.50	7.70
56	647	**Firville**	Tipperary	SAC	Kelly *et al.* (1995)	7.56	0.00	0.00	0.00	NA
57	648	**Killeen**	Tipperary	NHA	2003	5.39	NA	NA	NA	NA
58	652	**Monaincha/Ballaghmore**	Tipperary, Laois	NHA	2003	10.78	1.41	1.67	15.49	9.05
59	674	**Ballynagrenia**	Westmeath	NHA	Derwin & MacGowan (2000)	6.80	1.04	2.43	35.74	4.73
60	674	**Ballinderry**	Westmeath	NHA	Derwin & MacGowan (2000)	3.92	1.39	2.41	61.53	1.51
61	677	**Cloncrow Bog (New Forest)**	Westmeath	NHA	2003	8.05	0.06	0.12	1.49	7.93
62	679	**Garriskil**	Westmeath	SAC	Kelly *et al.* (1995)	8.35	0.00	0.00	0.00	NA
63	684	**Lough Derravaragh**	Westmeath	NHA	2003	4.89	0.21	0.37	7.57	4.11
64	691	**Rinn River**	Leitrim, Longford	NHA	2003	8.52	0.75	1.86	21.84	6.29
65	694	**Wooddown**	Westmeath	NHA	2003	7.81	0.44	0.80	10.24	7.01
66	890	**Cangort Bog**	Offaly, Tipperary	NHA	Un-surveyed	3.60	0.00	0.00	0.00	NA
67	921	**Screggan**	Offaly	NHA	2003	8.92	1.91	3.38	37.89	5.54
68	937	**Scohaboy**	Tipperary	NHA	Derwin & MacGowan (2000)	9.58	2.19	3.40	35.49	6.18
69	985	**Lough Kinale**	Longford, Cavan, Westmeath	NHA	Un-surveyed	1.88	0.00	0.00	0.00	NA
70	993	**Ayle Lower Bog**	Clare	NHA	2003	3.55	NA	NA	NA	NA
71	1020	**Loughanilloon Bog**	Clare	NHA	Un-surveyed	1.95	0.00	0.00	0.00	NA
72	1227	**Aughrim**	Galway	NHA	Derwin & MacGowan (2000)	12.55	0.16	0.24	1.91	8.83
73	1240	**Capira/Derrew**	Galway	NHA	2003	5.10	NA	NA	NA	NA
74	1242	**Carrownagappul**	Galway	SAC	Kelly *et al.* (1995)	17.56	1.46	2.91	16.57	14.65
75	1244	**Castlefrench East**	Galway	NHA	2003	4.63	0.02	0.02	0.43	4.63
76	1254	**Derrinlough Bog**	Galway	NHA	2003	8.90	0.31	0.45	5.06	5.45
77	1255	**Derrynagran**	Galway	NHA	2003	3.36	NA	NA	NA	NA
78	1264	**Eskerboy**	Galway	NHA	Derwin & MacGowan (2000)	5.50	NA	NA	NA	NA
79	1280	**Killaclogher**	Galway	NHA	2003	19.60	NA	NA	NA	NA
80	1283	**Killure**	Galway	NHA	2003	13.79	NA	NA	NA	NA
81	1303	**Moorfield**	Galway	NHA	2003	6.43	0.93	1.56	24.26	4.87
82	1324	**Jamestown**	Meath	NHA	2003	5.20	2.16	3.88	74.62	1.32
83	1352	**Bunnaruddee Bog**	Kerry	NHA	2003	7.44	NA	NA	NA	NA

84	**1388**	**Carbury**	Kildare	NHA	2003	7.75	0.00	0.00	0.00	NA
85	**1393**	**Hodgestown Bog**	Kildare	NHA	2003	3.98	NA	NA	NA	NA
86	**1405**	**Cashel**	Leitrim	NHA	2003	5.32	0.30	0.51	9.59	4.81
87	**1420**	**Corracramph**	Leitrim	NHA	2003	9.42	0.69	1.60	16.99	7.82
88	**1423**	**Cloonageeher Bog**	Leitrim, Longford	NHA	2003	10.31	0.78	2.00	19.40	8.31
89	**1448**	**Forthill**	Longford	NHA	2003	4.14	1.13	1.68	40.58	1.97
90	**1450**	**Mount Jessop**	Longford	NHA	2003	4.70	0.18	0.25	5.32	4.45
91	**1580**	**Girley**	Meath	NHA	Derwin & MacGowan (2000)	5.75	NA	NA	NA	NA
92	**1582**	**Molerick Bog**	Meath	NHA	2003	1.96	NA	NA	NA	NA
93	**1623**	**Carrickynaghtan**	Roscommon	NHA	2003	25.24	0.49	1.06	4.20	24.18
94	**1652**	**Tullaghan**	Roscommon	NHA	2003	5.06	NA	NA	NA	NA
95	**1684**	**Lorrha**	Tipperary	NHA	2003	3.09	NA	NA	NA	NA
96	**1725**	**Nure Bog**	Westmeath	NHA	2003	6.23	NA	NA	NA	NA
97	**1812**	**Lough Garr**	Westmeath	NHA	2003	8.15	NA	NA	NA	NA
98	**1818**	**Ballykenny**	Longford	SAC	Kelly *et al.* (1995)	8.55	0.00	0.00	0.00	NA
99	**1818**	**Fisherstown**	Longford	SAC	Kelly *et al.* (1995)	6.20	0.00	0.00	0.00	NA
100	**1853**	**Nore Valley -Timoney**	Tipperary	NHA	Derwin & MacGowan (2000)	8.21	2.63	3.28	39.95	4.93
101	**2033**	**Daingean**	Offaly	NHA	Derwin & MacGowan (2000)	4.59	0.00	0.00	0.00	NA
102	**2072**	**Lisnanarriagh**	Roscommon	NHA	2003	4.42	NA	NA	NA	NA
103	**2110**	**Corliskea**	Roscommon, Galway	SAC	Kelly *et al.* (1995)	16.15	2.01	2.23	13.81	13.93
104	2110	**Moorfield Bog-Farm Cottage**	Galway	SAC	Fernandez (2005)	6.44	0.47	0.57	8.85	5.87
105	2110	**Trien**	Roscommon	SAC	Kelly *et al.* (1995)	9.34	0.20	0.20	2.14	9.14
106	2110	**Clonfelliv**	Roscommon	SAC	Fernandez et al (2005)	3.80	0.09	1.20	31.58	2.60
107	**2298**	**Derrynabrock**	Mayo, Roscommon	SAC	Kelly *et al.* (1995)	4.31	0.03	0.03	0.70	2.33
108	2298	**Gowlaun (River Moy)**	Mayo	SAC	2003	15.37	1.01	1.43	9.30	14.28
109	2298	**Cloongoonagh (River Moy)**	Sligo	SAC	Derwin & MacGowan (2000)	10.67	0.33	0.66	6.19	10.01
110	2298	**Kilgarriff (River Moy)**	Mayo	SAC	Derwin & MacGowan (2000)	4.87	0.00	0.00	0.00	NA
111	2298	**Tawnaghbeg (River Moy)**	Mayo	SAC	Kelly *et al.* (1995)	5.20	0.00	0.00	0.00	NA
112	**2307**	**Cloonloum More**	Clare	NHA	Derwin & MacGowan (2000)	5.47	NA	NA	NA	NA
113	**2310**	**Lough Ree (Clooncraff - Cloonlarge)**	Roscommon	SAC	2003	53.90	4.35	9.69	17.98	25.70
114	**2323**	**Milltown Pass**	Westmeath	NHA	2003	4.36	0.45	0.73	16.74	0.08
115	**2331**	**Mouds**	Kildare	SAC	Derwin & MacGowan (2000)	13.74	3.01	5.18	37.70	8.56
116	**2332**	**Coolrain**	Laois	SAC	Derwin & MacGowan (2000)	5.25	1.71	2.54	48.38	2.71
117	**2333**	**Knockacoller**	Laois	SAC	Kelly *et al.* (1995)	3.56	0.54	0.67	18.82	2.89
118	**2336**	**Carn Park**	Westmeath	SAC	Derwin & MacGowan (2000)	8.89	1.25	1.69	19.01	4.09
119	**2337**	**Crosswood**	Westmeath	SAC	Kelly *et al.* (1995)	5.17	1.78	2.83	54.74	2.34
120	**2338**	**Drumalough West**	Roscommon	SAC	2003	5.42	0.37	0.53	9.78	4.89
121	**2339**	**Ballynamona & Corkip Lough**	Roscommon	SAC	Derwin & MacGowan (2000)	4.34	2.00	2.85	65.67	1.49
122	**2340**	**Lough Sheelin - Clare Island**	Cavan, Meath, Westmeath	SAC	Derwin & MacGowan (2000)	5.98	0.21	0.55	9.25	5.43
123	2340	**Lough Sheelin - Moneybeg**	Cavan, Meath, Westmeath	SAC	Derwin & MacGowan (2000)	7.28	1.05	3.15	43.27	4.13
124	**2341**	**Ardagullion/Cloonshannagh**	Longford	SAC	Derwin & MacGowan (2000)	4.18	0.29	0.79	18.90	3.39
125	**2342**	**Mount Hevey**	Meath, Westmeath	SAC	Derwin & MacGowan (2000)	16.06	1.17	1.67	10.40	14.39
126	**2343**	**Tullaher Lough/Monmore**	Clare	SAC	Derwin & MacGowan (2000)	1.80	0.00	0.00	0.00	NA
127	**2344**	**Annaghbeg**	Galway	NHA	2003	7.09	0.84	1.73	24.40	5.36
128	**2346**	**Brown Bog**	Longford	SAC	Kelly *et al.* (1995)	3.75	0.00	0.00	0.00	NA

