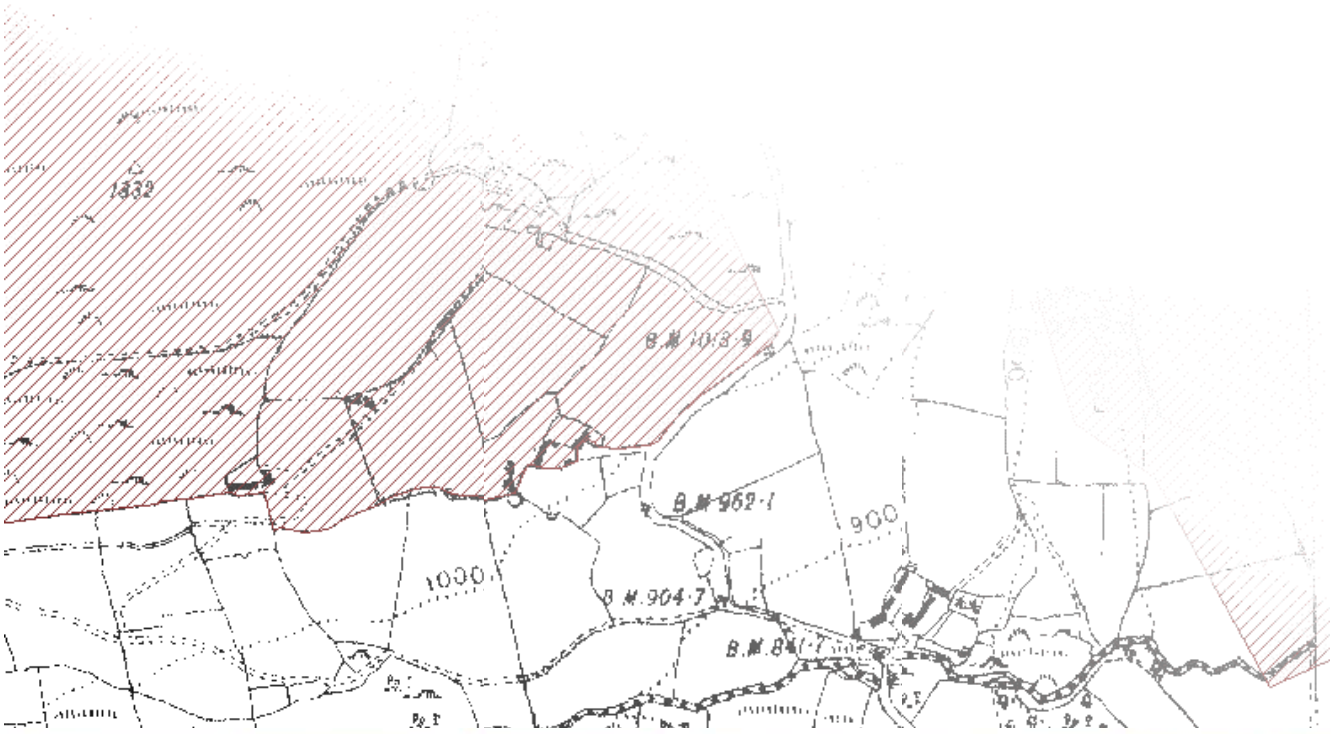
AN ROINN COMHSHAOIL, OIDHREACHTA AGUS RIALTAIS ÁITIÚIL
DEPARTMENT OF THE ENVIRONMENT, HERITAGE AND LOCAL GOVERNMENT

National Parks and Wildlife Conservation Plan for 2005-2010

Raheenmore Bog cSAC

Sitecode 582

Co. Offaly








SUMMARY

Site Description

Raheenmore Bog is situated 12km north-east of Tullamore, Co. Offaly and comprises 182ha. It developed in a small basin in the catchment of the Brosna and Boyne rivers, and is the deepest remaining raised bog in Ireland. The majority of the site (89%) comprises a statutory Nature Reserve. The underlying rock is Carboniferous limestone, with overlying gravely glacial till and lacustrine deposits above this. Deep peripheral drains surround the bog. Surface drains are also present, mostly on the eastern side of the bog.

By far the most important habitat present is the active raised bog, an Annex I priority habitat listed in the E.U. Habitats Directive. The habitat has a well-developed hummock and hollow system. The hummocks are often colonised by the bog mosses *Sphagnum imbricatum* and *S. fuscum*. Pool areas support Great Sundew, the moss *Sphagnum cuspidatum* and the liverwort *Cladopodiella fluitans*. In places, moss lawns of *S. magellanicum* have infilled the pools. Overall, the cover of bog mosses on the bog is very good. Away from the dome summit, Bog Asphodel flats dominate the peat surface. Other species include Ling Heather, Deergrass, lichens, Bog Cottons and White Beak-sedge.

Other habitats present on the site include cutover bog, strips of Birch woodland at the margins, lowland wet grassland (fertilised to varying degrees) and freshwater marsh. Small relict areas of poor fen or lagg vegetation have been identified at Raheenmore. It may therefore be possible to restore some lagg areas, which would add to the quality of the site. Noteworthy plant species present include Tussock Sedge and the moss *Sphagnum pulchrum*. Merlin frequents the site and the Irish Red Grouse recently bred on the bog.

Land Use

The major current land use of the site is nature conservation and enhancement of the bog ecology. In this regard, turf cutting has ceased, surface drains have been blocked, and three dams have been installed at the bog margins. Research and monitoring of the ecological enhancement measures is also occurring. Old cutover and former lagg areas have been reclaimed. Fertilisation and slurry spreading have heavily improved fields on the eastern and north-eastern side of the site. Cattle are mainly grazed in these areas.

Main conservation issues

- Raised bog ecological enhancement
- Drainage, dams and peat cutting
- Lands outside the Nature Reserve
- Ecological enhancement of relict lagg areas

Main management objectives

- To maintain and, where possible, enhance the quality of the active raised bog (64% of the site)
- To restore some areas of lagg vegetation around the raised bog i.e. in the west-north-west and south of the site
- To maintain and, where possible, enhance the ecological quality of other habitats, in particular dry, deciduous woodland (3% of site), cutover bog (10%), lowland wet grassland (23%), and freshwater marsh (<1%)
- To maintain and possibly increase the populations of Annex I and other important species of flora and fauna present e.g. Merlin, Grouse and *Sphagnum pulchrum*
- To maintain liaison between NPW, landowners and other interested parties, in order to effectively manage the site for conservation

Main strategies to achieve objectives

- Surface drain blocking
- Peripheral drain blocking
- Research/Monitoring/Impact Assessment
- Land purchase
- Habitat maintenance
- Liaison/consultation with landowners and interested parties

ACKNOWLEDGEMENTS

Thanks to Mr. Ciaran Ryan, who was the Plan Facilitator for Raheenmore Bog cSAC. Thanks also to regional staff and other NPW staff for their inputs.

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APPENDICES

MAPS

READER'S GUIDE

The Department of Environment, Heritage and Local Government (DEHLG), has produced this plan to provide ecological information about the site and to outline the main objectives for the conservation of the special features of the site.

The **Introduction** outlines the **policy background** to the site's designation and the relevant legislation.

The **Site description** contains **general information** on the site's boundaries, ownership and organisations involved. It also contains sections on the **physical aspects** of the site such as geology and hydrology as well as the **biological features**, in particular, the habitats and species found there. **Land use** and cultural features are also described.

The **Ecological Assessment** assesses the main ecological attributes of the site.

The **Objectives, Strategies and Zoning section** outlines the management necessary for the conservation of the site. It starts with a set of specific **conservation objectives.** These are followed by the main **management issues** that may impact on the conservation of the site and the **strategies** that will be used to achieve the objectives as outlined. In cases where more information is required, general strategies are usually applied. Where sufficient data and knowledge is available, specific management prescriptions are outlined for the timescale of the plan. In the final section, the site is divided into management **zones** to indicate where each strategy applies.

The appendices include a **glossary** where scientific and technical terms are explained, a list of **notifiable actions** relevant to each habitat within the site, and additional information on the site.

INTRODUCTION

Legal Background for Conservation Plans

The legal basis for selection and designation of **Special Areas of Conservation** (SACs) is the **EU Habitats Directive**, which was adopted in 1992. Focusing on the conservation of natural and semi-natural habitats and species of flora and fauna, the Habitats Directive seeks to establish "Natura 2000", a network of protected areas throughout the European Community. The Habitats Directive includes a list of habitats that require SAC designation and specific conservation measures. This list is known as Annex I and the habitats are referred to as Annex I habitats. On this list, habitats that require special attention because they are in danger of disappearance, are termed 'priority habitats'. A second list, Annex II in the Habitats Directive comprises species that must be afforded special protection.

In Ireland, the habitats and species that must be afforded protection under the Habitats Directive include:

- 16 Annex I priority habitats that require particular attention – including raised bogs, active blanket bogs, turloughs and machair,
- 45 other Annex I habitats – such as certain types of heaths, lakes and woodlands,
- 25 Annex II species – including Otter, Freshwater Pearl Mussel and Killarney Fern.

It is the responsibility of each member state to designate SACs to protect the Annex I habitats and Annex II species. These sites, together with the **Special Protection Areas** (SPAs) designated under the **EU Birds Directive** (1979), form the European "Natura 2000" network.

The Birds Directive contains annexes, which are lists of birds that require particular conservation measures (Annex I), and also species that may be hunted, and species that may be sold. There are 28 Annex I species regularly occurring in Ireland including Whooper Swan, Greenland White-fronted Goose, Peregrine Falcon, Corncrake and Terns. Member states are also required to protect sites that are important for migratory species such as ducks, geese and waders.

The Habitats Directive was transposed into Irish law through the **European Communities (Natural Habitats) Regulations 1997.** The **Wildlife Act 1976** is the main statute governing the protection of wildlife in Ireland and was amended in 2000 to take account of European law, particularly the Habitats and Birds Directives. The **Wildlife (Amendment) Act 2000** also makes legal provision for the designation and protection of a national network of **Natural Heritage Areas** (NHAs). Over 1,100 proposed NHAs were published in 1995 and almost 400 of these are also selected as candidate SACs.

The European Communities (Natural Habitats) Regulations 1997 include the following points:

The Minister for the Environment, Heritage and Local Government must transmit a candidate list of sites to the European Commission for consideration.

Following adoption of this list by the Commission, the Minister will formally designate the sites as SACs.

Sites are legally protected once they are publicly advertised.

Landowners and other users with a legal entitlement should be notified of designation, and the Minister must make all reasonable efforts to do so. Notification also includes a list of activities that may alter, damage, destroy or interfere with the integrity of the site. A person who illegally damages a site may be prosecuted or required to repair damage.

Landowners and other users with a legal entitlement may appeal the designation of lands on scientific grounds.

Landowners and other users with a legal entitlement will be compensated for actual loss of income arising from restrictions imposed as a result of designation.

DEHLG is the government department with responsibility for the designation and protection of wildlife habitats, species and areas of conservation interest. As part of their responsibility in relation to biodiversity and wildlife under the Wildlife Acts (1976 and 2000), the Minister's brief extends far beyond the habitats and species listed in the annexes of the Habitats and Birds Directives. For this reason, cSAC conservation plans may deal with species that are not mentioned in these annexes.

Reasons for Site Designation

The reason for the proposal to designate this site as a SAC is the presence of:

HABITAT LISTED IN ANNEX I OF THE E.U. HABITATS DIRECTIVE	
• *Active raised bog	Raheenmore Bog is relatively intact and is the deepest remaining raised bog in Ireland.

* indicates priority habitat as listed in Annex I of the Habitats Directive

General Conservation Objectives

Under Article 6 of the EU Habitats Directive, DEHLG is required to ensure the favourable conservation status of all Annex I habitats and Annex II species within cSACs. By preparing, implementing and reviewing this plan on a five year basis, DEHLG aims to achieve the objectives of the Habitats Directive in relation to this site. The general objectives DEHLG will apply to achieve this are:

- to maintain the Annex I habitat for which the cSAC is selected
- to liaise with the landowners, relevant authorities and interested parties
- to increase the scientific knowledge of the site through further scientific research and development of monitoring programmes

Specific conservation objectives and strategies are outlined in the section, **Objectives, Strategies and Zoning**.

Implications for landowners and other site users

In most areas designated as cSACs, current practices will not have to change significantly.

In cases where users are required to change practices or restrict activities to protect the wildlife interest of the site, compensation will be payable based on actual loss of income.

If an owner, occupier or user of a site wishes to carry out certain activities within the designated area (that are not covered by licence or consent from another statutory body), they must consult with, and get consent from, the Minister for the Environment and Local Government. These activities are listed as “Notifiable Actions” for each habitat (see Appendix IV). Local Authorities are obliged to ensure appropriate assessment of the implications of any development permission sought that may have an impact on a designated area.

The designation of the site or any conservation actions can be appealed by landowners or right-owners on a scientific basis. Details of the appeals procedure are also given in Appendix V.

SITE DESCRIPTION

Location including site boundaries

Raheenmore Bog developed in a small basin in the catchment of two major river systems, the Brosna and the Boyne. It is situated about 5km north-west of Daingean and 12km north-east of Tullamore, Co. Offaly on the central plain of the Irish midlands.

Grid Ref.: N 44 32

Latitude: N 53 ^{o} 20' 11"

Longitude: W 07 ^{o} 20' 22"

Area: 210ha

Altitude Range: 98 m to 101 m

Townlands: Clonagh, Cloneen, Mullagharush, Cruit, Kilclonfert, Raheenmore, Puttaghan, Barnan and Kilduff.

(Map references are provided in Appendix II).

Roads/Access

The road from Daingean to Tyrellspass runs about 3km east of the site. The bog can be accessed by turning west off this road, just north of Kilduff House. This roadway forms the northern boundary of the site.

Legal Status

Ownership

75% of the site is owned by NPWS (Statutory Nature Reserve) with the remainder under multiple private ownership (refer Ownership Map 2).

Designations of the Site

Candidate Special Area of Conservation	Site Code: IE0000582
Proposed Natural Heritage Area	Site Code: 582
Nature Reserve	Number 45 (Statutory Instrument number: 280 0f 1987)

Past Status and Designation of the Site

The site had no legal status prior to 1987, but was detailed as an Area of Scientific Interest (ASI) by An Foras Forbartha and listed as such in the Offaly County Development Plan (1996).

Rights Pertaining To The Site

Fishing	The sporting rights are State owned.
Rights of way	NPW has negotiated a right of way to the north of the site for management purposes, with another right of way present on the south-eastern side of the site.