129	**2347**	**Camderry**	Galway	SAC	Kelly *et al.* (1995)	10.92	0.73	1.41	12.91	9.50
130	**2348**	**Clooneen**	Longford	SAC	Derwin & MacGowan (2000)	7.36	0.50	1.15	15.63	6.21
131	**2349**	**Corbo**	Roscommon	SAC	Kelly *et al.* (1995)	9.02	1.79	3.36	37.25	5.66
132	**2350**	**Curraghlehanagh**	Galway	SAC	Kelly *et al.* (1995)	8.19	1.17	2.28	27.84	5.91
133	**2351**	**Moanveanlagh**	Kerry	SAC	Kelly *et al.* (1995)	7.37	0.68	1.63	22.12	5.74
134	**2352**	**Monivea**	Galway	SAC	Kelly *et al.* (1995)	9.68	2.20	4.83	49.90	4.85
135	**2353**	**Redwood**	Tipperary	SAC	Kelly *et al.* (1995)	9.47	2.62	2.62	27.67	6.85
136	**2354**	**Tullaghanrock**	Roscommon	SAC	Derwin & MacGowan (2000)	4.46	0.00	0.00	0.00	NA
137	**2355**	**Hawkswood**	Offaly	NHA	2003	5.70	0.33	0.40	7.02	5.30
138	**2356**	**Ardgraigue**	Galway	SAC	2003	6.51	1.14	2.78	42.70	3.73
139	**2357**	**Clonreher Bog**	Laois	NHA	2003	5.79	NA	NA	NA	NA
					TOTALS	**1206.52**	**90.24**	**168.63**		**694.55**

ALL RAISED BOGS HIGH BOG MARGIN LENGTH

	Code	Name	County	Designation	Last vegetation survey	Length margin (km)	Total length of currently cut plots (km)	Length margin currently cut (km)	% Margin currently cut	Length margin cut >5 yrs (km)
1	**6**	**Killyconny**	Cavan, Meath	SAC	Kelly *et al.* (1995)	6.17	0.00	0.00	0.00	NA
2	**220**	**Lough Namucka**	Galway	NHA	2003	11.24	NA	NA	NA	NA
3	**222**	**River Suck Callows**	Galway, Roscommon	NHA	2003	7.17	NA	NA	NA	NA
4	**229**	**Ballygar**	Galway	NHA	Derwin & MacGowan (2000)	4.55	0.00	0.00	0.00	NA
5	**231**	**Barroughter**	Galway	SAC	Kelly *et al.* (1995)	6.15	2.48	4.68	76.10	1.47
6	**235**	**Bracklagh**	Galway	NHA	2003	3.82	0.30	0.68	17.80	3.14
7	**245**	**Clooncullaun**	Galway	NHA	Kelly *et al.* (1995)	7.24	1.06	1.66	22.93	5.58
8	**247**	**Slieve (Cloonmore - Cloon Felly)**	Galway	NHA	Derwin & MacGowan (2000)	8.10	NA	NA	NA	NA
9	**248**	**Cloonmoylan**	Galway	SAC	Kelly *et al.* (1995)	12.83	2.77	4.70	36.63	8.13
10	**249**	**Cloonoolish**	Galway	NHA	2003	4.89	1.04	1.97	40.29	2.10
11	**254**	**Crit Island**	Galway	NHA	2003	26.20	0.65	3.41	13.02	22.79
12	**267**	**Funshin**	Galway	NHA	2003	7.80	NA	NA	NA	NA
13	**280**	**Castlefrench West**	Galway	NHA	2003	6.98	0.99	2.04	29.23	3.89
14	**281**	**Keeloges**	Galway	NHA	2003	16.10	0.59	1.17	7.27	13.40
15	**283**	**Kilmore**	Galway	NHA	2003	5.22	1.49	2.89	55.36	2.33
16	**284**	**Kilnaborris (Killeragh)**	Galway	NHA	Derwin & MacGowan (2000)	6.47	1.90	3.09	47.76	3.38
17	**285**	**Kilsallagh**	Galway	SAC	Kelly *et al.* (1995)	11.00	1.25	2.31	21.00	8.69
18	**292**	**Leaha Bog**	Galway	NHA	2003	4.78	NA	NA	NA	NA
19	**296**	**Lisnageeragh**	Galway	SAC	Kelly *et al.* (1995)	11.50	0.37	0.67	5.83	10.83
20	**297**	**Addergoole**	Galway	SAC	Kelly *et al.* (1995)	11.44	0.46	1.56	13.64	10.10
21	**301**	**Lough Lurgeen**	Galway	SAC	Kelly *et al.* (1995)	31.51	1.02	1.50	4.76	19.68
22	**307**	**Lough Tee**	Galway	NHA	2003	19.40	1.76	2.92	15.05	16.47
23	**310**	**Meneen**	Galway	NHA	2003	8.93	0.41	4.73	52.97	4.20
24	**321**	**Raford River**	Galway	NHA	Dromey & Douglas (1995)	10.42	0.58	1.58	15.16	8.84
25	**326**	**Shankill West**	Galway	SAC	Kelly *et al.* (1995)	4.57	0.07	0.08	1.75	3.55
26	**333**	**Anna More**	Kerry	NHA	2003	3.90	0.02	0.04	1.03	3.86
27	**337**	**Doon Lough**	Clare	NHA	2003	2.20	0.00	0.00	0.00	NA
28	**382**	**Sheheree**	Kerry	SAC	Kelly *et al.* (1995)	1.13	0.00	0.00	0.00	NA
29	**391**	**Ballynafagh**	Kildare	SAC	Kelly *et al.* (1995)	4.98	1.02	1.68	33.73	3.30
30	**422**	**Aghnamona**	Leitrim, Longford	NHA	2003	19.64	0.44	0.79	4.00	18.85
31	**497**	**Flughany**	Mayo, Sligo	SAC	Kelly *et al.* (1995)	15.30	0.16	0.31	2.03	6.02
32	**564**	**River Little Brosna**	Offaly	NHA	2003	4.59	1.07	1.21	26.25	3.38
33	**565**	**Clonydonnin**	Westmeath	NHA	Derwin & MacGowan (2000)	6.23	0.55	1.06	17.01	5.17
34	**566**	**All Saint's Bog**	Offaly	SAC	Kelly *et al.* (1995)	7.89	0.57	1.15	14.58	6.74
35	**570**	**Blackcastle**	Offaly	NHA	Kelly *et al.* (1995)	5.81	0.67	0.91	15.66	4.91
36	**572**	**Clara**	Offaly	SAC	Kelly (1992)	18.04	1.98	3.38	18.74	15.49
37	**575**	**Ferbane**	Offaly	SAC	Kelly *et al.* (1995)	6.04	0.22	0.22	3.64	6.04
38	**580**	**Mongan**	Offaly	SAC	Kelly *et al.* (1995)	6.13	0.03	0.03	0.49	6.10

39	581	**Moyclare**	Offaly	SAC	Kelly *et al.* (1995)	4.68	0.63	0.98	20.94	3.70
40	582	**Raheenmore**	Offaly	SAC	Kelly (1992)	5.67	0.00	0.00	0.00	NA
41	585	**Sharavogue**	Offaly	SAC	Kelly *et al.* (1995)	6.69	0.14	0.14	2.09	5.29
42	591	**Bella Bridge**	Roscommon	NHA	2003	15.50	NA	NA	NA	NA
43	592	**Bellanagare**	Roscommon	SAC	Kelly *et al.* (1995)	42.68	1.21	3.76	8.81	38.92
44	595	**Callow (part of Lough Gara)**	Roscommon, Sligo	SAC	Kelly *et al.* (1995)	9.90	2.35	3.46	34.95	6.44
45	597	**Carrowbehy**	Roscommon	SAC	Kelly *et al.* (1995)	16.25	0.00	0.00	0.00	NA
46	600	**Cloonchambers**	Roscommon	SAC	Kelly *et al.* (1995)	14.79	0.40	0.52	3.52	12.84
47	603	**Cornaveagh**	Roscommon	NHA	2003	4.75	0.78	0.97	20.42	3.78
48	604	**Derrinea**	Roscommon	SAC	Kelly *et al.* (1995)	4.01	0.00	0.00	0.00	NA
49	605	**Derrycanan**	Roscommon	NHA	Derwin & MacGowan (2000)	23.19	1.94	6.48	27.94	16.71
50	614	**Cloonshanville**	Roscommon	SAC	Kelly *et al.* (1995)	6.36	0.04	0.07	1.10	5.74
51	640	**Arragh More**	Tipperary	NHA	2003	13.26	0.10	0.14	1.06	13.12
52	641	**Ballyduff**	Tipperary	SAC	Kelly *et al.* (1995)	4.20	0.79	1.00	23.81	3.20
53	641	**Clonfinane**	Tipperary	SAC	Kelly *et al.* (1995)	4.60	0.00	0.00	0.00	NA
54	642	**Ballymacegan**	Tipperary	NHA	2003	3.63	0.60	0.88	24.21	2.75
55	647	**Kilcarren**	Tipperary	SAC	Kelly *et al.* (1995)	8.46	0.46	0.55	6.50	7.70
56	647	**Firville**	Tipperary	SAC	Kelly *et al.* (1995)	7.56	0.00	0.00	0.00	NA
57	648	**Killeen**	Tipperary	NHA	2003	5.39	NA	NA	NA	NA
58	652	**Monaincha/Ballaghmore**	Tipperary, Laois	NHA	2003	10.78	1.41	1.67	15.49	9.05
59	674	**Ballynagrenia**	Westmeath	NHA	Derwin & MacGowan (2000)	6.80	1.04	2.43	35.74	4.73
60	674	**Ballinderry**	Westmeath	NHA	Derwin & MacGowan (2000)	3.92	1.39	2.41	61.53	1.51
61	677	**Cloncrow Bog (New Forest)**	Westmeath	NHA	2003	8.05	0.06	0.12	1.49	7.93
62	679	**Garriskil**	Westmeath	SAC	Kelly *et al.* (1995)	8.35	0.00	0.00	0.00	NA
63	684	**Lough Derravaragh**	Westmeath	NHA	2003	4.89	0.21	0.37	7.57	4.11
64	691	**Rinn River**	Leitrim, Longford	NHA	2003	8.52	0.75	1.86	21.84	6.29
65	694	**Wooddown**	Westmeath	NHA	2003	7.81	0.44	0.80	10.24	7.01
66	890	**Cangort Bog**	Offaly, Tipperary	NHA	Un-surveyed	3.60	0.00	0.00	0.00	NA
67	921	**Screggan**	Offaly	NHA	2003	8.92	1.91	3.38	37.89	5.54
68	937	**Scohaboy**	Tipperary	NHA	Derwin & MacGowan (2000)	9.58	2.19	3.40	35.49	6.18
69	985	**Lough Kinale**	Longford, Cavan, Westmeath	NHA	Un-surveyed	1.88	0.00	0.00	0.00	NA
70	993	**Ayle Lower Bog**	Clare	NHA	2003	3.55	NA	NA	NA	NA
71	1020	**Loughanilloon Bog**	Clare	NHA	Un-surveyed	1.95	0.00	0.00	0.00	NA
72	1227	**Aughrim**	Galway	NHA	Derwin & MacGowan (2000)	12.55	0.16	0.24	1.91	8.83
73	1240	**Capira/Derrew**	Galway	NHA	2003	5.10	NA	NA	NA	NA
74	1242	**Carrownagappul**	Galway	SAC	Kelly *et al.* (1995)	17.56	1.46	2.91	16.57	14.65
75	1244	**Castlefrench East**	Galway	NHA	2003	4.63	0.02	0.02	0.43	4.63
76	1254	**Derrinlough Bog**	Galway	NHA	2003	8.90	0.31	0.45	5.06	5.45
77	1255	**Derrynagran**	Galway	NHA	2003	3.36	NA	NA	NA	NA
78	1264	**Eskerboy**	Galway	NHA	Derwin & MacGowan (2000)	5.50	NA	NA	NA	NA
79	1280	**Killaclogher**	Galway	NHA	2003	19.60	NA	NA	NA	NA
80	1283	**Killure**	Galway	NHA	2003	13.79	NA	NA	NA	NA
81	1303	**Moorfield**	Galway	NHA	2003	6.43	0.93	1.56	24.26	4.87
82	1324	**Jamestown**	Meath	NHA	2003	5.20	2.16	3.88	74.62	1.32
83	1352	**Bunnaruddee Bog**	Kerry	NHA	2003	7.44	NA	NA	NA	NA