Management Infrastructure

Individuals and Organisations Involved

Landowners	NPW owns, and is responsible for the management of, the Statutory Nature Reserve, which covers 162 ha (89%) of the site. The remainder of the site is under multiple private ownership.
National Parks & Wildlife (NPW) of the Department of Environment, Heritage and Local Government (DEHLG)	NPW is responsible for maintaining the nature conservation value of the site. The site is patrolled by the local Conservation Ranger, with input from other staff as necessary (see Appendix VI for further details of NPW regional staff).
Planning Authority	Offaly County Council is the relevant local authority for this site and is responsible for planning issues.

Local Authority Policy in relation to the Site

The site is listed in the Offaly County Development Plan (1996) as a designated Nature Reserve and as an Area of Scientific Interest of National importance. The plan states that *"the Council will continue to promote a policy of seeking the conservation of a representative sample of peatlands and the protection of peatland habitats.....The Council will liaise with the various governmental and non-governmental agencies involved, in an effort to secure the conservation of at least 4% of the original peatland area of the County."*

Physical Features

Climate

National Climate

Ireland is a warm, wet, temperate, maritime (Atlantic) climate. It is characterised by dominant south-westerly winds and the depression activity on the boundary of subtropical and polar air currents. These result in a constantly high air humidity and high precipitation. The combined action of the sea winds and the relatively warm waters of the Gulf Stream cause characteristically mild temperatures. There is a relatively small difference between mean summer and winter temperatures. Mean air temperatures for the year range from 8.9 ^{o}C to 10.5 ^{o}C. The rainfall range is between 749 mm and 1568 mm. Mean daily sunshine ranges from 3.2 hours to 4.5 hours. All of the above figure are for 1996 and are issued by the Climatology and Observations Division of *Met Eireann* (2nd Jan., 1997).

Although the development of a raised bog is affected by a number of factors, the most important natural control in terms of their continual growth is a humid, wet climate. Ireland is thus ideally suited to the formation of peat bogs. Our climate ensures that microbial decay remains sub-optimal and peat will continue to accumulate if the hydrology of the bog is protected.

Site Climate

There is little published data for Raheenmore Bog with regard to climate, but the indications are that the climate closely resembles that recorded at Birr meteorological station. Regionally, the prevailing wind is from a westerly to southerly direction. The first frosts occur in early October with the last ones generally in mid-May. Rohan (1986), details the following information for the nearest meteorological station at Birr, 48 km west-south-west of Raheenmore:

- annual mean hourly wind speed (1962 - 1984): 3.7 m/s
- annual mean daily air temperature (1951 - 1980): 9.5 ^{o}C
- mean daily max. air temperature (July): 18.8 ^{o}C
- mean daily max. air temperature (Jan.): 7.4 ^{o}C
- annual mean relative humidity at 0000 hrs: 89%, 0600 hrs: 91%, 1200 hrs: 76%, 1800 hrs: 78%

The following table shows mean values for the given variables for the period 1990-1998 recorded at Birr Meteorological Station, Grid reference: N074044 @ 73 m.

Year	Temperature (^{0}C)	Total rainfall (mm)	Total sunshine (hrs)	Mean wind speed (knots)
1990	10.1	845.1	1222.0	6.5
1991	9.7	801.0	1073.0	5.9
1992	9.8	820.3	1012.8	6.0
1993	9.3	867.6	932.0	6.2
1994	9.6	949.5	1049.7	7.2
1995	10.2	828.6	1321.4	6.0
1996	9.3	837.7	1174.5	5.6
1997	10.4	943.3	1173.3	5.5
1998	10.3	1003.1	1063.7	6.7
Average	9.9	877.4	1113.6	6.2

Geology & Geomorphology

(from Kelly and Schouten, 1998; Flynn, 1993)

Bedrock Geology

The Midlands of Ireland are underlain chiefly by blue-grey limestones of Lower Carboniferous age. Inliers of older Devonian and Lower Palaeozoic shales emerge through the carboniferous rocks in places, most notably in the Slieve Bloom Mountains. The area of Raheenmore Bog is underlain by Carboniferous limestone. It is a very muddy, well bedded, dark grey or black limestone (Calp). It often contains chert bands or nodules. The bedrock surface within the bog basin is extremely irregular. Volcanic rocks emerge through this unit to the south of Raheenmore Bog and through other limestone units to the east.

Glacial and Post-glacial Sediments

Sediments up to, and in excess of, 50m thick cover the bedrock of the Midlands. For the most part, these take the form of glacio-lacustrine (including well-bedded sands, gravels, silts and clays) and glacio-fluvial deposits (mainly well bedded sands and gravels), or tills. Because most of these sediments are de-glacial in origin, their deposition is irregular and often chaotic.

Raheenmore Bog basin is infilled with glacial deposits. There is a lower sandy, gravely till which mostly directly overlies the bedrock. This till is generally in excess of 10m thick, but thins at the margins of the basin. The lower till unit is overlain by a second "till" of gravely clay or clayey gravel. This unit varies in thickness from 1m to 10m, averaging about 4m. These two units are separated in places by a thin sand or gravel deposit. The bog occurs in a basin completely surrounded by deposits of till with sand and gravel lenses, with the till to the east appearing to be particularly gravel-dominated.

Raheenmore Bog formed in a depression where glacial deposits have been covered by a blanket of lacustrine deposits, which seals the peat off from the underlying layers. The deposit is most frequently seen in open drains and is rarely exposed at the surface. The material is blue-grey in colour, silty and towards the margins of the bog, it becomes coarser in texture.

Geomorphology of Surrounding Area

The topography surrounding Raheenmore Bog is very variable. Large areas of flat terrain are found among smaller areas of gently sloping land around the southern and western margins. This contrasts with the topography on the northern and eastern sides of the site, which consist of a number of steep-sided hills, separated from one another by small incised valleys. The hills found on the southern side of the bog are roughly elliptical in shape and have their long axes trending in an east-west direction. The hills on the northern and eastern sides are approximately conical in shape. Generally speaking, the maximum height of the land surrounding the bog is greater than that of the bog itself (Flynn, 1993)

Geomorphology

Raheenmore Bog can be divided into cutover and uncut bog. The uncut bog has steep sides, which then rises much more gently to a high point in the centre of the site. No pool systems are observed on the bog, however, there is a well-developed hummock and hollow microtopography in the centre. This topography is absent in areas strongly affected by drainage, particularly around the bog margins. The steep sides currently observed at the bog margins are as a result of subsidence due to cutting and drainage. The natural margin of the bog has been removed by cutting on all sides. Cutover bog has a generally flat topography crossed by numerous small drains (Flynn, 1993).

Hydrology & Water Quality

(after Kelly, 1993; Schouten *et al.,* 1994; Streefkert, 1996; Kelly and Schouten, 1998)

General Raised Bog Hydrology

The volume of water in undisturbed peat varies in the range of 88-97%. Raised bogs have groundwater levels above those of their near surroundings. This makes them solely dependent on precipitation for their water supply. Although bogs are areas that do not receive groundwater, they are wet environments in the sense that groundwater levels are normally close to the surface and the water levels fluctuate little in time compared with groundwater levels in mineral soils.

The body of a well-developed raised bog is termed the catotelm. It is normally overlain by the much thinner acrotelm, from which it receives its water. The catotelm may be seen as a saturated body of water, with a small fraction of organic matter that impedes outflow. The groundwater table coincides approximately with the catotelm surface and therefore, the shape of the catotelm is almost the same as the shape of the groundwater body of the bog. The water can flow out of the catotelm in two ways: sideways to the surroundings (lateral flow) and downwards to the underlying mineral layers. The cross-sectional shape of a bog is that of a watertable in equilibrium with the lateral discharge and a spatially constant infiltration of water from acrotelm to catotelm. In summary, a raised bog may be considered as a slightly leaky body (catotelm), covered by a slightly leaky roof (the acrotelm). Apart from the leakage, the excess precipitation flows off over the roof. Because of its large hydraulic conductivity (water transmissivity), the thin (< 50 cm) acrotelm is the crucial zone in raised bog hydrology.

When peat is drained, certain structural changes take place, as the removal of water allows subsidence to occur and aeration to increase, elevating mineralisation rates (Hobbs, 1986). If this process proceeds too far, re-wetting of the peat is not possible, as the peat has become compacted and pore spaces are lost. This means that the water storage capacity of the peat is diminished. The effects of peat cutting are similar to that of drainage, with the addition of possible peat slumping and the formation of large cracks along the bog edge.

Hydrology of Raheenmore Bog

Raheenmore Bog developed in a small basin in the catchment of two major river systems i.e. the Brosna and the Boyne. The range of values for water volume in Raheenmore Bog (85 - 95%) are similar to those found on an undisturbed bog. Peripheral and surface drains are shown on the Drainage Hydrology Map (Map 5). Most of the drainage discharges through three large drains, two of which flow to the north, and one to the south-west.

Peripheral Drainage at Raheenmore

Studies have shown that the whole bog is drying out due to peripheral drainage (Kelly, 1993). These drains (up to 4m deep in places) almost completely surround the bog. This was mostly part of a drainage scheme in the area (Boyne Arterial Drainage Scheme dug in 1981). Other peripheral drains were opened by local landowners. These water-courses mainly drain the narrow zone within the cutover areas. The deepest sections (2.5-4m) are found along the northern and eastern sides of the site. Hydrological monitoring of the site has shown that these drains are seriously affecting the hydrology of the bog, with water loss exceeding recharge and resulting in subsidence in the marginal areas. The central core of the bog is still quite wet, but at the south-eastern side, considerable drying out has occurred (Kelly, 1994).

Surface Drainage at Raheenmore

(from sources listed above and Flynn, 1993)

Although the majority of the core bog dome is un-drained, a series of drains on the eastern side of the bog are of note. Some of these are at least 150 years old, as they are indicated on the Ordnance Survey map of 1838, with the remainder over 80 years old (shown on the Ordnance Survey map of 1910). These drains were expanded and maintained between 1910 - 1950. They are now mostly infilled with various *Sphagnum* species, including *S. cuspidatum* and *S. magellanicum*. Although

their water carrying potential has reduced due to colonisation by *Sphagna* and other species, they still act as focus points for water flow. In this area, the bog surface shows a hollow as a result of peat subsidence. Furthermore, there are no pools or hummocks here, but there is a rather uniform vegetation cover. The wet vegetation community still present, is a result of water from the higher parts of the bog now discharging into the subsided area. Drains near the southern side of the bog have resulted in a strong desiccation of the acrotelm here also, as is shown by the dominance of Purple Moor-grass (*Molinia caerulea)*. Kelly (1993), produced a desiccation map (refer Map 6) to illustrate the level of drying out of the bog surface. It was constructed by the amalgamation of community types with similar hydrological regimes.

Marginal Peat Cutting

A large number of water-logged ditches associated with former turf cutting are found in the cutover bog area. Marginal cutting, which has occurred all around the bog, results in drainage, with a number of effects. Firstly, permanent structural changes of the peat result, in that the porosity decreases causing a further lowering and fluctuations of the water table. When the water table is lowered considerably, desiccation leads to irreversible damage to the acrotelm, which then loses its peat-forming capacity. These processes are reflected by the vegetation changes from *Sphagnum* dominated communities to vegetation dominated by Cross-leaved Heath (*Erica tetralix*), Bog Asphodel (*Narthecium ossifragum*), Deer-grass (*Trichophorum caespitosum*) and finally to Ling Heather (*Calluna vulgaris*) dominated communities. The lowering of the groundwater table results also in the subsidence of the peat, which increases the inclination of the bog surface towards the margins. The discharge of surface water increases, which then may cause a lowering of the groundwater table at a greater distance from the margin of the bog. Peat subsidence will, therefore, extend further into the bog, until a new equilibrium has been reached. At present the marginal facebank is 1.5-4.0m above the peat surface in the cutover. The bog margin shows locally extensive fissure formation and peat slippage. In the north-west, north and south-east, cutover extends locally over a considerable distance into the high bog.

Areas of Groundwater Influence at Raheenmore

Small relict areas of poor fen or lagg vegetation have been identified at Raheenmore. The lagg zone is the natural marginal drainage channel circumscribing the bog and receiving water from the bog and adjacent mineral soil. There are still areas of vegetation on the margins that indicate the influence of ground water, where lagg conditions could possibly prevail. On the west-north-western side and small areas on the southern edge, mineral springs feeding the lagg zone still survive (refer possible discharge sites on Drainage Hydrology Map; Map 5).

Soils and Soil Processes

(after Kelly and Schouten, 1998)

Raised bog development

The raised bog landscape unit is a characteristic feature of the Central Plain of Ireland. The formation is a result of the combination of depressed topography, poor drainage gradients and climatic changes throughout the past 10,000 years of the post-glacial period.

Bogs grow by forming new organic material at their surface. Previously formed material is covered by a gradually increasing layer of younger material. At the same time a process of decay occurs, which gradually slows down as the periods which plant remains lie above the groundwater table become scarcer and shorter. Eventually, it becomes permanently waterlogged and no aeration occurs anymore. Decay then becomes a very slow process and peat builds up.

Peat

The main component of the soil in a bog is water (88-97%). Apart from a negligible content of mineral material, the rest is organic matter, being the remains of vegetation accumulated in the course of time. No detailed peat surveys have been carried out on Raheenmore Bog. However, studies indicate that there are at least 12m of peat at the higher points of the bog surface. This is

one of the deepest raised bogs known. Sub-peat mineral soils of lacustrine origin underlie this. The peat development reflects the overall three stratigraphical layers of poorly humified *Sphagnum* moss peat dome, a sub-surface layer of humified *Sphagnum* peat and a basal fen layer.

The properties of material at and near the surface differ from those of the deeper (and older) peat. As a result of greater compaction of lower peat layers, density increases and porosity decrease downwards. At and near the surface an "active layer" (the acrotelm) can be distinguished. It is a relatively thin top layer (normally less than 50 cm), including the living peat moss. It can be described as containing an oscillating water table, having a large hydraulic conductivity and a variable water content, being subject to periodic air entry when the water table lowers, rich in peat forming aerobic micro-organisms and having a live matrix of growing plant material. It has also been described as the peat-forming layer, in which organic matter, alive at the surface, is undergoing conversion to peat.

At Raheenmore, the area of well-developed acrotelm currently covers less than 50% of the bog. The soil is very acid oligotrophic peat, with up to 95% moisture content in un-drained areas of the bog, decreasing to 85% or less on the drained margins. Peat thickness greater than 15m have been observed (Flynn, 1993), with the normal range from the margin to centre being 2-12m (Bord na Mona, 1948).

Biological Features

Habitats and Vegetation

Note: Throughout the conservation plan, habitats are named and described under two different systems: the Annex I habitat(s) are as listed in the EU Habitats Interpretation Manual, while all other habitats are as listed according to the NPW NHA classification system.

The following table lists the habitats within the site. The Annex I habitat of the Habitats Directive for which the site was selected is listed, with the relevant NHA category also shown. Annex I priority habitats are marked with an asterisk (*). The Indicative Habitat map for the site is presented in Map 3. The percentage presented for each habitat type is based on the approximate geographic area of each habitat, as shown in Map 3.

Habitats Found within Raheenmore Bog cSAC

ANNEX I HABITAT TYPE	CORRESPONDING NHA CATEGORY	% AREA
*Active raised bog	Raised bog	64%
-	Cutover bog	10%
-	Dry broadleaved semi-natural woodland	3% (including scrub)
-	Scrub (included with woodland)	Included with woodland
-	Lowland wet grassland	23%
-	Freshwater marshes	<1%
-	Drainage ditches (not shown on habitat map)	Included with other habitat classes

Annex I Habitat:

Active Raised Bog (64% of total site area)

The bog has a well-developed hummock and hollow system. The hummocks are often colonised by the mosses *Sphagnum imbricatum* and *S. fuscum*. Pool areas support Great Sundew (*Drosera anglica*), *Sphagnum cuspidatum* and the liverwort *Cladopodiella fluitans*. In places, moss lawns of *S. magellanicum* have infilled the pools. Overall, the cover of *Sphagnum* on the bog is very good. Away from the dome summit, Bog Asphodel flats dominate the peat surface. Other species include Ling Heather, Deergrass, *Cladonia* lichens, Bog Cottons (*Eriophorum* spp.) and White Beak-sedge (*Rhynchospora alba*). This habitat class can be divided into a number of ecotopes - central, sub-central and marginal (Kelly, 1993). See Appendix III for a detailed description of the three ecotopes and the lagg.

Other Habitats

Cutover Bog

At the margins, there are areas of old abandoned cutover. In wetter areas, small pools or pits have formed with species such as Marsh Cinquefoil (*Potentilla palustris*), Marsh Pennywort (*Hydrocotyle vulgaris*) and Lesser Tussock-sedge (*Carex diandra*), indicating mineral enrichment. Old turf banks and other desiccated peat areas usually support vegetation typical of drier conditions with species like Ling Heather, Common Gorse (*Ulex europaeus*) and Bracken (*Pteridium aquilinum*). Intermediate areas are often colonised by Purple Moor-grass (*Molinia caerulea*). In places, the cutover has been colonised by scrub (e.g. common Gorse) and trees (e.g. Birch (*Betula pubescens*)). This is most notable to the south-east of the site, and is detailed separately below. Scrub/woodland is also seen in the south, west and north.

Dry, Broad-leaved Semi-natural Woodland/Scrub

Birch dominated woodland/scrub has developed on some areas of old cutover, especially on the south-eastern side of the bog.

Scrub (e.g. Common Gorse, Birch) growing on old cutover can also be seen fringing the bog margins on the north and south sides (not shown separately on the Indicative Habitat Map).

Lowland Wet Grassland

This occurs on peaty/mineral soil. Some of this habitat is on old areas of cutover, now reclaimed. The ends of these fields, nearest the bog, are often peaty, wetter and less improved (e.g. north and east-south-east of the site). Rushes (*Juncus effusus, J. acutiflorus/articulatus*) are frequent in this habitat. The sward is often species-rich with Brown Sedge (*Carex disticha*) among other sedge species, Dock (*Rumex* sp), Crested Dog's-tail (*Cynosurus cristatus*), Valerian (*Valeriana officinalis*), Meadowsweet (*Filipendula ulmaria*) and Purple Moor-grass found in fields, at the bog margins.

The most improved wet grassland occurs on the north-eastern boundary of the site. Roughly half of this area is low-lying and on peaty soil. Soft Rush (*Juncus effusus*) is growing up among the Perennial Rye-grass (*Lolium perenne*) in the low-lying areas. This indicates that the natural vegetation of these areas would currently be wet grassland/fen/bog. These areas lie below the surface level of the adjacent intact bog and were part of the raised bog lagg zone. The ground slopes fairly steeply eastwards towards the site boundary and Perennial Rye-grass becomes even more dominant here.

Freshwater Marsh A semi-reclaimed area of former lagg can now be described thus. Sedge species (*Carex* spp.) are abundant, with Jointed/Sharp-flowered Rush (*Juncus acutiflorus/articulatus*) frequent. A herb-rich sward also occurs.

Drainage Ditches Past drainage by the Office of Public Works and local landowners has resulted in drainage ditches totally encircling the bog. Old drainage ditches also extend into the bog, especially on the eastern side of the site. These have now substantially been blocked and are beginning to in-fill with vegetation. (Refer Drainage Hydrology Map; Map 5.)

Notable Flora:

Raheenmore Bog is a classical example of a Midland raised bog with the characteristic flora of this increasingly uncommon habitat type. Noteworthy species include Lesser Tussock-sedge and the moss, *Sphagnum pulchrum*.

Fauna:

Amphibians and Reptiles

The Common Frog (*Rana temporaria*) occurs on site. This is listed as Internationally Important in the Irish Red Data Book. The Common Lizard (*Lacerta vivipara*) also occurs.

Birds

The principal species breeding on site include Pheasant (*Phasianus colchicus*), Red Grouse (*Lagopus lagopus hibernicus*), Snipe (*Gallinago gallinago*), Lapwing (*Vanellus vanellus*), Curlew (*Numenius arquata*), Woodcock (*Scolopax rusticola*), Skylark (*Alauda arvensis*) and Meadow Pipit (*Anthus pratensis*).

Other birds frequenting the site are Merlin (*Falco columbarius*), Sparrowhawk (*Accipiter nisus*), Kestrel (*Falco tinnunculus*), Grey Heron (*Ardea cinerea),* Teal (*Anas crecca*) and Mallard (*Anas platyrhynchos*).

Merlin is listed under Annex I of the EU Birds Directive. The Red Grouse is regarded by some authorities as being distinct from the British species and has become scarcer in Ireland in recent times.

Mammals

The principal mammal species recorded include the Irish Hare (*Lepus timidus hibernicus*), Badger (*Meles meles*) and Fox (*Vulpes vulpes*). The Irish Hare is a race of the Arctic Hare and quite distinct from the Brown Hare (*Lepus europaeus*), which is not native to Ireland. Both of these species are listed as Internationally Important in the Irish Red Data Book.

Cultural Features

Land use and impacts on the site

Nature Conservation

The majority of the site (89%) is a statutory Nature Reserve. This was established on 28th September 1987. It is State-owned and managed by NPW. As such, activities relating to the conservation of the bog are the major land use of the site. Desiccation of the bog is the major threat to the ecological quality of the site. This has been caused by past peat cutting and drainage of the bog and surrounding lagg area. The following conservation activities have been undertaken at the site:

- **Surface drain blocking**

Peat extraction has been terminated and most of the surface drains have been blocked. The drain blocking is achieved by using peat from the side of the drain itself (hand blocking) or from a borrow pit adjacent to the drain. The blocks project above the general bog surface so that the water in the drain must flow back onto the bog surface, rather than simply flowing through the drain at a higher level.

- **Construction of dams**

Cutting and associated drainage has been responsible for an estimated subsidence of 1.5m to the bog margins at Raheenmore and seems now to be affecting the remaining wet central areas of the bog. Monitoring has shown that the deep, peripheral drain surrounding the bog is seriously affecting the hydrology of the bog, resulting in subsistence in marginal areas.

To try and control this damaging process, insertion of shallow semi-humified peat dams has occurred on site, in areas where water losses are greatest (refer Drainage Hydrology Map; Map 5). A first series of dams were built in the south-east, with another dam built in the north in 1997 and a third dam fully operational in 1998. These dams are up to 5m high by 20m wide and range from about 200m to 400 m long. They are made out of well-humified peat from adjacent cutover or imported to the site from elsewhere. Plastic sheeting is incorporated into the design to minimise excessive seepage through, or under, the dam and overflow pipes are provided to prevent overtopping. Unfortunately, after a period of time, dams 1 and 3 failed and are currently not functioning.

- **Research and monitoring**

Research and monitoring of the bog and the restoration measures, are other on-going activities associated with conservation management. It has been selected as one of the main locations for international, multi-disciplinary study of raised bogs. Measurements are recorded with regard to phreatic, piezometric, precipitation, evapotranspiration, discharge, groundwater, hydraulic conductivities and organic matter volume fraction levels. These details and maps showing the location of the measurement instruments on the bog are given in Map 7.

There are signs of trampling damage from access ways to monitoring instruments, which have been in place since approximately 1990. This can be observed on aerial photographs and on the ground in the increased occurrence of White Beak-sedge.

Agriculture No grazing or agricultural activities occur on the main bog area. However, at the site margins, old cutover and former lagg areas have been reclaimed. Fields on the eastern and north-eastern side of the site have been heavily improved. Cattle are mainly grazed in these areas. Fertilisation and slurry spreading occur in these fields occasionally.

Peat extraction There is no peat cutting occurring on site at present.

Land use adjacent to the site

Agriculture Cattle and to a lesser extent sheep grazing, are the major land uses adjacent to the site. Fertilisation and the spreading of slurry on land are common farming practices.

Residential and infrastructure Scattered residential buildings are present in the vicinity of the site. The towns of Tyrellspass and Daingean are c. 6km north-west and 6km south-east of the site respectively. The main Dublin to Galway road is approximately 6km north of the site.

Past human use

Peat extraction The past use of the site was primarily for the extraction of peat. In this regard, surface, and some peripheral drains, were dug. The majority of the surface drains are on the eastern boundary. Some of these were cut 100-150 years ago. The margins of Raheenmore Bog have largely been cutover. Peat cutting was concentrated in marginal areas to the south-east and north-west. The width of the cutover varies between 30-300m. The depth to which the peat has been extracted varies as well and is among other factors dependent on the depth of the mineral subsoil. At present, the marginal facebank is 1.5 to 4.0m above the peat surface in the cutover.

Peat cutting has now ceased and most of the surface drains have been blocked. In 1992, a marginal area to the west was reclaimed, with the clearing of scrub and the digging of drains.

Arterial Drainage Peripheral drains almost completely surround the bog. These were mostly part of the Boyne Arterial Drainage Scheme dug in 1981.

Burning The north-eastern section of the bog was burnt in the past. The practice of burning has discontinued.

Conservation In 1959, the rare Ranoch-rush (*Scheuchzeria palustris*) was transplanted to Raheenmore Bog from the nearby Pollagh Bog, owing to the forthcoming excavation of the latter site by Bord na Mona. This plant is now absent from Raheenmore Bog and is extinct in Ireland.

National Monuments and Other Features

There are no recorded national monuments present on the site. The 6 inch map (refer Map 1) indicates a ring fort termed Raheenmore, just south of the site boundary.

SITE EVALUATION

Ecological Assessment

Note: The following is an assessment of the ecological features of the site. It is largely based on information given in the explanatory notes which accompany the Natura 2000 form (compiled in 1995). Additional information, obtained since these notes were written may also have been used to make the assessment.

The site was chosen as a potential SAC because of the presence of the central vegetation complex (a component community of active raised bog) at the site, which is not represented at another bog. As a result, the active raised bog at Raheenmore has a particularly high degree of representativity. Undisturbed bog communities are still present on the central part of the bog, with well-developed hummock and hollow system and pools occurring in the central area. Several other habitats are present within the site (including woodland and grassland), with lagg zones being of particular conservation significance (see Appendix III for details). The flora and fauna species found are typical of Irish midland active raised bog. The area of active raised bog present at the site comprises less than 2% of the national surface area. Given the current intactness of the central vegetation complex and the potential to manage the issues associated with it, the active raised bog is considered to be of good conservation value.

Raheenmore Bog's conservation value is further heightened as there are very few intact or near-intact raised bogs in Europe, except in Finland and Sweden. Raheenmore Bog is currently the deepest, substantially intact, midland, oceanic raised bog remaining in the world, and is representative of the smaller, wetter, raised bogs of the region. It is the most easterly, protected raised bog in Ireland.

The high bog section of the site is reasonably intact, although most of the margins of the bog have been cutover and subject to drainage and subsequent dessication. The high bog and old cutover are within the site boundary, as are the majority of the drains impacting on the bog hydrology. Consequently, there is good potential for conserving the ecological features of the site through appropriate management within the site boundary. Considerable work, including drain blocking and dam building, has already been completed on the bog and this will help to prevent further drying out of the bog. Peat cutting is not occurring within the site and is no longer a threat. In addition, most of the site is State-owned and a Nature Reserve and as such a large proportion is protected from damaging activities (e.g. peat extraction).

Areas of degraded raised bog (7120) are also present at the site but the habitat is considered to be poorly representative.

OBJECTIVES, STRATEGIES AND ZONING

Conservation Objectives

The nature conservation objectives for this site are:

Objective 1: To maintain and, where possible, enhance the quality of the active raised bog (64% of the site).

Objective 2: To restore areas of lagg vegetation around the raised bog i.e. in the west-north-west and south of the site.

Objective 3: To maintain and, where possible, enhance the ecological quality of other habitats, in particular dry, broadleaved semi-natural woodland (3% of site), cutover bog (10%), lowland wet grassland (23%), and freshwater marsh (<1%).

Objective 4: To maintain, and possibly increase, the populations of Annex I and other important species of flora and fauna present e.g. Merlin, Grouse and *Sphagnum pulchrum.*

Objective 5: To maintain effective liaison between NPW, landowners and other interested parties, in order to effectively manage the site for conservation.

Management Issues

Note: The main issues that may impact on the conservation of the site are outlined below. The constraints that these may pose and the management potential for the site are discussed.

- **Raised bog ecological enhancement**
- **Drainage, dams and peat cutting**
- **Facebank stabilisation**
- **Peripheral drainage**
- **Lands outside the Nature Reserve**
- **Dam Construction**
- **Monitoring and associated damage**
- **Burning**
- **Deciduous woodland**
- **Ecological enhancement of relict lagg areas**

Raised Bog Ecological Enhancement

The enhancement of the active raised bog to the extent and diversity existing prior to human impacts is not an achievable aim. The peat has mostly been removed from the margins (cutover) and areas of former lagg have been reclaimed, almost beyond recognition. However, the current ecological quality and diversity of the habitat can be maintained and potentially enhanced. Increasing the area of the more restricted and important vegetation types, particularly those which were more widespread in the past (e.g. the central ecotope) is part of this aim. On Raheenmore, it is estimated that the central core could be approximately doubled in size from 35ha to 62ha (Kelly, 1993).