84	**1388**	**Carbury**	Kildare	NHA	2003	7.75	0.00	0.00	0.00	NA
85	**1393**	**Hodgestown Bog**	Kildare	NHA	2003	3.98	NA	NA	NA	NA
86	**1405**	**Cashel**	Leitrim	NHA	2003	5.32	0.30	0.51	9.59	4.81
87	**1420**	**Corracramph**	Leitrim	NHA	2003	9.42	0.69	1.60	16.99	7.82
88	**1423**	**Cloonageeher Bog**	Leitrim, Longford	NHA	2003	10.31	0.78	2.00	19.40	8.31
89	**1448**	**Forthill**	Longford	NHA	2003	4.14	1.13	1.68	40.58	1.97
90	**1450**	**Mount Jessop**	Longford	NHA	2003	4.70	0.18	0.25	5.32	4.45
91	**1580**	**Girley**	Meath	NHA	Derwin & MacGowan (2000)	5.75	NA	NA	NA	NA
92	**1582**	**Molerick Bog**	Meath	NHA	2003	1.96	NA	NA	NA	NA
93	**1623**	**Carrickynaghtan**	Roscommon	NHA	2003	25.24	0.49	1.06	4.20	24.18
94	**1652**	**Tullaghan**	Roscommon	NHA	2003	5.06	NA	NA	NA	NA
95	**1684**	**Lorrha**	Tipperary	NHA	2003	3.09	NA	NA	NA	NA
96	**1725**	**Nure Bog**	Westmeath	NHA	2003	6.23	NA	NA	NA	NA
97	**1812**	**Lough Garr**	Westmeath	NHA	2003	8.15	NA	NA	NA	NA
98	**1818**	**Ballykenny**	Longford	SAC	Kelly *et al.* (1995)	8.55	0.00	0.00	0.00	NA
99	**1818**	**Fisherstown**	Longford	SAC	Kelly *et al.* (1995)	6.20	0.00	0.00	0.00	NA
100	**1853**	**Nore Valley -Timoney**	Tipperary	NHA	Derwin & MacGowan (2000)	8.21	2.63	3.28	39.95	4.93
101	**2033**	**Daingean**	Offaly	NHA	Derwin & MacGowan (2000)	4.59	0.00	0.00	0.00	NA
102	**2072**	**Lisnanarriagh**	Roscommon	NHA	2003	4.42	NA	NA	NA	NA
103	**2110**	**Corliskea**	Roscommon, Galway	SAC	Kelly *et al.* (1995)	16.15	2.01	2.23	13.81	13.93
104	2110	**Moorfield Bog-Farm Cottage**	Galway	SAC	Fernandez (2005)	6.44	0.47	0.57	8.85	5.87
105	2110	**Trien**	Roscommon	SAC	Kelly *et al.* (1995)	9.34	0.20	0.20	2.14	9.14
106	2110	**Clonfelliv**	Roscommon	SAC	Fernandez et al (2005)	3.80	0.09	1.20	31.58	2.60
107	**2298**	**Derrynabrock**	Mayo, Roscommon	SAC	Kelly *et al.* (1995)	4.31	0.03	0.03	0.70	2.33
108	2298	**Gowlaun (River Moy)**	Mayo	SAC	2003	15.37	1.01	1.43	9.30	14.28
109	2298	**Cloongoonagh (River Moy)**	Sligo	SAC	Derwin & MacGowan (2000)	10.67	0.33	0.66	6.19	10.01
110	2298	**Kilgarriff (River Moy)**	Mayo	SAC	Derwin & MacGowan (2000)	4.87	0.00	0.00	0.00	NA
111	2298	**Tawnaghbeg (River Moy)**	Mayo	SAC	Kelly *et al.* (1995)	5.20	0.00	0.00	0.00	NA
112	**2307**	**Cloonloum More**	Clare	NHA	Derwin & MacGowan (2000)	5.47	NA	NA	NA	NA
113	**2310**	**Lough Ree (Clooncraff - Cloonlarge)**	Roscommon	SAC	2003	53.90	4.35	9.69	17.98	25.70
114	**2323**	**Milltown Pass**	Westmeath	NHA	2003	4.36	0.45	0.73	16.74	0.08
115	**2331**	**Mouds**	Kildare	SAC	Derwin & MacGowan (2000)	13.74	3.01	5.18	37.70	8.56
116	**2332**	**Coolrain**	Laois	SAC	Derwin & MacGowan (2000)	5.25	1.71	2.54	48.38	2.71
117	**2333**	**Knockacoller**	Laois	SAC	Kelly *et al.* (1995)	3.56	0.54	0.67	18.82	2.89
118	**2336**	**Carn Park**	Westmeath	SAC	Derwin & MacGowan (2000)	8.89	1.25	1.69	19.01	4.09
119	**2337**	**Crosswood**	Westmeath	SAC	Kelly *et al.* (1995)	5.17	1.78	2.83	54.74	2.34
120	**2338**	**Drumalough West**	Roscommon	SAC	2003	5.42	0.37	0.53	9.78	4.89
121	**2339**	**Ballynamona & Corkip Lough**	Roscommon	SAC	Derwin & MacGowan (2000)	4.34	2.00	2.85	65.67	1.49
122	**2340**	**Lough Sheelin - Clare Island**	Cavan, Meath, Westmeath	SAC	Derwin & MacGowan (2000)	5.98	0.21	0.55	9.25	5.43
123	2340	**Lough Sheelin - Moneybeg**	Cavan, Meath, Westmeath	SAC	Derwin & MacGowan (2000)	7.28	1.05	3.15	43.27	4.13
124	**2341**	**Ardagullion/Cloonshannagh**	Longford	SAC	Derwin & MacGowan (2000)	4.18	0.29	0.79	18.90	3.39
125	**2342**	**Mount Hevey**	Meath, Westmeath	SAC	Derwin & MacGowan (2000)	16.06	1.17	1.67	10.40	14.39
126	**2343**	**Tullaher Lough/Monmore**	Clare	SAC	Derwin & MacGowan (2000)	1.80	0.00	0.00	0.00	NA
127	**2344**	**Annaghbeg**	Galway	NHA	2003	7.09	0.84	1.73	24.40	5.36
128	**2346**	**Brown Bog**	Longford	SAC	Kelly *et al.* (1995)	3.75	0.00	0.00	0.00	NA

129	**2347**	**Camderry**	Galway	SAC	Kelly *et al.* (1995)	10.92	0.73	1.41	12.91	9.50
130	**2348**	**Clooneen**	Longford	SAC	Derwin & MacGowan (2000)	7.36	0.50	1.15	15.63	6.21
131	**2349**	**Corbo**	Roscommon	SAC	Kelly *et al.* (1995)	9.02	1.79	3.36	37.25	5.66
132	**2350**	**Curraghlehanagh**	Galway	SAC	Kelly *et al.* (1995)	8.19	1.17	2.28	27.84	5.91
133	**2351**	**Moanveanlagh**	Kerry	SAC	Kelly *et al.* (1995)	7.37	0.68	1.63	22.12	5.74
134	**2352**	**Monivea**	Galway	SAC	Kelly *et al.* (1995)	9.68	2.20	4.83	49.90	4.85
135	**2353**	**Redwood**	Tipperary	SAC	Kelly *et al.* (1995)	9.47	2.62	2.62	27.67	6.85
136	**2354**	**Tullaghanrock**	Roscommon	SAC	Derwin & MacGowan (2000)	4.46	0.00	0.00	0.00	NA
137	**2355**	**Hawkswood**	Offaly	NHA	2003	5.70	0.33	0.40	7.02	5.30
138	**2356**	**Ardgraigue**	Galway	SAC	2003	6.51	1.14	2.78	42.70	3.73
139	**2357**	**Clonreher Bog**	Laois	NHA	2003	5.79	NA	NA	NA	NA
					TOTALS	**1206.52**	**90.24**	**168.63**		**694.55**