Drainage, Dams and Peat Cutting

Past peat cutting and associated drainage has resulted in desiccation of the bog, which has continued to date (e.g. drying of margins, shrinkage of whole bog and drying out due to old surface drains). Peat cutting has now ceased and the majority of surface drains have been blocked. However, because of the increased slope on the bog due to cutting and drainage, this does not suffice to prevent further drying out of the high bog. In this regard, three dams have been constructed, although two (dams 1 and 3) are currently not functioning. Nevertheless, the aim is to arrest the desiccation of the bog, and hopefully restore active peat formation.

Facebank Stabilisation

The steep gradients on several of the cut peat facebanks are unstable and liable to erosion, particularly in the west and south-west of the site. This negatively impacts on the hydrology, and in turn, the ecology of the bog. It may be necessary to impact on lands outside the site boundary to adequately stabilise the facebanks.

Peripheral Drainage

Peripheral drains surround the raised bog. These cause desiccation of the bog and retard the development of a lagg zone. Blocking of these drains is desirable. However, this could cause flooding of low-lying fields adjoining the bog. Liaison between NPW and landowners is necessary

prior to any works being carried out. There is a possibility that the collapse of the eastern dam has caused increased siltation of the peripheral drain to the east. NPW will investigate to determine whether this has occurred.

Lands Outside the Nature Reserve

Most of the site is a statutory Nature Reserve, which is in State ownership. However, at the site margins, many fields are in private ownership. Reclamation of these, including deepening old drains and making new drains, impacts on the raised bog. Fertilisation and slurry spreading near the site boundary can cause enrichment and impact on the bog hydrochemistry, but is not considered a serious threat. These activities also detrimentally impact on previous natural lagg vegetation. Effluent from a slurry tank has been identified flowing into a drain north-west of the site. However, the flow in the drain is away from the bog (refer Drainage Hydrology Map; Map 5) and therefore, this effluent should not impact on the bog hydrochemistry. To control these activities, liaison is required with the landowners, or if possible, these lands should be considered for purchase. In any case, these activities are Notifiable Actions (see Appendix IV) and NPW must be informed if they are proposed within the site.

Dam Construction

Dam construction is expensive at c. €760 per linear metre. However, the science of dam building on raised bogs and their effectiveness, is relatively new. Dams may fail or be ineffectual. This has occurred on the site with the failure of dams 1 and 3 in 1999. It is planned to restore dam 3, but more dams may be required for bog rehabilitation. In this instance, cost may be a limiting factor.

Monitoring and Associated Damage

Monitoring of the ecological enhancement measures is necessary in order to determine their effectiveness. However, some monitoring methods can impact on the bog and in fact some hydrological transects are now apparent (due to trampling) on aerial photographs.

Burning

Burning is never desirable on raised bogs and can be ecologically very damaging. This activity has been practised in the past and the condition of vegetation in some areas still indicates previous burning. However, this has not occurred in the recent times and is unlikely to happen in the future.

Deciduous Woodland

Dry, deciduous woodland/scrub is currently present on old cutover. Some clearance of this may be required to aid the blocking of drains. It is desirable to maintain this habitat within the site to increase diversity, although the conservation of the raised bog will take priority.

Ecological Enhancement of Relict Lagg Areas

Very little lagg vegetation remains at Raheenmore Bog. As no raised bogs with an intact lagg vegetation remain in Ireland, it would be of significant conservation importance to discover if lagg re-creation is possible and, if not, to at least conserve the few lagg fragments that remain. Full restoration of lagg vegetation cannot be considered until existing ditches lose their draining functions. Therefore, in the short term, drain blocking and dam construction are the principal measures required to aid rehabilitation of a lagg zone. Another important aspect with regard to restoration of lagg communities is the land management practices on fields adjoining these areas.

The most suitable areas for lagg restoration are on the west-north-western edge and on the southern boundary, where mineral springs still survive (refer possible discharge sites on Drainage

Hydrology Map; Map 5). The former area consists of patches of semi-lagg to lagg vegetation, and the hydrochemical analysis indicate ground water influence. If drainage in this area was reduced, and the regional ground water table height increased, it could form an area of vegetation which would constitute a lagg. On the southern edge, ombrotrophic peat layers would have to be removed in order to increase the influence of groundwater. Species such as Lesser Tussock-sedge are already established in peat pits in this area and thus, re-colonisation points exist in this situation.

Relating hydrological and hydrochemical analysis to the vegetation of these areas can be used to extend existing areas of poor fen, or to attempt re-creation of lagg vegetation types.

General Strategies

Specific strategies that relate to the above objectives are outlined below. However, there are a number of strategies that relate to the site as a whole. These are as follows:

Implement plan

DEHLG will seek to ensure that the aims of this conservation plan are achieved through:

- liaison with the landowners, relevant authorities and interested parties
- implementation of REPS or DEHLG farm plans, which will use this document as a guideline for prescribing management on a farm by farm basis, and also will ensure that the agreed prescriptions for the relevant habitats are adhered to
- enforcement of Regulations under the Habitats/Birds Directives and the Wildlife Act

Establish a monitoring regime

The monitoring regime for the site will comprise :

Scientific monitoring Monitoring of the favourable conservation status of the active raised bog will be done by, or on behalf of, the staff of the Monitoring Section of the NPW or staff working to NPW in accordance with the procedures laid down by that section. The work, if any, to be done on this site in that respect will be prescribed by that section.

Site surveillance Patrolling of the site by the Conservation Ranger, with special attention to the Annex I priority habitat will identify any major changes, damaging operations, or threats should they arise.

Enforce notifiable actions

Certain activities may be restricted in SACs. Notifiable Actions for particular habitats are listed in Appendix IV of this plan. Permission from the Minister is required before these actions may be carried out within the designated area. For example, drainage works on the bog or within the local water catchment area are notifiable actions for active raised bog.

Specific Strategies

Objective 1.

To maintain and, where possible, enhance the quality of the active raised bog (64% of the site).

Strategies:

1.1. Surface Drain Blocking

NPW will complete the blocking of surface drains relevant to the active raised bog (e.g. some small drains to the south-west of the site still require blocking). Drain blocking will be achieved by using peat from the side of the drain itself (hand blocking) or from a borrow pit adjacent to the drain. The blocks will project above the general bog surface, so that the water in the drain must flow back onto the bog surface, rather than simply flowing through the drain at a higher level.

1.2. Stabilisation

NPW will stabilise the peat facebanks most in need of attention in order to minimise erosion of, and water runoff from, the bog (e.g. west and south-west of site). Facebank measurements have been done and will be referred to (NPW internal report, 1992).

1.3. Peripheral Drain Blocking

NPW will block the peripheral drains to the east of site and NPW will repair dam 3 (refer NPW Research). Due to the potential flooding of surrounding land caused by drain blocking (see also strategy 1.4), liaison between NPW and the landowners is necessary prior to any works being carried out.

1.4. Research/ Impact Assessment

NPW will instigate studies to assess the impacts of the above strategies on lands adjoining the site i.e.:

- Water level measurements in nearby low-lying land
- The stabilisation of facebanks to the west and south-west may affect adjacent land which may not be within the SAC
- Blocking of peripheral drainage may flood nearby low-lying lands. Lands to the east of the site are likely to be flooded by drain blocking

1.5. Liaison

It is necessary for NPW to liaise with the relevant landowners in order to control drainage, fertilisation and slurry spreading on lands adjacent to the high bog and cutover. Liaison with landowners will also be required for lands potentially affected by ecological enhancement activities.

1.6. Land Purchase

NPW will consider and investigate the possibility of purchasing the remainder of the land within the site boundary. NPW will purchase lands within the site as and when they are offered for sale. NPW is seeking to purchase turbary rights and, where possible, fee simple ownership on raised bogs. €3451.41/ha (£1100 per acre) for turbary rights and €4078.95/ha (£1300 per acre) for fee simple turbary rights apply. NPW will also consider other lands outside the site, which may be affected by ecological enhancement activities within the site, for purchase.

1.7. Monitoring of Surface Height

NPW will insert benchmarks down to the underlying mineral soil in order to determine future fluctuations in the height of the bog surface.

1.8. Monitoring of ecological status and changes occurring.

Monitoring and maintenance of work already carried out is important in ensuring the effectiveness of the ecological enhancement measures. Basic monitoring should be done regularly (e.g. bi-monthly) including:

- Monitor the surface drains already blocked.
- Monitor the dams.
- Monitor any future work e.g. facebank stabilisation and peripheral / surface drain blocking.
- Monitor and minimise the impacts of servicing the measurement instruments on site.

1.9. Prevention of Burning

Burning should not occur on the high bog and is a notifiable action.

Objective 2.

To restore areas of lagg vegetation around the raised bog, i.e. in the west-north-west and south of the site.

Strategies:

2.1. Drain Blocking

NPW will block surface and peripheral drains as detailed in strategies 1.1 and 1.3. These are the principal measures with regard to the restoration of lagg communities.

2.2. Land Purchase

NPW will consider the purchase of the lands adjoining the possible discharge sites (indicated on the Drainage Hydrology Map; Map 5).

2.3. Prevention of pollution

The possible discharge sites (shown on the Drainage Hydrology Map; Map 5) are areas of vegetation on the margins that indicate the influence of groundwater (seepage), where lagg conditions could possibly prevail. Drainage, fertilisation or slurry spreading should not occur within 50m minimum of these areas.

Objective 3.

To maintain and where possible enhance the ecological quality of other habitats, in particular dry broadleaved semi-natural woodland (3% of site), cutover bog (10%), lowland wet grassland (23%), and freshwater marsh (<1%).

Strategies:

3.1. Maintenance of woodlands

Scrub and woodland species will not be cleared in the areas at the site margins. Scrub clearance to aid drain blocking and dam maintenance can occur. Drain blocking may flood woodland areas. However, this will improve the conservation of the raised bog, which takes priority over the woodland habitat.

3.2. Maintenance of lowland wet grassland, cutover bog, freshwater marsh.

Activities such as drainage, fertilisation and re-seeding are notifiable activities on such habitats (see Appendix IV) and it is necessary to consult with NPW prior to such activities being carried out.

Objective 4.

To maintain and possibly increase the populations of Annexed and other important species of flora and fauna present e.g. Merlin, Grouse and *Sphagnum pulchrum.*

Strategies:

4.1.	**Habitat Maintenance**	Strategies described above that are designed to maintain Annex I and other habitats within the site will safeguard the important species occurring within it. NPW will seek to maintain or increase the populations of important species through the implementation of these strategies, in addition to those that are applicable to the management of the site as a whole.
4.2.	**Prevention of illegal hunting**	NPW will strive to ensure that no illegal shooting occurs on site. It is Departmental policy that no hunting occurs on State-owned lands.
4.3.	**Monitoring**	NPW will monitor the ecological status and changes occurring at the site, as per strategy 1.8 and the general strategies.

Objective 5.

To maintain effective liaison between NPW, landowners and other interested parties, in order to effectively manage the site for conservation.

Strategies:

5.1.	**Liaise with interested parties**	NPW will strive to maintain effective liaison with landowners (particularly through the Liaison Committee), relevant authorities and interested parties on achieving the objectives for conservation of the site.
5.2.	**Monitor development applications**	NPW will continue to monitor applications, including current applications, for planning permission and licenses for lands within and adjacent to the site. Appropriate bodies will be notified if developments are thought to conflict with conservation objectives.
5.3.	**Liaise with REPS planners**	REPS planners are required to consult with NPW staff when they are developing plans for land within the site.

Zoning

Note: Zoning is the division of a nature conservation site and neighbouring lands into a number of sub-units. There are four types of zones identified (not necessarily all occurring within a site): A, B and C within the site and D outside the site but impacting on it. The relevant strategies are listed for each site.

Zone A: A Natural Zone

Areas of high conservation value, which require no or little intervention (Map 4).

1A: NON-INTERVENTION AREAS

1A1: The central and sub-central ecotopes of the raised bog can be considered non-intervention areas. Here surface drains have been blocked. The only activities necessary are monitoring and measurements (strategy.1.8) to aid future management decisions regarding conservation of the bog ecosystem.

Zone B: Active Management

Areas of high conservation value where high management input is needed to maintain, rehabilitate, restore to a more desirable state (Map 4).

B1: At the edges of the marginal ecotope of the raised bog, in old cutover and current deciduous woodland, active management is required to enhance the ecological quality of the site. Peripheral (strategy 1.3) and some surface drains (strategy 1.1) require blocking and facebanks require stabilisation (strategy 1.2). The impact of these measures must first be investigated (strategy 1.4). Monitoring and maintenance of work is also essential (strategy 1.8). Prevention of unnecessary woodland and scrub clearance (strategy 3.1) is desirable.

Liaison with landowners (strategy 1.5) is required so as to minimise the impact of farming activities here on the bog hydrology, hydrochemistry and ecology. The wet grassland fields require management with regard to control of drainage, fertilisation and slurry spreading (strategy 3.2). This is especially important for lands adjoining possible discharge sites (strategy 2.3). Purchasing of site lands in private ownership will to be considered (strategy 1.6).

Summary of Specific Strategies

Note: It is implicit with all the strategies presented that their implementation is dependent on availability of adequate resources in terms of staff, expertise and financial resources. Also, that cooperation with landowners and other key stakeholders is key to achieving the stated objectives.