ESTIMATED TURBARY RIGHTS OWNERS CALCULATION

Appendix XV includes a summary of figures related to cutting on 93 raised bogs where a turf cutting assessment was done. This assessment involved the production of a GIS projects where the margin of the high bog of these 93 bogs was accurately depicted and subsequently measured. As a result, accurate values of high bog margin, length of margin currently cut, number of turf plots currently cut or cutters (i.e. within the last 5 years prior to the 2003 survey) and total length of currently cut plots was obtained. These data is provided in the following table:

Table 18.1 Summarised data of 93 raised bogs where a turf cutting assessment was carried out

Raised bogs where a turf cutting assessment was carried out	
Number of raised bogs	93
Total length of high bog margin (km)	923.21
Total length of high bog margin cut > 5 years (km)	694.55
Total length of high bog margin currently cut (km)	168.63
Total length of currently cut plots (km)	90.24
Total number of current cutters	2660
Average turf plot width (m)	34

Note
The total length of high bog margin currently cut is much higher than the total length of currently cut plots. This is because the first figure represents every single twist in the face bank measured by GIS, whereas the length of plots corresponds to the width of a turbary right, which calculated average is 34m.
The difference between total length of margin ever cut (694.55 + 168.63 = 863.18km) and total length of high bog margin does not correspond to natural margin. Occasionally, it was not possible to discern the boundary between natural margin and old cut margin (where turbary rights may exist).

As illustrated in table above, the total length corresponding to 2660 turf plots currently cut is 90.24km. This number of plots is a rather small figure compare to the number of turbary right owners within these 93 bogs that have the right to cut turf. Although the calculation of an accurate value of numbers of rights would be a long process, a simple estimation can be made. Considering two different figures: a) total length of high bog margin (923.21) and b) length of margin ever cut (863.18km). The actual length of margin where cut may occur would be between these two values. Taking into account the following factor: Total length of currently cut plots (90.24) / Total length of bog margin currently cut (168.63) = 0.54 and multiplying previous figures by this factor we obtain two numbers (498.4 & 465.5), that correspond to total length of turf plots where cutting may occur (i.e. total turbary rights length). Moreover, considering that the average width of turf plot is 34m, this gives us a number of turbary rights for these 93 bog ranging between 14,659 and 13,691.

There are other 46 raised bogs remaining as designated, cutting does not occur in all these raised bogs, but the majority of them still have rights to cut that could be exercised any time. According to the figure calculated from the GIS maps produced within this project (see Appendix XVII). The total high bog margin length for the 46 raised bogs is 283.31km. Hence following similar process used for the previous 93 raised bogs; it gives us a figure of roughly 4,500 cutters.

To summarise, following this simple mathematical exercise and always bearing in mind that this are only estimations. The overall number of turbary rights and thus cutters that have the right to cut turf varies from 18,000-19,200 on the 139 designated raised bogs. However, this figure could easily be higher than 20,000 as the width of turf plots may be smaller.

Validation of previous calculation
The Central Fisheries Board investigated the ownership, including turbary rights on 32 raised bogs site in the late 1990's for the National Parks and Wildlife Services. The summary of the data collected by them is included in table 18.2 below, according to their information the total number of turbary right and property owners on these 32 bogs was 5161.
The total number of turbary right owners for these 32 raised bogs have also been calculated following the same process described in the above section. The total number of rights according to our calculation is 4981. Compared to the figure given by the Central Fisheries Board, our calculation is 180 smaller than theirs. Thus, considering their data as more accurate our calculation's error is 3.5%, which can be

deemed as rather small. Therefore, considering that we previously estimated that the overall designated raised bogs number of turbary rights ranges between 18,000-19,200 and taken into account a 3.5% error. The estimated number of rights may vary from 18,630 to 19,872, therefore it confirms that 20,000 is a rather accurate number of total turbary right owners.

It should be noted that although the total figures given by the Central Fisheries Board and our calculation only differ by 3.5%. The difference on individual site figures are higher and thus this calculations are not reliable at individual raised bog level.

Table 18.2 Estimated number of turbary right owners in a selection of sites

	Code	Name	County	Designation	Total number of currently cut plots (2003)	Length margin (km)	Total length of currently cut plots (km)	Length margin currently cut (km)	% margin currently cut	Length margin cut >5 yrs (km)	Estimated total length of possible plots at the bog (km) = Length margin x 0.54 factor	Estimated number of turbary right owners (Estimated total length of possible plots at the bog / 0.034km plot width)	Number of turbary right owners per site. According to maps and schedules of ownership (Compiled by Central Fisheries Board)
1	231	Barroughter	Galway	SAC	84	6.15	2.48	4.68	76.10	1.47	3.32	**98**	**379**
2	248	Cloonmoylan	Galway	SAC	76	12.83	2.77	4.70	36.63	8.13	6.93	**204**	**618**
3	285	Kilsallagh	Galway	SAC	46	11.00	1.25	2.31	21.00	8.69	5.94	**175**	**169**
4	296	Lisnageeragh	Galway	SAC	15	11.50	0.37	0.67	5.83	10.83	6.21	**183**	**144**
5	301	Lough Lurgeen	Galway	SAC	25	31.51	1.02	1.50	4.76	19.68	17.02	**500**	**343**
6	326	Shankill West	Galway	SAC	4	4.57	0.07	0.08	1.75	3.55	2.47	**73**	**113**
7	391	Ballynafagh	Kildare	SAC	32	4.98	1.02	1.68	33.73	3.30	2.69	**79**	**158**
8	566	All Saint's Bog	Offaly	SAC	14	7.89	0.57	1.15	14.58	6.74	4.26	**125**	**92**
9	572	Clara	Offaly	SAC	60	18.04	1.98	3.38	18.74	15.49	9.74	**287**	**449**
10	575	Ferbane	Offaly	SAC	1	6.04	0.22	0.22	3.64	6.04	3.26	**96**	**63**
11	581	Moyclare	Offaly	SAC	25	4.68	0.63	0.98	20.94	3.70	2.53	**74**	**50**
12	592	Bellanagare	Roscommon	SAC	34	42.68	1.21	3.76	8.81	38.92	23.05	**678**	**642**
13	600	Cloonchambers	Roscommon	SAC	19	14.79	0.40	0.52	3.52	12.84	7.99	**235**	**54**
14	614	Cloonshanville	Roscommon	SAC	1	6.36	0.04	0.07	1.10	5.74	3.43	**101**	**58**
15	641	Ballyduff	Tipperary	SAC	19	4.20	0.79	1.00	23.81	3.20	2.27	**67**	**49**
16	641	Clonfinane	Tipperary	SAC	0	4.60	0.00	0.00	0.00	4.60	2.48	**73**	
17	647	Kilcarren	Tipperary	SAC	6	8.46	0.46	0.55	6.50	7.70	4.57	**134**	**282**
18	647	Firville	Tipperary	SAC	0	7.56	0.00	0.00	0.00	7.56	4.08	**120**	
19	1242	Carrownagappul	Galway	SAC	38	17.56	1.46	2.91	16.57	14.65	9.48	**279**	**519**
20	2298	Derrynabrock	Mayo, Roscommon	SAC	1	4.31	0.03	0.03	0.70	2.33	2.33	**68**	**22**
21	2348	Clooneen	Longford	SAC	13	7.36	0.50	1.15	15.63	6.21	3.97	**117**	**98**
22	2351	Moanveanlagh	Kerry	SAC	32	7.37	0.68	1.63	22.12	5.74	3.98	**117**	**102**
23	1818	Ballykenny	Longford	SAC	0	8.55	0	0	0	8.55	4.62	**136**	**190**
24	1818	Fisherstown	Longford	SAC	0	6.2	0	0	0	6.2	3.35	**98**	
25	582	Raheenmore	Offaly	SAC	0	5.67	0	0	0	5.67	3.06	**90**	**34**
26	580	Mongan	Offaly	SAC	1	6.13	0.03	0.03	0.49	6.10	3.31	**97**	**39**
27	679	Garriskil	Westmeath	SAC	0	8.35	0	0	0	8.35	4.51	**133**	**17**
28	604	Derrinea	Roscommon	SAC	0	4.01	0	0	0	4.01	2.17	**64**	**6**
29	585	Sharavogue	Offaly	SAC	4	6.69	0.14	0.14	2.09	5.29	3.61	**106**	**14**
30	6	Killyconny	Cavan, Meath	SAC	0	6.17	0.00	0.00	0.00	6.17	3.33	**98**	**360**
31	597	Carrowbehy	Roscommon	SAC	0	16.25	0.00	0.00	0.00	16.25	8.78	**258**	**90**
32	382	Sheheree	Kerry	SAC	0	1.13	0.00	0.00	0.00	1.13	0.61	**18**	**7**
				Totals	**550**	**313.59**	**18.09**	**33.14**			**169.34**	**4981**	**5161**

CUTTING CESSATION OPTIONS SUMMARY

Turf cutting cessation options

- **A.** Immediate cessation of turf cutting on:
  - **A.1** All SACs and NHAs
  - **A.2** Only sites with priority habitats
  - **A.3** All SACs and phase out NHAs
- **B.** Prioritise banning at raised bog level based on:
  - **B.1** Impact assessment criteria
  - **B.2** All SACs complemented by B.1
  - **B.3** High impacts associated with small size and/or natural range preservation
  - **B.4** All SACs complemented by B.3
  - **B.5** Presence of large vulnerable areas of high quality priority habitat
- **C.** Prioritise banning at individual turf plot level
  - **C.1** The cutting cessation as outlined in the individual site reports

Cessation Term categories

IT Immediate Term
ST Short Term
MT Medium Term

Aspects for which the advantage and disadvantage of each option have been assessed:

- **Elimination of damage associated with turf cutting (e.g. burning, drainage).**
  This aspect is assessed by the % of raised bogs where all turf cutting has ceased an no cutting can recommence. The complete cessation of cutting will greatly reduce the incidence of burning in particular.
- **Cessation direct loss of particular features of interest.**

  This aspect is assessed by the % of raised bogs where all turf cutting has ceased an no cutting can recommence. Under these circumstances no direct loss of features of interest will occur.
- **Retention of the peat archive (i.e. ecological and archaeological information).**

  This aspect is assessed by the % of raised bogs where all turf cutting has ceased an no cutting can recommence. Without cutting there will obviously be no further loss of peat archive.
- **Allows restoration to commence at the earliest possible date, thus reducing the overall costs of such work while increasing their effectiveness.**

  This aspect is assessed by the % of raised bogs where all turf cutting has ceased an no cutting can recommence. It is assumed that until all cuttings ceases it will not be possible to block drains or carry out extensive restoration of the cutaway.
- **Raised bogs where the negative impacts of cutting will continue in the ST or MT as either cutting currently occurs or is allow to recommence.**

  These impacts are as follows

  - The four aspects mentioned above plus.
  - It delays the time when restoration activity can be fully implemented.
  - The cost of restoration works will be higher and effectiveness reduced as further damage would be done.
- **Acquisition cost in the immediate to short term.**

  This is based on the number of raised bogs where cessation occurs in the immediate to short term. While overall cost of acquiring the turbary rights over the whole program will be similar for all options, there will be highest in the immediate to short term where cutting on a high percentage of the sites is phased out rapidly.

- **Need for ongoing assessments of impacts of recommencing of turf cutting.**

  The total number of raised bogs with priority habitats where new assessments will be needed are given. Under some options turf cutting can recommence on sites with priority habitats, only if the impact assessment potential score is not to high. This requires a case by case examination with obvious associated cost.

- **Monitoring complexity.**

  This refers only to compliance with the requirement to cease cutting. Obviously where no cutting is allowed on a suite of sites (i.e. all sites or SACs) it is easiest to monitor compliance (simple). Where cutting is phased out at individual site level but some recommencement is allowed following assessment of impacts a moderate level of complexity is involved (moderately complex). The most complex is the situation when phasing out or recommencement is assessed at turf plot level (extremely complex). In one case, where recommencement is subject to assessment on only a very small number of sites, this is considered to be relatively simple.

- **Avoiding sanctions under the Habitats Directive and contribution to Kyoto Protocol.**

  This aspect is defined by the percentage of priority habitats preserved by phasing out cutting on the raised bog in the immediate term or not allowing recommencements to occur. Priority habitats require protection under the Habitats Directive and are carbon sinks rather than carbon sources thus helping to meet the requirements under the Kyoto Protocol. The higher the percentage protected the greater the likelihood of achieving favourable conservation status and thus avoiding sanctions under the Habitats Directive. The same applies for the preservation of priority habitat for its carbon sink function.

- **Controversy involved in the immediate term.**

  This is assessed by the % of raised bogs where cutting is phased out immediately or cutting is not allowed to recommence. It is reasonable assumed the higher the number of turf cutters / turbary owners affected in the immediate term the greater the initial controversy will be. Whether the with longer term phasing out will be less is another matter.

- **Displacement of turf cutters in the immediate term.**

  An estimate of the number of turf cutters who will have to cease immediately is given.

- **Turf supply disruption in the immediate term.**

  This is assessed by the number of sites where turf cutting is phased out immediately. This can be expected to cause some disruption to local fuel supplies.

- **Equity between the turf cutters.**

  This aspect is defined by whether the option discriminates between turf cutters on the same or different bogs.

- **Turf cutting pressure may transfer in medium term to other raised bogs with priority habitats.**

  For most options the possibility exist that cutting activity may transfer to adjacent bogs where cutting is still allowed. When such bogs contain priority habitat this could case significant problems. For each option the number of bogs where this could occur is given.

Ranking impacts of each aspect

The relative impact of each option on specific aspects is ranked according to the best professional judgement, as follows:

- 2 (-): High negative impact
- 1(-): Moderate negative impact
- 0: Neutral
- 1(+): Moderate positive impact
- 2 (+): High positive impact