	Strategy	Action required	Who to implement	When/Duration/ Frequency	Estimated Total Cost	Additional Resources needed
1.1.	Surface Drain Blocking	Complete the blocking of surface drains relevant to active raised bog.	NPW			
1.2.	Stabilisation	Stabilise the peat facebanks most in need of attention.	NPW			
1.3.	Peripheral Drain Blocking	Block peripheral drains to east of site and repair dam 3. Liaise with landowners prior to implementing this action.	NPW			
1.4.	Research/ Impact Assessment	Instigate studies to assess impacts of strategies 1.1-1.3.	NPW			
1.5.	Liaison	Liaise with landowners regarding control of activities on lands adjacent to high bog and cutover.	NPW/ Landowners			
1.6.	Land Purchase	Consider and investigate purchase of lands within the site. Seek to purchase turbary rights related to the site.	NPW			
1.7.	Monitoring of Surface Height	Insert benchmarks to underlying mineral soil to determine future fluctuations in bog surface height.	NPW			
1.8.	Monitoring of ecological status and changes occurring.	Monitor status of maintenance and restoration works.	NPW			
1.9.	Prevention of Burning	Prevent burning on the site, burning is a notifiable action.	NPW			
2.1.	Drain Blocking	See strategies 1.1 and 1.3.	-			
2.2.	Land Purchase	Consider purchase of land beside possible discharge sites.	NPW			
2.3.	Prevention of pollution	Control drainage, fertilisation or slurry spreading within 50m of possible discharge sites.	NPW/ Landowners			
3.1.	Maintenance of woodlands	Maintain scrub and woodland on the site, in particular at site margins, as appropriate.	NPW/ Landowners			
3.2.	Maintenance of lowland wet grassland, cutover bog, freshwater marsh.	Control damaging activities, such as drainage, fertilisation and re-seeding, which are notifiable actions.	NPW/ Landowners			
4.1.	Habitat Maintenance	The implementation of strategies 1.1-1.9, 2.1-2.3 and 3.1-3.2 will achieve this strategy.	-			
4.2.	Prevention of illegal hunting	Strive to ensure that no illegal hunting occurs at the site.	NPW			
4.3.	Monitoring	Monitor in accordance with strategy 1.8 and the general monitoring strategies.	-			
5.1.	Liaise with interested parties	Maintain effective liaison with all interested parties.	NPW			
5.2.	Monitor development applications	Monitor development applications within and beside the site.	NPW			
5.3.	Liaise with REPS planners	Liaise with NPW when developing REPS plans within the site.	REPS Planners			

APPENDIX I: GLOSSARY

ABIOTIC FACTORS – Non-living factors such as geology and climate.

ACIDIC - When applied to soils, refers to soils which are of a low pH i.e. below 7. The term is often used in relation to the plant communities that an acid soil may support e.g. acidic grassland.

ACIDIFICATION - The detrimental effect of acid rain on soils and freshwater.

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 actrotelm is vital to a raised bog as this is the peat forming layer and water storing layer of the bog.

AFFORESTATION - The planting of trees (usually conifers) over an area of previously unplanted ground.

ALGAE - Simple plants that are not differentiated into roots, stems and leaves and have no true vascular system. They can be microscopic, or very large and are capable of photosynthesis. They can be found in most habitats but the majority occurs in freshwater or marine environments.

ALKALINE - When applied to soils it refers to soils of a calcareous nature and of a high pH, i.e. above 7. The term is often used to describe plant communities associated with such soils e.g. Alkaline Fens.

ALTITUDE - Vertical height above sea level.

AMPHIBIANS – A vertebrate group whose members spend part of their life cycle in water and part on land e.g. Frog.

ANGIOSPERMS - Flowering plants. Strictly, those seed bearing plants that develop their seeds from ovules within a closed cavity, the ovary.

ANNEX I - of the EU Birds Directive, lists birds that are strictly protected so that they cannot be killed, captured, disturbed or traded.

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

ANNEX II - of the EU Birds Directive lists birds which may be hunted.

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

ANNEX III - of the EU Habitats Directive gives the criteria for selecting sites to be designated as SACs.

ANNEX IV - of the EU Habitats Directive lists animal and plant species of Community interest in need of strict protection.

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.

ANNUALS - Plants which complete their lifecycle in one year, germinating in Autumn or spring, flowering fruiting and dying by the following Autumn.

AQUATIC ENVIRONMENT – Rivers, streams, lakes, ponds, springs and features that depend on natural waters e.g. marsh, bogs and wetlands.

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.

ARABLE LAND – Farmland that includes all areas growing cereals or other crops, ploughed and planted annually.

ASIs - Areas of Scientific Interest. Areas that were identified in the 1970s as being of conservation interest. The NHA designation developed from ASIs.

ASSEMBLAGE - A collection of organisms.

BASE POOR SOILS - Soils that only slowly release the dissolved chemicals or minerals contained within them.

BASEFLOW – The flow of water in a river or stream derived from groundwater or through-flow into the surface watercourse.

BASIN - A depressed area of the Earth's surface, in which sediments accumulate.

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.

BIOTIC FACTORS – The influence of living components of the environment on organisms.

BIOTOPE - An environmental region, defined by certain conditions characteristic organisms that typically inhabit it

BIRDS DIRECTIVE (Council Directive 79/ 409/ 2nd April 1979) - Under this Directive Ireland is required to conserve the habitats of two categories of wild birds: 1) Listed rare and vulnerable species and 2) Regularly occurring migratory species. The Directive also obliges Ireland to conserve wetlands, especially those of international importance and regulates the hunting and trading of wildbirds. It was transposed into Irish legislation by the EU (Natural Habitats) Regulations, 1997.

BOG WOODLAND - A priority habitat listed in Annex I of the EU Habitats Directive. Coniferous and broad-leaved forests on humus to wet peaty substrate, with the water level permanently high and even higher than the surrounding water table. In Ireland most of these forests represent sub-types of raised bog, generally degraded and invaded by commercial forestry species: however those stands dominated by Birch (*Betula pubescens*) or Scots Pine (*Pinus sylvestris*) may be of interest.

BRYOPHYTES - A group of simple non-vascular spore-bearing green plants comprising the mosses, liverworts and hornworts.

CALCAREOUS FENS WITH *CLADIUM MARISCUS* & *CAREX DAVALLIANA* – A priority habitat listed in Annex I of the EU Habitats Directive. *Cladium mariscus* beds of the emergent-plant zones of lakes, fallow lands or succession stage of extensively farmed wet meadows in contact with the vegetation of the *Caricion davallianae* or other *Phragmition* species.

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

CARR - Shrub or woodland communities growing in waterlogged ground.

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.

COMMONAGE – An area of land which are undivided but are owned by more than one person / or the rights to use the land are owned by more than one person.

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

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.

CUTOVER BOG – An NPW habitat classification that describes areas of bog which have been previously cut, although not down to the marl layer or bedrock. 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

DENSE BRACKEN – An NPW habitat classification which refers to areas with 75% cover of Bracken (*Pteridium aquilinum*), a single branched fern with a characteristic small and bright green foliage dying to rich reds and russets in the Autumn.

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.

DCMNR – Department of Communication, Marine and Natural Resources

DRAINAGE DITCHES - An NPW 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.

DRY, BROAD-LEAVED SEMI-NATURAL WOODLAND – An NPW habitat classification which refers to woodland which reaches a height more then 5 m in most places. If the cover of exotic trees within a block is more than 10%, the woodland should be classified as mixed woodland. Also see wet broad-leaved semi-natural woodland.

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.

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.

EPA – Environmental Protection Agency

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.

ESKER - A ridge of sand/ gravel resulting from deposition by sub-glacial streams. Typically the soils of an esker are thin, calcareous and vary between sandy loams and gravels.

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

EUTROPHICATION - The nutrient enrichment of aquatic ecosystems usually by phosphates and nitrates. It may occur naturally but can also be the result of human activity (fertiliser run-off/ sewage discharge/ seepage from silage etc.).

EVALUATION - A considered or measured assessment of available information leading to a ranking or valuing.

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.

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.

FENS AND FLUSHES - An NPW 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.

FLORA - plant life.

FLORA PROTECTION ORDER - under the 1976 Wildlife Act, particular plants can be protected under a Flora Protection Order. Under such an order it becomes an offence to cut, uproot or damage these plants unless under licence from the Minister. The same order prohibits damage to the habitats of these species.

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.

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

FRESHWATER MARSHES – An NPW habitat classification are intermediate between swamps and wet grassland, and often occupy a zone between these habitats. They may have some prominent tall swamp species, but are not overwhelmingly dominated by them. They are distinguished from fens and flushes by a lower calcium status and are usually richer in nutrients. This habitat is characterised by a species-rich mixture of Sedges, small Grasses Reeds and other Reed like Grasses, wetland Herbs, as well as other Herbs and Grasses more typical of dryer ground.

GEOMORPHOLOGY – The study of the form and structure of the landscape, which is shaped by the underlying geology.

GLACIOFLUVIAL - Deposits laid down by glacial meltwater.

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.

HEATH – An NPW habitat classification comprises of vegetation on relatively dry acidic mineral or peat soil usually dominated by Ericaceous shrubs, which include *Calluna vulgaris* (Heather), all Heathers (*Erica* spp.), *Vaccinium myrtillus* (Bilberry), *Empetrum nigrum* (Crowberry), *Arctostaphylos uva-ursea* (Bearberry), *Daboecia cantabrica* (St Dabioc's Heath), or dwarf, cushion

forming *Ulex* spp. These shrubs must form a minimum cover of 25% to fall into the heath category. This habitat is frequently found in mosaic with other upland habitats.

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.

HYDROCHEMICAL MONITORING - Observing the chemical composition of water over a period of time usually carried out for detailed studies of raised bogs.

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.

IMPEDED DRAINAGE - A limited through flow of water.

IMPERMEABLE - Does not allow the passage of water.

IMPROVED GRASSLAND – An NPW habitat classification describing species poor grassland, distinctive by its even appearance and bright colour, usually heavily fertilised and re-seeded with fast growing grasses.

INVERTEBRATES - Animals without backbones.

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

LAKES AND PONDS - An NPW habitat classification describing enclosed bodies of fresh water, or semi-enclosed bays of larger bodies of fresh water. Only the open water body itself is included, so areas of standing with tall emergent vegetation are not included here but should be assigned to reedbeds and other swamps.

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.

LIAISON COMMITTEE - This is a special group set up to discuss the contents of a conservation management plan and the implementation of the plan. The committee will include representation of landowners, right-holders and other interest groups. It shall be the function of the committee to advise NPW managers on the interaction between site conservation management and local interests. The Liaison Committee will nominate a member to the official Appeals Board which will consider appeals against site designation and other issues. The Liaison Committee will be independent from the NPW.

LICHENS – An organism that consists of a fungus growing in close association (symbiosis) with an alga.

LOWLAND DRY GRASSLAND - An NPW habitat classification describing grasslands which normally are below the 100m contour, on well drained soils and characteristically with a fairly complete cover of grasses.

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.

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).

MINEROTROPHIC MIRE - A peatland system that is fed by ground water.

MITIGATE - To make or become less severe or harsh / moderate.

MIXED WOODLAND - An NPW habitat classification that describes woodland that is structurally similar to dry (& wet) broad-leaved semi-natural woodland, i.e. the canopy in most places must achieve a height of 5 m. In mixed woodland however, the cover of exotic species within a block exceeds 10%.

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.

MOSAIC - Used to describe habitats that occur together and cannot easily be mapped separately.

NATIONAL PARKS AND WILDLIFE (NPW) – 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 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.

NATURE RESERVES (NRs) - Under National legislation, the Wildlife Act of 1976, a number of sites have been designated as Nature Reserves. These areas are mainly owned by the NPW and are managed for the purposes of conservation.

NGOs - Non- Governmental Organisations.

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.

NICHE – The functional position of an organism within its environment, i.e. where individuals of a species can survive grow and reproduce.

NO SHOOTING AREAS - These areas are also referred to as Wildfowl Sanctuaries and are areas that have been excluded from the "Open Season Order" so that game birds can rest and feed undisturbed. Shooting of game birds is not allowed in these areas.

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.

NPW - National Parks and Wildlife

OLIGO – Prefix denoting few or little

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.

OMBROTROPHIC - A system (often used when describing raised bogs) which relies solely on precipitation for inputs to the system.

OPEN SEASON – A specified period of time when a specified quarry species may be hunted.

ORGANISM - Any living thing.

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.

PERENNIAL - Referring to plants that live for two years at least.

pH - A quantitative expression for the acidity or alkalinity of a solution or soil. The scale ranges from 0-14: pH 7 is neutral, less than 7 is acidic and greater than 7 is alkaline.

PIEZOMETERS – A instrument used for measuring the fluctuations of water levels in the acrotelm of a raised bog.

POACHING - Damage caused to the vegetation by excessive numbers of large grazers.

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

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 NPW 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.

RECLAIMED LAND - this is applied to lands which have been modified from there natural state by intervention in the form of: a) drainage, b) bulldozed, c) clearance of scrub, d) infilling of wetland, e) ploughed and reseeded.

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

REEDBEDS AND OTHER SWAMPS - An NPW habitat classification. This habitat comprises tall, species poor, usually emergent vegetation, often found in a narrow fringe at the edge of open water or occupying more extensive areas in shallow basins which may become dry in Summer. The vegetation is species poor and overwhelmingly dominated by a single species, typically Common Reed (Phragmites australis).

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 NPW 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 NPW, whose function here is to ensure that the favourable conservation status of the site is maintained and where possible improved.

SCRAGH - a floating mat of vegetation.

SCRUB – An NPW 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 5 m or less. This category does not apply to stands of young trees which will eventually grow to a height of more than 5 m.

SEDIMENT - Solid particles that can originate by the weathering and erosion of pre-existing rock, by chemical precipitation from water, or by the breakdown of organisms.

SEDIMENTARY - Formed by the deposition of sediment, i.e. rock particles or chemical precipitate, or pertaining to the process of sedimentation.

SEMI-IMPROVED GRASSLAND - An NPW habitat classification which refers to grasslands which have been lightly fertilised but not re-seeded. These grasslands may still support a rich assemblage of grasses and herbs.

SHALE - Fine-grained sedimentary rock, like mudstone but with an irregular parting.

SOAK SYSTEMS - Used when describing vegetation on raised bogs. Relates specifically to areas of more nutrient demanding vegetation. These systems are now extremely rare due to the exploitation of most of Irelands larger raised bogs.

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.

STRATIFICATION - Arrangement in layers: differentiation of horizontal layers in soils.

SUCCESSION - The non-seasonal, directional continuous pattern of colonisation and extinction on a site by populations.

SUPPLEMENTARY FEEDING - The practice of providing livestock with additional food, usually carried out in winter. This term is most often used when hay, silage or other foods are brought into a site to supply Cattle or Sheep with food during times when growing conditions are poor.

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

SUSTAINABLE - The highest rate at which a renewable resource can be used without reducing its supply (without causing damage to the resource).

SWARD - Refers to the vegetation cover of low growing plants communities, such as grasslands.

TAXON – Any grouping within the classification of organisms (plural = taxa)

TERRESTRIAL - A term used to refer to living on land. The opposite of aquatic.

TILL - Unconsolidated, unsorted glacial deposits.

TRADITIONAL MANAGEMENT PRACTICES Land management practices which were carried out prior to the 1950s. These practices were often less intensified than today’s management practices. In REPS prescriptions traditional means an activity which has been carried out for a specified number of years on a site (usually 10 years).

TROPHIC STATUS - The nutrient status (i.e. a measure of the availability of nutrients).

TURBARY – Refers to the right to harvest turf.

VERTEBRATES - Animals with backbones.

VERY RARE - 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. Very Rare applies to 1-2, 10 km squares in this context.

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.

APPENDIX II: REFERENCES

Map References:

O.S. 1/2 inch (1:126,720) map: 15

O.S. Discovery (1:50,000) map: 48

O.S. 6 inch (1: 10,560) map: OY 010

Databases :

NHA database, NPW, Department of Environment, Heritage and Local Government, 7 Ely Place, Dublin 2.

Natura 2000 database, NPW, Department of Environment, Heritage and Local Government, 7 Ely Place, Dublin 2.

Photographic Coverage:

Black and white obliques: Bord na Mona (1950s)

Department of Environment, Heritage and Local Government HQ Ely Place, Aerial photo No. O.S. 38 7253, 1:140,000, Black and white

Department of Environment, Heritage and Local Government HQ Ely Place, Aerial photo: GSI colour (1990s)

Department of Environment, Heritage and Local Government HQ Ely Place, Aerial photo No. 7253, Flight Line 38. Date: 1995

Relevant Legislation:

S.I. No. 94/1997: European Communities (Natural Habitats) Regulations, 1997.

Local Government (Planning and Development) Regulations, 1994.

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APPENDIX III: DETAILED INFORMATION ON HABITATS AND VEGETATION

The priority habitat (active raised bog) in this cSAC has three ecotopes and a relict lagg. Details of these areas are as follows:

Central ecotope

This has a hummock/hollow system with frequent pools. It is the wettest and least disturbed bog complex, situated in the very central area of the bog. In general, bryophyte cover is high, with dwarf shrub and herb cover low. Here, the wettest *Sphagnum magellanicum* lawns are found, as indicated by the presence of *S. cuspidatum* and the liverwort *Cladopodiella fluitans*. Bogbean (*Menyanthes trifoliata*) and Great Sundew can also be observed. In places, drier versions of these lawns are found with more *Sphagnum capillifolium*, Ling Heather and Hare's-tail Cottongrass (*Eriophorum vaginatum*). Where drying-out only occurs for very short periods, permanent pools and wet hollows are found. Here, there is a high cover of *Sphagnum cuspidatum* and *Cladopodiella fluitans* with Common Cottongrass (*Eriophorum angustifolium*). Hummock communities dominated by *Sphagnum capillifolium* or *S. imbricatum* (relatively small) are present within this system. In drier areas, some large *Leucobryum glaucum* moss hummocks occur. Elongated, damp hollows can also be found, dominated by Bog Asphodel.

Around this central core of the bog is a sizeable, similar area but with more scattered pools. Here the pools are most likely becoming progressively infilled as the bog drains from the edges. *Sphagnum magellanicum* is common here.

Sub-central ecotope

This occurs to the south-east and east of the central ecotope. The majority of the eastern part of this ecotope has been drained. The vegetation here is sometimes heath-like with an abundance of Ling and other heathers. Species which tend to colonise bare, disturbed peat e.g. Common Cottongrass and *Campylopus introflexus* can be found. *Sphagnum capillifolium* dominated hummocks also occur.

In areas unaffected by drainage, heath type vegetation and species colonising bare peat are again found. Indications of past burning is in evidence in the species seen (e.g. *Campylopus paradoxus* and *Zygnemales*). Permanent pools with a definite linear orientation, wet hollows, *Sphagnum magellanicum* lawns and elongated damp hollows dominated by Bog Asphodel, also occur.

Marginal ecotope (including sub-marginal and facebank areas)

This ecotope can be sub-divided into sub-marginal, marginal and facebank complexes. At the edges of the high bog is sub-marginal vegetation. The majority of this is dominated by Bog Asphodel damp hollows with a relatively high shrub cover (c. 28%). These tend to be elongated features, as they are the focus points for surface water run-off. White Beak-sedge hollows are also common with low bryophyte and *Sphagnum* cover, high algal cover, and frequent Common Cottongrass and Bog Asphodel. On the southern section of this ecotope, Ling Heather is common.

Around the edges of almost all the bog (except at the north-east), the vegetation becomes more marginal. Deergrass often becomes dominant in very dry areas, amid the aforementioned Bog Asphodel hollow complexes. Deergrass at high abundance tends to indicate past disturbance, for example drainage or fire. Ling Heather also occurs with high cover values in these marginal areas.

This ecotope also includes the facebanks of past peat cutting at the limit of the high bog. Here, Ling Heather is the dominant species, reaching cover values of up to 100%. The dwarf shrub and bryophyte (but few *Sphagnum* spp.) cover is high. Bog Asphodel, Deergrass, White Beak-sedge hollow, heath type, bare peat and fire damage communities are also found at the facebanks.

Lagg

Lagg is a Swedish term used to describe the zone surrounding a raised bog, where a mixing of ground water and precipitation takes place, so that a fen type vegetation can be supported. No intact areas exist in Ireland today, because of interference by humans (cutting and drainage). Areas of former lagg have been identified at Raheenmore, in the west-north-west and south of the site. The following species recorded (Kelly, 1993) indicate groundwater influence in a peatland situation: Branched Bur-reed (*Sparganium erectum),* Yellow Water-lily (*Nuphar lutea*), Slender Tufted-sedge (*Carex acuta*), Ragged-robin (*Lychnis flos-cuculi*), Water Horsetail (*Equisetum fluviatile*), Marsh Ragwort (*Senecio aquaticus*) and Brown Sedge (*Carex disticha*). Marsh Arrowgrass (*Triglochin palustris*), Sharp-flowered Rush (*Juncus acutiflorus*) and Narrow-fruited Water-cress (*Nasturtium microphyllum*) also suggest lagg conditions.

The habitats present on Raheenmore Bog, within this relict lagg, can now be described as lowland wet grassland and to a lesser degree cutover bog. Freshwater marsh may also be present and one area has been identified. Not all the current land of these habitats would have been former lagg zone, with the land at the bog margins being the most likely candidate areas. Kelly (1993) details this past zone on the ecotope map and identifies four possible former lagg areas, described below:

- Rich lagg (groundwater)

An area of wet, small, sedge grassland developed on the cutover and influenced by upwelling groundwater on the western edge of the bog.

- Rich lagg (rain/mineralised)

Areas of grass (Purple Moor-grass, Yorkshire Fog (*Holcus lanatus*)) dominated wet heath with strongly fluctuating water tables and some indication of mineralisation developed on cutover areas.

- Rich lagg (rainwater/groundwater)

Willow (*Salix* sp.) scrub and tall herb-rich grassland located on cutover areas with a high watertable and some groundwater influence.

- Poor lagg

Areas of scrub, Bracken (*Pteridium aquilinum*) and improved grassland developed on the former lagg on dried out peat or mineral soils.

APPENDIX IV: NOTIFIABLE ACTIONS

HABITAT TYPE 2.3

WET LOWLAND GRASSLANDS

Under STATUTORY INSTRUMENT 94 of 1997, made under the EUROPEAN COMMUNITIES ACT 1972 and in accordance with the obligations inherent in the COUNCIL DIRECTIVE 92/43/EEC of 21 May 1992 (the Habitats Directive) on the conservation of the natural habitats and species of wild fauna and flora, all persons must obtain the written consent, (in circumstances prescribed at section A and B below) of the Minister for The Environment and Local Government before performing any of the operations on, or affecting, the following habitats where they occur on lands / waters within the candidate Special Area of Conservation.

Please note that where a landowner has a current approved plan under the Rural Environmental Protection Scheme or any scheme which the Minister considers to be equivalent s/he need only notify the Minister of activities not covered in the plan.

SECTION A	**SECTION B**
Please note that the activities listed in *Section A overleaf* are required to be notified to the Minister for The Environment and Local Government and should not be undertaken before consent.	Please note that the activities listed in *Section B* overleaf may, and in most cases do, require a license or consent from another statutory authority (e.g. the local planning authority, the Minister for the Marine and Natural Resources, or the Minister for Agriculture and Food). If so, these notifiable actions do not apply. However, if such activities are not regulated by another statutory authority, the said activities are required to be notified to the Minister for The Environment and Local Government.

HABITAT TYPE 2.3

WET LOWLAND GRASSLANDS

Section A	Section B
THE MINISTER FOR THE ENVIRONMENT AND LOCAL GOVERNMENT IS REQUIRED TO BE NOTIFIED IN RELATION TO THE FOLLOWING ACTIVITIES AND SUCH ACTIVITIES SHOULD NOT PROCEED WITHOUT PRIOR CONSENT	(NO REQUIREMENT TO NOTIFY IF ALREADY LICENSED BY ANOTHER MINISTER/BODY)
grazing of livestock above a sustainable density (as defined in approved farm plans)/grazing by livestock treated within the previous week with a pesticide which leaves persistent residues in the dung	developing leisure facilities including golf courses, sports pitches, caravan or camping facilities.
changing of traditional use from hay meadow (to either grazing or silage making), or from grazing to silage cutting	removal of soil, mud, gravel, sand or minerals
adding lime/adding fertiliser of any sort to areas not previously fertilised/ applying fertiliser which would increase the level of nitrogen in the soil/applying fertiliser which would increase the level of phosphorous in the soil/ applying phosphorous to soils which already have in excess of the REPS index 2 levels mowing grass before the 30th June (*Note; if you have been notified that your lands hold breeding corncrakes, or certain rare meadows, special provisions will apply)*	developing roads or car parks
burning of vegetation	construction of fences, buildings or
reclamation, infilling, ploughing or land drainage/ reseeding, planting of trees or any other species use of any pesticide or herbicide	embankments
dumping, burning or storing any materials	afforestation
alteration of the banks, bed or low of watercourses	
operation of commercial recreation facilities (e.g. pony trekking)/introduction (or re-introduction) into the wild of plants or animals of species not currently found in the area	
any other activity of which notice may be given by the Minister from time to time	

In a very limited number of cases it may be necessary for the Minister for The Environment and Local Government to restrict existing activities. In these cases compensation will be payable for actual losses arising out of any such restriction. In the event of restrictions being imposed by the Minister for The Environment and Local Government, an appropriate appeals procedure will be put in place.

HABITAT TYPE 4.1

RAISED BOG, CUTAWAY BOG AND BOG WOODLAND

Under STATUTORY INSTRUMENT 94 of 1997, made under the EUROPEAN COMMUNITIES ACT 1972 and in accordance with the obligations inherent in the COUNCIL DIRECTIVE 92/43/EEC of 21 May 1992 (the Habitats Directive) on the conservation of the natural habitats and species of wild fauna and flora, all persons must obtain the written consent, (in circumstances prescribed at section A and B below) of the Minister for The Environment and Local Government before performing any of the operations on, or affecting, the following habitats where they occur on lands / waters within the candidate Special Area of Conservation.

Please note that where a landowner has a current approved plan under the Rural Environmental Protection Scheme or any scheme which the Minister considers to be equivalent s/he need only notify the Minister of activities not covered in the plan.

SECTION A	**SECTION B**
Please note that the activities listed in *Section A overleaf* are required to be notified to the Minister for The Environment and Local Government and should not be undertaken before consent.	Please note that the activities listed in *Section B* overleaf may, and in most cases do, require a license or consent from another statutory authority (e.g. the local planning authority, the Minister for the Marine and Natural Resources, or the Minister for Agriculture and Food). If so, these notifiable actions do not apply. However, if such activities are not regulated by another statutory authority, the said activities are required to be notified to the Minister for The Environment and Local Government.

HABITAT TYPE 4.1

RAISED BOG, CUTAWAY BOG AND BOG WOODLAND

Section A	Section B
THE MINISTER FOR THE ENVIRONMENT AND LOCAL GOVERNMENT IS REQUIRED TO BE NOTIFIED IN RELATION TO THE FOLLOWING ACTIVITIES AND SUCH ACTIVITIES SHOULD NOT PROCEED WITHOUT PRIOR CONSENT	(NO REQUIREMENT TO NOTIFY IF ALREADY LICENSED BY ANOTHER MINISTER/BODY)
grazing of livestock/grazing by livestock treated within the previous week with a pesticide which leaves persistent residues in the dung	developing leisure facilities including golf courses, sports pitches, caravan or camping facilities.
adding lime/adding fertiliser of any sort	removal of soil, mud, gravel, sand or minerals
creation of new tracks or paths	developing roads or car parks
burning areas of vegetation reclamation, infilling, or ploughing /reseeding, planting of trees or any other species/cutting trees or removing timber	construction of fences, buildings or embankments
drainage works on the bog or within the local water catchment area	afforestation
cutting turf or peat moss extraction	erecting or operating a windfarm
use of any pesticide or herbicide, including sheep dip	
dumping, burning or storing any materials	
alteration of the banks, bed or flow of watercourses	
operation of commercial recreation facilities (e.g. botanical tours)	
introduction (or re-introduction) into the wild of plants or animals of species not currently found in the area	
any other activity of which notice may be given by the Minister from time to time	

In a very limited number of cases it may be necessary for the Minister for The Environment and Local Government to restrict existing activities. In these cases compensation will be payable for actual losses arising out of any such restriction. In the event of restrictions being imposed by the Minister for The Environment and Local Government, an appropriate appeals procedure will be put in place.

HABITAT TYPE 5.1

WOODLANDS

Under STATUTORY INSTRUMENT 94 of 1997, made under the EUROPEAN COMMUNITIES ACT 1972 and in accordance with the obligations inherent in the COUNCIL DIRECTIVE 92/43/EEC of 21 May 1992 (the Habitats Directive) on the conservation of the natural habitats and species of wild fauna and flora, all persons must obtain the written consent, (in circumstances prescribed at section A and B below) of the Minister for The Environment and Local Government before performing any of the operations on, or affecting, the following habitats where they occur on lands / waters within the candidate Special Area of Conservation.

Please note that where a landowner has a current approved plan under the Rural Environmental Protection Scheme or any scheme which the Minister considers to be equivalent s/he need only notify the Minister of activities not covered in the plan.

SECTION A	**SECTION B**
Please note that the activities listed in Section A overleaf are required to be notified to the Minister for The Environment and Local Government and should not be undertaken before consent.	Please note that the activities listed in Section B overleaf may, and in most cases do, require a licence or consent from another statutory authority (e.g. the local planning authority, the Minister for the Marine and Natural Resources, or the Minister for Agriculture and Food). If so, these notifiable actions do not apply. However, if such activities are not regulated by another statutory authority, the said activities are required to be notified to the Minister for The Environment and Local Government.