Turf cutting cessation	A									B														C		
Options	**A.1**			**A.2**			**A.3**			**B.1[1]**			**B.2[2]**			**B.3**			**B.4**			**B.5**			**C.1[3]**		
Cessation Period	**IT**	**ST**	**MT**	**IT**	**ST**	**MT**	**IT**	**ST**	**MT**	**IT**	**ST**	**MT**	**IT**	**ST**	**MT**	**IT**	**ST**	**MT**	**IT**	**ST**	**MT**	**IT**	**ST**	**MT**	**IT**	**ST**	**MT**
N° of raised bogs	139	-	-	109	-	30	64	-	75	70	15	38 (30 priority habitat absent)	94	9	35 (30 priority habitat absent)	26	NA	NA	77	-	62 (30 priority habitat absent)	8	NA	NA	6	-	133
Priority habitat protected (ha)	2474 (100%)	-	-	2474 (100%)	-	0	1954 (79%)	-	520 (21%)	1627 (65.76%)	300.10 (12.1%)	58.90 (2.4%)	2283.14 (92.03%)	166.63 (6.74%)	12.26 (4.96%)	611.58 (24.7%)	NA	NA	2062.94 (83.38 %)	-	411.06 (16.62%)	488 (19.7%)	NA	NA	135 (5.4%)	-	2339 (94.54%)
N° of current cutters	>2720	-	-	2660	-	>60	1539	-	>1181	2265	368	NA	2423	214	NA	944	NA	NA	1947	-	NA	290	NA	NA	779 [4]	533[4]	1348
Estimated n° of turbary right owners	>19155	-	-	>16140	-	>3015	>9841	-	>9314	10903	2973	>5279	14013	2500	>2642	2548	NA	NA	10919	-	>8236	1152	NA	NA	779	533	>18376
ECOLOGICAL ASPECTS																											
Elimination of damage associated with cutting	2 (+) / 100%	-	-	1(+) / 78.4%	-	1(+) / 21.6%	1(-) / 46.0%	-	1(-) / 64%	1(-) / 50.36%	1(-) / 10.80%	1(-) / 27.34%	1 (+) / 67.63%	1 (+) / 6.47%	1 (+) / 25.18%	2 (-) / 18.70%	NA	NA	1(-) / 55.4%	-	1(-) / 49.64%	2 (-) / 5.76%	NA	NA	2 (-) / 0%	2 (-) / 0%	2 (-) / 100%
Cessation of direct loss of features of interest	2 (+) / 100%	-	-	1(+) / 78.4%	-	1(+) / 21.6%	1(-) / 46.0%	-	1(-) / 64%	1(-) / 50.36%	1(-) / 10.80%	1(-) / 27.34%	1 (+) / 67.63%	1 (+) / 6.47%	1 (+) / 25.18%	2 (-) / 18.70%	NA	NA	1(-) / 55.4%	-	1(-) / 49.64%	2 (-) / 5.76%	NA	NA	2 (-) / 0%	2 (-) / 0%	2 (-) / 100%
Retention of peat archive	2 (+) / 100%	-	-	1(+) / 78.4%	-	1(+) / 21.6%	1(-) / 46.0%	-	1(-) / 64%	1(-) / 50.36%	1(-) / 10.80%	1(-) / 27.34%	1 (+) / 67.63%	1 (+) / 6.47%	1 (+) / 25.18%	2 (-) / 18.70%	NA	NA	1(-) / 55.4%	-	1(-) / 49.64%	2 (-) / 5.76%	NA	NA	2 (-) / 0%	2 (-) / 0%	2 (-) / 100%
Allows restoration to commence	2 (+) / 100%	-	-	1(+) / 78.4%	-	1(+) / 21.6%	1(-) / 46.0%	-	1(-) / 64%	1(-) / 50.36%	1(-) / 10.80%	1(-) / 27.34%	1 (+) / 67.63%	1 (+) / 6.47%	1 (+) / 25.18%	2 (-) / 18.70%	NA	NA	1(-) / 55.4%	-	1(-) / 49.64%	2 (-) / 5.76%	NA	NA	2 (-) / 0%	2 (-) / 0%	2 (-) / 100%
Raised bogs where the negative impacts of cutting will continue in the ST or MT	0			30			75			38 - 54 (16 subject to assessment if cutting recommenced)			44 - 45 (1 subject to assessment if cutting recommenced)			113			62			131			139 (as cutting will continue on the less sensitive areas)		
SOCIO-ECONOMIC/MANAGEMENT ASPECTS																											
Acquisition cost in the IM to ST	139			109			64			85			103			26			77			8			1312 turf plots (No one complete bog)		
Need for ongoing assessments of impacts of recommencing cutting	No			No			No			Yes 39 raised bogs with priority habitat (16 only if cutting recommenced / 23 with ST or MT cessation)			Yes 15 raised bogs with priority habitat (1 only if cutting recommenced / 14 with ST or MT cessation)			NA			Yes for small number of sites.			NA			Yes 109 raised bogs priority habitat (22 only if cutting recommenced (16 where cutting currently absent + 6 bogs above) / 87 with current cutting)		
Monitoring complexity	Simple			Simple			Simple			Moderately complex			Moderately complex			NA			Relatively simple			NA			Extremely complex		
Avoiding sanctions under Habitats Directive and contribution to Kyoto Protocol	2 (+) / 100%			2 (+) / 100%[5]			1 (-) / 79%			1 (-) / 65.76%			1 (+) / 92.03%			2 (-) / 24.7%			1 (-) / 83.38%			2 (-) / 19.7%			2 (-) / 0%		
Controversy involved in the IT	2 (-) / 100%			2 (-) / 78.4%			1 (-) / 46.0%			1(-) / 50.36%			1(-) / 67.64%			1(+) / 18.70%			1(-) / 55.4%			2 (+) / 5.76%			2 (+) / 0% - only 779 turf plots. However, highly controversial at site level.		
Displacement of turf cutters in the IT	2 (-) / >2720			1(-) / 2660			1(+) / 1539			1(-) / 2265			1(-) / 2423			1(+) / 944			1(-) / 1947			2 (+) / 290			2 (+) / 779		
Local turf supply disruption in IT	2 (-) / 117			1(-) / 93			1(+) / 49			1(-) / 70			1(-) / 79			1(+) / 26			1(-) / 62			2 (+) / 8			2 (+) / 6 (Cutting may recommence always subject to assessment)		
Equity between the turf cutters	2 (+) Treats all bogs and cutters equally			1(-) Distinction made between bogs with or without priority habitat			1(-) Distinction made between SACs and NHAs			1(-) Distinction made between bogs with the most threatened priority habitats and those with less threatened			1 (-) Distinction made between bogs with the most threatened priority habitats and those with less threatened at NHA level			2 (-) Distinction made between bogs meeting this criteria and the remaining 113 bogs			1 (-) Distinction made between SACs and some NHAs			2 (-) Distinction made between bogs meeting this criteria and the remaining 131 bogs			2 (-) Distinction made between cutters within individual bogs (likely to lead to strong local controversy)		
Turf cutting pressure transfer to other raised bogs with priority habitats	No			No. It may transfer to 30 NHAs without priority habitats			Yes to 45 NHAs with priority habitats			Yes to 39 raised bog with priority habitats (16 where recommencement may occur / 23 with ST or MT cessation)			Yes to 15 raised bogs with priority habitats (1 where recommencement may occur / 14 with ST or MT cessation)			Yes to 83 raised bogs with priority habitats			Yes to 32 NHAs raised bogs with priority habitats			Yes to 101 raised bogs with priority habitats			Yes to 109 raised bogs with priority habitats and also may transfer within the same bog		

Note

[1] According to option B.1, cutting would not be allow to recommence in those 16 raised bogs where priority habitats was present and cutting was absent in 2003 (see Table 9.1-Appendix IX) without an impact assessment report. Should any of the plots at any of these sites achieve a potential impact score which will require immediate cessation then no cutting will be allowed to recommence on the site. This category contains 488.2ha (19.73%) of priority habitat and the estimated number of turbary owners is 1479.

[2] According to option B.2, cutting would not be allow to recommence on the 1 raised bogs (Ballygar NHA 229) where priority habitats was present and cutting was absent in 2003 (see Table 9.1-Appendix IX) without an impact assessment report. Should any of the plots at this site achieve a potential impact score which will require immediate cessation then no cutting will be allowed to recommence on the site. This site contains 12.5ha (0.51%) of priority habitat and the estimated number of turbary owners is 72.

[3] According to option C.1, the immediate cessation of any current cutting would only occur at 6 raised bogs, as all their current plots require immediate response. However, turf cutting could recommence on less sensitive plots at any of the 139 raised bogs, including these 6 bogs.

[4] Although the 6 raised bogs where the immediate cessation of any current cutting is proposed according to option C.1, only contain 32 currently cut plots. The immediate cessation of cutting is proposed at other 747 plots. Furthermore, the short term cessation of 533 currently cut plots is proposed, but it does not imply the complete cessation of any cutting at raised bog level in the short term.