HABITAT TYPE 5.1

WOODLANDS

Section A	Section B
THE MINISTER FOR THE ENVIRONMENT AND LOCAL GOVERNMENT IS REQUIRED TO BE NOTIFIED IN RELATION TO THE FOLLOWING ACTIVITIES AND SUCH ACTIVITIES SHOULD NOT PROCEED WITHOUT PRIOR CONSENT	(NO REQUIREMENT TO NOTIFY IF ALREADY LICENSED BY ANOTHER MINISTER/BODY)
grazing by livestock	developing leisure facilities including golf courses, sports pitches, caravan or camping facilities.
adding lime	any activity which may cause pollution of the woodland
adding fertiliser of any sort	removal of soil, mud, gravel, sand or minerals
reclamation, infilling, ploughing or land drainage	developing roads or car parks
reseeding, planting of trees or any other species	construction of fences, buildings or
felling of trees, removal of timber	embankments
removal of foliage, moss or other materials	felling trees or reafforestation
killing ivy	
use of any pesticide or herbicide	
dumping, burning or storing any materials	
alteration of the banks, bed or flow of watercourses	
operation of commercial recreation facilities (e.g. bird watching tours)	
introduction (or re-introduction) into the wild of plants or animals of species not currently found in the area	
any other activity of which notice may be given by the Minister from time to time	

In a very limited number of cases it may be necessary for the Minister for The Environment and Local Government to restrict existing activities. In these cases compensation will be payable for actual losses arising out of any such restriction. In the event of restrictions being imposed by the Minister for The Environment and Local Government, an appropriate appeals procedure will be put in place.

HABITAT TYPE 5.2

SCRUB

Under STATUTORY INSTRUMENT 94 of 1997, made under the EUROPEAN COMMUNITIES ACT 1972 and in accordance with the obligations inherent in the COUNCIL DIRECTIVE 92/43/EEC of 21 May 1992 (the Habitats Directive) on the conservation of the natural habitats and species of wild fauna and flora, all persons must obtain the written consent, (in circumstances prescribed at section A and B below) of the Minister for The Environment and Local Government before performing any of the operations on, or affecting, the following habitats where they occur on lands / waters within the candidate Special Area of Conservation.

Please note that where a landowner has a current approved plan under the Rural Environmental Protection Scheme or any scheme which the Minister considers to be equivalent s/he need only notify the Minister of activities not covered in the plan.

SECTION A	**SECTION B**
Please note that the activities listed in Section A overleaf are required to be notified to the Minister for The Environment and Local Government and should not be undertaken before consent.	Please note that the activities listed in *Section B* overleaf may, and in most cases do, require a license or consent from another statutory authority (e.g. the local planning authority, the Minister for the Marine and Natural Resources, or the Minister for Agriculture and Food). If so, these notifiable actions do not apply. However, if such activities are not regulated by another statutory authority, the said activities are required to be notified to the Minister for The Environment and Local Government.

HABITAT TYPE 5.2

SCRUB

Section A	Section B
THE MINISTER FOR THE ENVIRONMENT AND LOCAL GOVERNMENT IS REQUIRED TO BE NOTIFIED IN RELATION TO THE FOLLOWING ACTIVITIES AND SUCH ACTIVITIES SHOULD NOT PROCEED WITHOUT PRIOR CONSENT	(NO REQUIREMENT TO NOTIFY IF ALREADY LICENSED BY ANOTHER MINISTER/BODY)
grazing of livestock above a sustainable density (as defined in approved farm plans)/grazing by livestock treated within the previous week with a pesticide which leaves persistent residues in the dung	developing leisure facilities including golf courses, sports pitches, caravan or camping facilities.
supplementary feeding of stock (as defined in approved farm plans)	any activity which may cause pollution of the site
adding lime /adding fertiliser of any sort	removal of soil, mud, gravel, sand or minerals
reclaiming land covered by scrub; if scrub is cut it must be allowed to regrow	developing roads or car parks
reclamation, infilling, ploughing or land drainage	construction of fences, buildings or
reseeding, planting of trees or any other species felling of trees, removal of timber	embankments
removal of foliage, moss or other materials	felling trees or reafforestation
killing ivy	
use of any pesticide or herbicide /dumping, burning or storing any Materials	
alteration of the banks, bed or flow of watercourses	
operation of commercial recreation facilities (e.g. walking tours)	
introduction (or re-introduction) into the wild of plants or animals of species not currently found in the area	
any other activity of which notice may be given by the Minister from time to time	

In a very limited number of cases it may be necessary for the Minister for The Environment and Local Government to restrict existing activities. In these cases compensation will be payable for actual losses arising out of any such restriction. In the event of restrictions being imposed by the Minister for The Environment and Local Government, an appropriate appeals procedure will be put in place.

HABITAT TYPE 6.3

MARSHES AND REEDBEDS

Under STATUTORY INSTRUMENT 94 of 1997, made under the EUROPEAN COMMUNITIES ACT 1972 and in accordance with the obligations inherent in the COUNCIL DIRECTIVE 92/43/EEC of 21 May 1992 (the Habitats Directive) on the conservation of the natural habitats and species of wild fauna and flora, all persons must obtain the written consent, (in circumstances prescribed at section A and B below) of the Minister for The Environment and Local Government before performing any of the operations on, or affecting, the following habitats where they occur on lands / waters within the candidate Special Area of Conservation.

Please note that where a landowner has a current approved plan under the Rural Environmental Protection Scheme or any scheme which the Minister considers to be equivalent s/he need only notify the Minister of activities not covered in the plan.

SECTION A	**SECTION B**
Please note that the activities listed in *Section A overleaf* are required to be notified to the Minister for The Environment and Local Government and should not be undertaken before consent.	Please note that the activities listed in *Section B* overleaf may, and in most cases do, require a license or consent from another statutory authority (e.g. the local planning authority, the Minister for the Marine and Natural Resources, or the Minister for Agriculture and Food). If so, these notifiable actions do not apply. However, if such activities are not regulated by another statutory authority, the said activities are required to be notified to the Minister for The Environment and Local Government.

HABITAT TYPE 6.3

MARSHES AND REEDBEDS

Section A	Section B
THE MINISTER FOR THE ENVIRONMENT AND LOCAL GOVERNMENT IS REQUIRED TO BE NOTIFIED IN RELATION TO THE FOLLOWING ACTIVITIES AND SUCH ACTIVITIES SHOULD NOT PROCEED WITHOUT PRIOR CONSENT	(NO REQUIREMENT TO NOTIFY IF ALREADY LICENSED BY ANOTHER MINISTER/BODY)
grazing of livestock above a sustainable density (as defined in approved farm plans) within 50m of the marsh or reedbed	developing leisure facilities including golf courses, sports pitches, caravan or camping facilities.
grazing by livestock treated within the previous week with a pesticide which leaves persistent residues in the dung	any activity which might cause pollution of the marsh or reedbed
supplementary feeding of stock within 50m of the marsh or reedbed	removal of soil, mud, gravel, sand or minerals
adding lime within 50m of the marsh or reedbed	developing roads or car parks
adding fertiliser of any sort within 50m of the marsh or reedbed	construction of fences, buildings or embankments
extracting water for irrigation or other purposes	construction or operation of an aquaculture facility.
operation of boat angling or shore angling Business	fishing for eels
restocking with fish.	bank maintenance and grading
reclamation, infilling, ploughing or land drainage within 50m of the marsh or reedbed	creation of weirs and dams
reseeding, planting of trees or any other species within 50m of the marsh or reedbed	
removal of trees or any aquatic vegetation within 50m of the marsh or reedbed	
use of any pesticide or herbicide in the marsh or reedbed or within 50m of the marsh or reedbed	
dumping rubbish or other materials or disposing of any chemicals or wastes in marsh or reedbed or into water-courses Running into them.	
dumping, burning or storing any materials within 50m of the marsh or reedbed including the land spreading of used pesticides (e.g. sheep dip).	
alteration of the banks, channel, bed or flow of the marsh or reedbed or of watercourses running into or out of it	
harvesting or burning of reed or willow.	
causing siltation	
operation of commercial recreation facilities (e.g. bird watching tours)	
introduction (or re-introduction) into the wild of plants or animals of species not currently found in the area	
any other activity of which notice may be given by the Minister from time to time	

In a very limited number of cases it may be necessary for the Minister for The Environment and Local Government to restrict existing activities. In these cases compensation will be payable for actual losses arising out of any such restriction. In the event of restrictions being imposed by the Minister for The Environment and Local Government, an appropriate appeals procedure will be put in place.

HABITAT TYPE 7.1

DITCHES, HEDGES, CEREALS AND INTENSIVE GRASSLANDS, WALLS, BUILDINGS, WASTE GROUND, BARE SOIL, PARKLAND GRASSLAND, BRACKEN, CAVES, OR QUARRIES

Under STATUTORY INSTRUMENT 94 of 1997, made under the EUROPEAN COMMUNITIES ACT 1972 and in accordance with the obligations inherent in the COUNCIL DIRECTIVE 92/43/EEC of 21 May 1992 (the Habitats Directive) on the conservation of the natural habitats and species of wild fauna and flora, all persons must obtain the written consent, (in circumstances prescribed at section A and B below) of the Minister for The Environment and Local Government before performing any of the operations on, or affecting, the following habitats where they occur on lands / waters within the candidate Special Area of Conservation.

Please note that where a landowner has a current approved plan under the Rural Environmental Protection Scheme or any scheme which the Minister considers to be equivalent s/he need only notify the Minister of activities not covered in the plan.

SECTION A	**SECTION B**
Please note that the activities listed in Section A overleaf are required to be notified to the Minister for The Environment and Local Government and should not be undertaken before consent.	Please note that the activities listed in Section B overleaf may, and in most cases do, require a licence or consent from another statutory authority (e.g. the local planning authority, the Minister for the Marine and Natural Resources, or the Minister for Agriculture and Food). If so, these notifiable actions do not apply. However, if such activities are not regulated by another statutory authority, the said activities are required to be notified to the Minister for The Environment and Local Government.

HABITAT TYPE 7.1

DITCHES, HEDGES, CEREALS AND INTENSIVE GRASSLANDS, WALLS, BUILDINGS, WASTE GROUND, BARE SOIL, PARKLAND GRASSLAND, BRACKEN, CAVES, OR QUARRIES

Section A	Section B
THE MINISTER FOR THE ENVIRONMENT AND LOCAL GOVERNMENT IS REQUIRED TO BE NOTIFIED IN RELATION TO THE FOLLOWING ACTIVITIES AND SUCH ACTIVITIES SHOULD NOT PROCEED WITHOUT PRIOR CONSENT disturbance of bats operation of commercial recreation facilities (e.g. bird watching tours) introduction (or re-introduction) into the wild of plants or animals of species not currently found in the area any other activity of which notice may be given by the Minister from time to time	(NO REQUIREMENT TO NOTIFY IF ALREADY LICENSED BY ANOTHER MINISTER/BODY) developing leisure facilities including sports pitches, caravan or camping facilities. developing roads or car parks construction of fences, buildings and embankments afforestation

In a very limited number of cases it may be necessary for the Minister for The Environment and Local Government to restrict existing activities. In these cases compensation will be payable for actual losses arising out of any such restriction. In the event of restrictions being imposed by the Minister for The Environment and Local Government, an appropriate appeals procedure will be put in place.

APPENDIX V: COMPENSATION AND APPEALS PROCEDURES

Compensation

The Government is committed, as part of the social partnership process, to the payment of a fair and proper level of compensation to landowners who have lands proposed as part of an SAC or SPA and to other users who have a legal entitlement in the site.

A landowner or user with a legal entitlement may seek compensation for actual losses incurred due to restrictions imposed as a result of designation. Eligible persons should submit to NPWS details of the losses incurred as a result of the inclusion of lands in an SAC/SPA and outlining the basis for the calculations. Documentary evidence of past earnings and the activities that produced these should be included with the claim. Should the applicant be dissatisfied with a compensation offer, the case may be referred to an independent arbitrator who will review the matter and make a final decision.

Where a landowner or user with a legal entitlement is restricted in carrying out an activity on their land or licensed area, the compensation due will exclude any payments that have been attracted under grant schemes.

For farmers, there are two options available for receiving compensation for possible restrictions to their farming practices. Farmers may also receive payments for carrying out actions that enhance a nature conservation area.

Rural Environment Protection Scheme (REPS)

Lands within SACs, SPAs, NHAs or commonages are defined as 'Target Areas' under this scheme. A REPS plan usually covers an entire farm, but a farmer with land in a target area receives a higher payment for that area. Farmers with small areas of land in a designated area can get REPS payments for that part of their farm. In either case, the farmer is subject to certain conditions regarding farming and land use practices, set out in the REPS plan for the farm. REPS is administered by the Department of Agriculture, Food and Forestry.

NPWS Farm Plan Scheme

Where a farmer chooses not to participate in REPS, and NPWS seeks to change the farm operation in some way or to restrict a particular activity, NPWS will pay for preparation of a farm plan. This scheme also applies to land within SACs, SPAs, NHAs and commonages.

An NPWS farm plan will normally be confined just to the designated land and will address the conservation requirements, as well as any costs arising. Payment may also be made for work carried out that enhances the nature conservation value of the designated area. The farmer will have a substantial input into the plan.

A list of trained and approved farm planners is available for farmers to choose from. For further information, contact NPWS.

Appeals Procedure

Objection or appeal can be made against the inclusion of a piece of land in a cSAC or SPA. A person can only make objections if they have a legal interest in the site (i.e. an owner or legal user). They must be made on scientific grounds, e.g. a landowner would show that the relevant habitats/species/geological features were not present in such a condition as to warrant designation. Appeals can also be made for the inclusion of lands. Appeals should be accompanied by a map of the area of concern and be as informative as possible. There are two stages to the appeals process:

Internal Appeals are initially dealt with by regional staff. If necessary, they may refer the case to other NPWS staff. If there is no agreement following the internal appeal, the case becomes an external appeal.

The option of an **External Appeal** is available only where an internal appeal is unsuccessful. If so, the appellant may have the case referred to an Appeals Advisory Board, which is independent of NPWS. A grant to defray the cost of an expert scientific report is available to the appellant. The Board is comprised of equal representation of landowners/users and conservationists, with an independent chairperson. The Board makes a recommendation on each appeal to the Minister who then decides on the outcome of the appeal.