[5] While this option appears to be the same as A.1 in fact it only deals with the current carbon sinks and not the potential contain as a result of restoration of high bog. Thus option A.1 allows to restoration of 100% of the raised bogs in the immediate term.

CDS SITES LIST

	Code	Name	Designation	CD Number
1	231	Barroughter	SAC	6
2	235	Bracklagh	NHA	1
3	245	Clooncullaun	NHA	1
4	248	Cloonmoylan	SAC	8
5	249	Cloonoolish	NHA	1
6	254	Crit Island	NHA	1
7	280	Castlefrench West	NHA	1
8	281	Keeloges	NHA	1
9	283	Kilmore	NHA	10
10	284	Kilnaborris (Killeragh)	NHA	2
11	285	Kilsallagh	SAC	5
12	296	Lisnageeragh	SAC	9
13	297	Addergoole	SAC	9
14	301	Lough Lurgeen	SAC	9
15	307	Lough Tee	NHA	10
16	310	Meneen	NHA	2
17	321	Raford River	NHA	10
18	326	Shankill West	SAC	5
19	333	Anna More	NHA	2
20	391	Ballynafagh	SAC	6
21	422	Aghnamona	NHA	18
22	497	Flughany	SAC	15
23	564	River Little Brosna	NHA	13
24	565	Clonydonnin	NHA	10
25	566	All Saint's Bog	SAC	8
26	570	Blackcastle	NHA	10
27	572	Clara	SAC	5
28	575	Ferbane	SAC	15
29	580	Mongan	SAC	18
30	581	Moyclare	SAC	17
31	585	Sharavogue	SAC	17
32	592	Bellanagare	SAC	14
33	595	Callow (part of Lough Gara)	SAC	8
34	600	Cloonchambers	SAC	11
35	603	Cornaveagh	NHA	2
36	605	Derrycanan	NHA	3
37	614	Cloonshanville	SAC	8
38	640	Arragh More	NHA	3
39	641	Ballyduff	SAC	8
40	642	Ballymacegan	NHA	10
41	647	Kilcarren	SAC	16
42	652	Monaincha/Ballaghmore	NHA	4
43	674	Ballynagrenia	NHA	3
44	674	Ballinderry	NHA	3
45	677	Cloncrow Bog (New Forest)	NHA	10
46	684	Lough Derravaragh	NHA	12
47	691	Rinn River	NHA	13

48	**694**	Wooddown	NHA	**7**
49	**921**	Screggan	NHA	**7**
50	**937**	Scohaboy	NHA	**3**
51	**1227**	Aughrim	NHA	**7**
52	**1242**	Carrownagappul	SAC	**11**
53	**1244**	Castlefrench East	NHA	**11**
54	**1254**	Derrinlough Bog	NHA	**10**
55	**1303**	Moorfield	NHA	**5**
56	**1324**	Jamestown	NHA	**4**
57	**1405**	Cashel	NHA	**7**
58	**1420**	Corracramph	NHA	**12**
59	**1423**	Cloonageeher Bog	NHA	**4**
60	**1448**	Forthill	NHA	**7**
61	**1450**	Mount Jessop	NHA	**10**
62	**1623**	Carrickynaghtan	NHA	**4**
63	**1853**	Nore Valley/Timoney	NHA	**13**
64	**2110**	Moorfield Bog/Farm Cottage	SAC	**1**
65	**2110**	Corliskea	SAC	**7**
66	**2110**	Trien	SAC	**7**
67	**2110**	Cloonfelliv	SAC	**7**
68	**2298**	Derrynabrock (River Moy	SAC	**8**
69	**2298**	Gowlaun (River Moy)	SAC	**15**
70	**2298**	Cloongoonagh (River Moy	NHA	**18**
71	**2310**	Lough Ree (Clooncraff/Cloonlarge)	SAC	**19**
72	**2323**	Milltown Pass	NHA	**12**
73	**2331**	Mouds	SAC	**6**
74	**2332**	Coolrain	SAC	**6**
75	**2333**	Knockacoller	SAC	**9**
76	**2336**	Carn Park	SAC	**5**
77	**2337**	Crosswood	SAC	**6**
78	**2338**	Drumalough West	SAC	**6**
79	**2339**	Ballynamona & Corkip Lough	SAC	**19**
80	**2340**	Lough Sheelin (Clare Island)	SAC	**16**
81	**2340**	Lough Sheelin (Moneybeg)	SAC	**16**
82	**2341**	Ardagullion - Cloonshannagh	SAC	**11**
83	**2342**	Mount Hevey	SAC	**17**
84	**2344**	Annaghbeg	NHA	**12**
85	**2347**	Camderry	SAC	**6**
86	**2348**	Clooneen	SAC	**14**
87	**2349**	Corbo	SAC	**15**
88	**2350**	Curraghlehanagh	SAC	**6**
89	**2351**	Moanveanlagh	SAC	**11**
90	**2352**	Monivea	SAC	**16**
91	**2353**	Redwood	SAC	**17**
92	**2355**	Hawkswood	NHA	**19**
93	**2356**	Ardgraigue	SAC	**8**

TURF CUTTING CESSATION SCHEME OF THE DEPARTMENT OF THE ENVIRONMENT, HERITAGE AND LOCAL GOVERNMENT

Compensation for cessation of turf-cutting in SACs and NHAs

This new scheme was introduced and is effective from July 2004. It was drawn up as a result of negotiations between the Government and the Farming Organisation which resulted in a new agreement on review of the implementation of the EU Habitats Regulations (1997) reached in 2004.

Revised Proposals

Purchase of raised bogs:

Purchase of freehold: €3,500 for the first acre(or part thereof) and €3,000 per acre thereafter

Purchase of turbary rights only: 85% of freehold as at present

The above rates will apply to all purchases from the date of this agreement. In addition they will be applied retrospectively (by means of an additional ex-gratia payment) in respect of any earlier purchases of raised bogs included in the December 2002 designation proposals.

Purchase of blanket bogs:

In general the purchase of Blanket Bogs is not envisaged. In exceptional circumstances, where it is necessary to prohibit turf-cutting €1,000 per acre will apply.

The Department will make a contribution toward an applicant's legal costs based on the amount of compensation paid in respect of freehold/fee simple title as follows:

Compensation paid	Contribution to fees
Less than €6348.69	€317.43
€6,348.70 - €12,697	€476.15
€12,698.00 - €19,046	€571.38
€19,046.00 - €31,743	€634.87

The following applies in the case of Raised Bogs and also applies where it is necessary to prohibit turf-cutting in Blanket Bogs

Save in exceptional circumstances, people will be allowed to continue domestic cutting on their plots for up to 10 years. In this context, the following will be available:

- A payment of €600 per annum for the remaining period for which people give up the right to continue cutting, while others are continuing to cut.
- Paid as a single sum, up front.
- Those who sell bog/turbary before end of 2005, get €6,000 (on top of purchase price).
- Declining by €600 per annum.
- This payment shall only apply to a vendor supplying satisfactory evidence of ownership of the plot as at 1st July, 2004.
- For bogs designated prior to 1999 this payment will be applied retrospectively to those who have sold bogs/turbary. This relates to the period 1999-2008 and the IR£1,000(€1,270) incentive payment where already paid will be deducted.

A landowner who does not wish to sell bog/turbary but who commits to cease cutting and to allow drain-blocking will also be entitled to a payment of €600 per annum. This rate of payment will be reviewed annually.

After the 10-year period the Department will review whether there are particular circumstances in which domestic turf-cutting can continue on raised bogs without damaging the bogs.