APPENDIX VI: NATIONAL PARKS AND WILDLIFE MANAGEMENT STAFF

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National Parks and Wildlife Service

Dept. of Environment Heritage & Local Government,

7 Ely Place,

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Phone Lo Call 1890 202021, (01) 8882000

Fax (01) 8883272

www.npws.ie

CEANTAR SPEISIALTA CAOMHNAITHE

CANDIDATE SPECIAL AREA OF CONSERVATION

RAHEENMORE BOG 000582

Boundary Version 1.00

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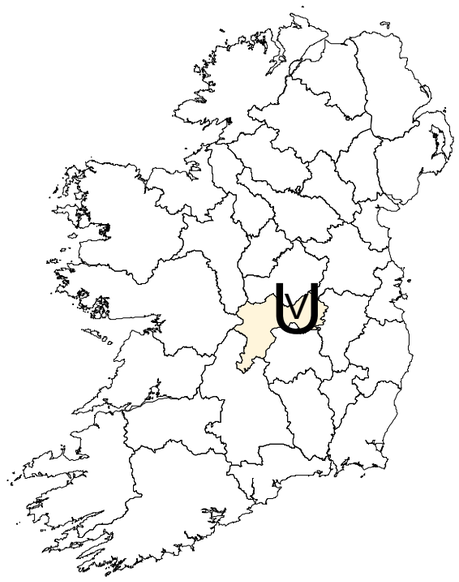
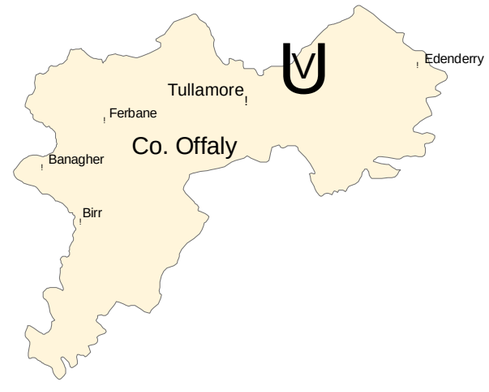


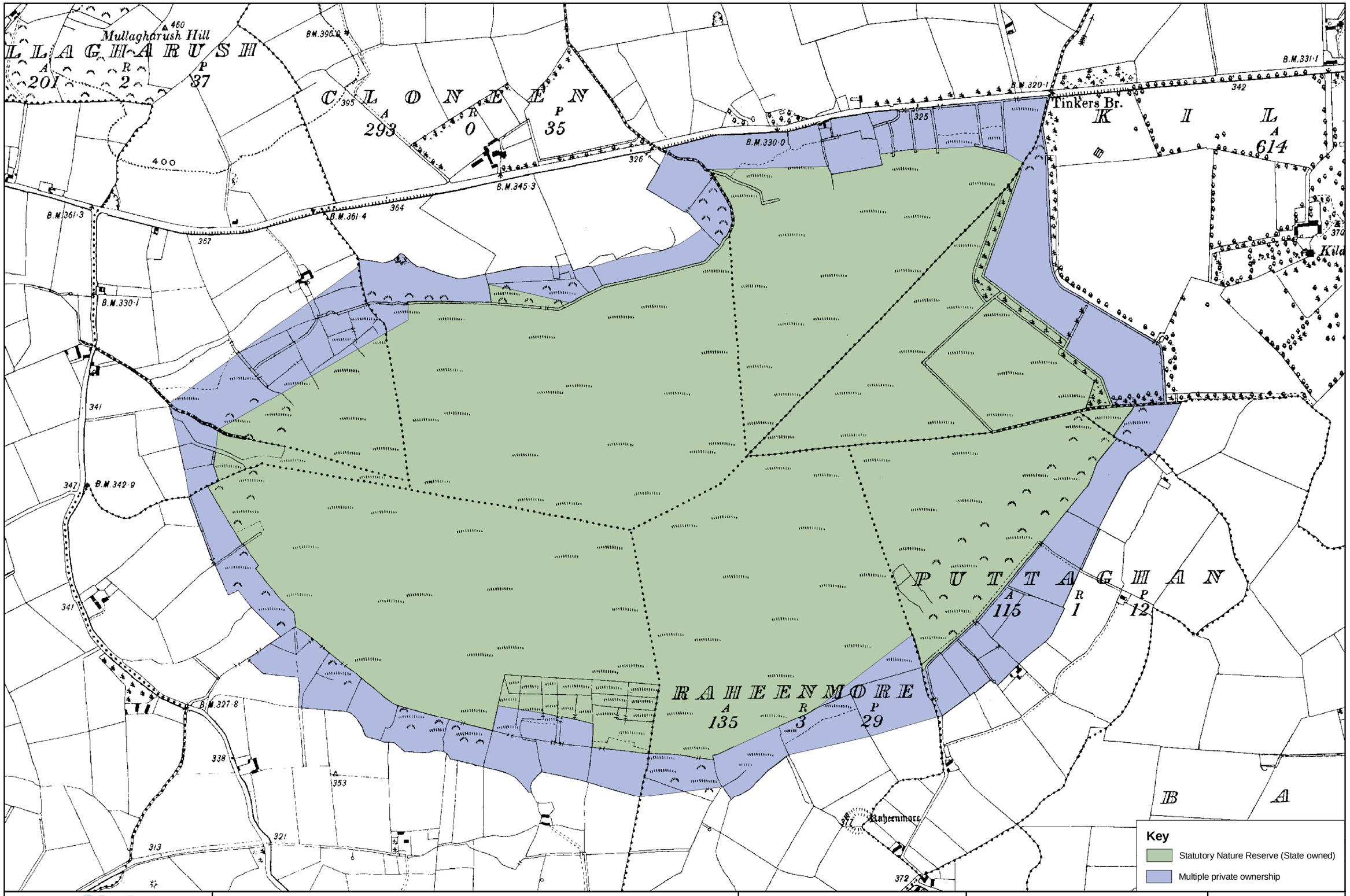


Map 1

SITE LOCATION AND BOUNDARY

Department of the Environment, Heritage and Local Government
An Roinn Comhshaoil,Oidhreachta agus Rialtais Áitiúil

Co-financed through 'Life' EU funding
Chomh-mhaoinithe trí chiste 'LIFE' and AE



AN ROINN COMHSHAOIL, OIDHREACHTA AGUS RIALTAIS ÁITIÚIL
DEPARTMENT OF THE ENVIRONMENT, HERITAGE AND LOCAL GOVERNMENT

CEANTAR SPEISIALTA CAOMHNAITHE
CANDIDATE SPECIAL AREA OF CONSERVATION

RAHEENMORE BOG

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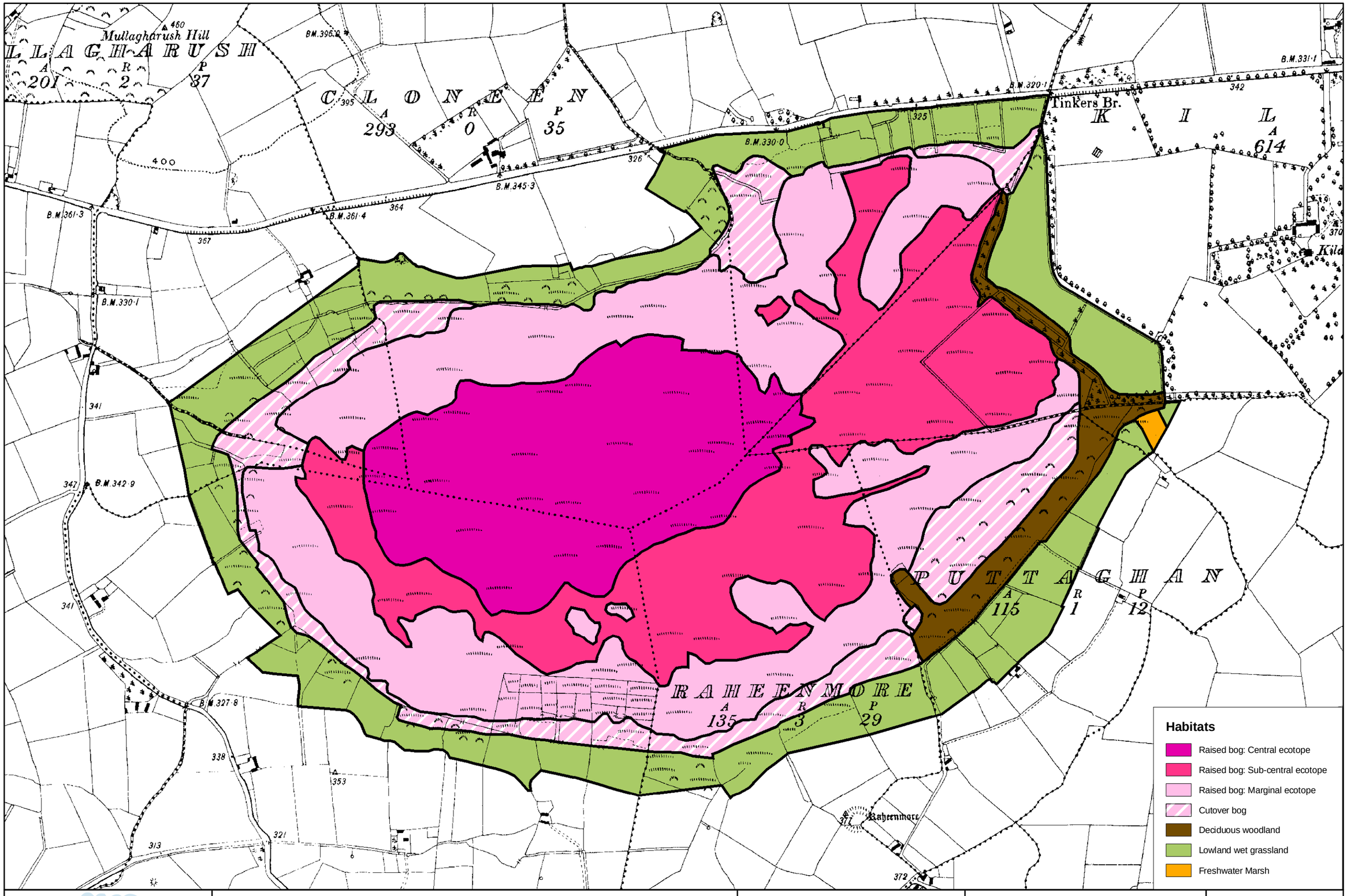
MAP 2: OWNERSHIP

Map to be read in conjunction with the conservation plan.

SITE CODE

cSAC 000582
Version 1.00



AN ROINN COMHSHAOIL, OIDHREACHTA AGUS RIALTAIS ÁITIÚIL
DEPARTMENT OF THE ENVIRONMENT, HERITAGE AND LOCAL GOVERNMENT

CEANTAR SPEISIALTA CAOMHNAITHE
CANDIDATE SPECIAL AREA OF CONSERVATION

RAHEENMORE BOG

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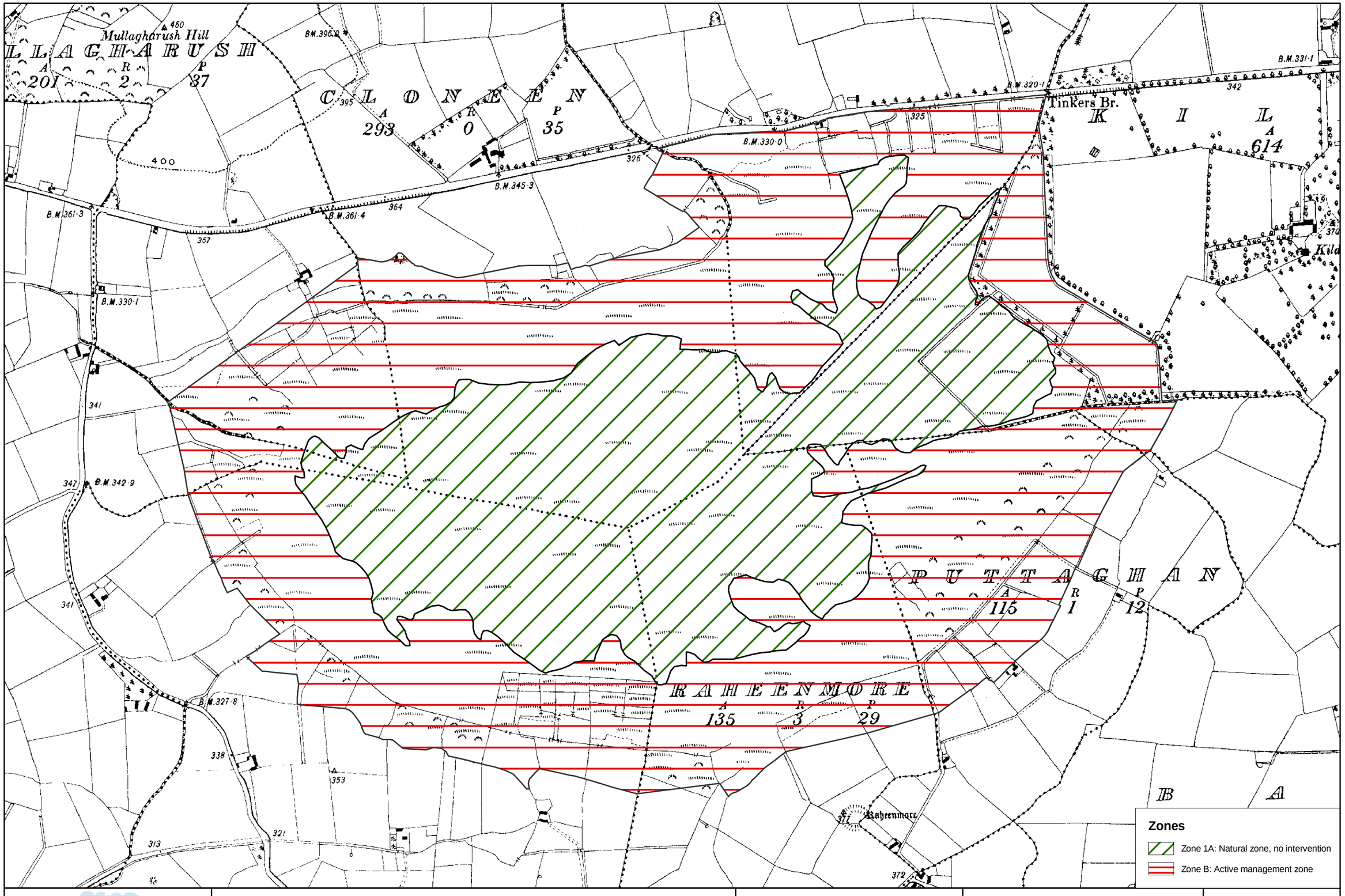
MAP 3:
INDICATIVE HABITAT MAP

Map to be read in conjunction with conservation plan.

SITE CODE

cSAC 000582
Version 1.00



AN ROINN COMHSHAOIL, OIDHREACHTA AGUS RIALTAIS ÁITIÚIL
DEPARTMENT OF THE ENVIRONMENT, HERITAGE AND LOCAL GOVERNMENT

CEANTAR SPEISIALTA CAOMHNAITHE

CANDIDATE SPECIAL AREA OF CONSERVATION

RAHEENMORE BOG

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0 50 100 200 M

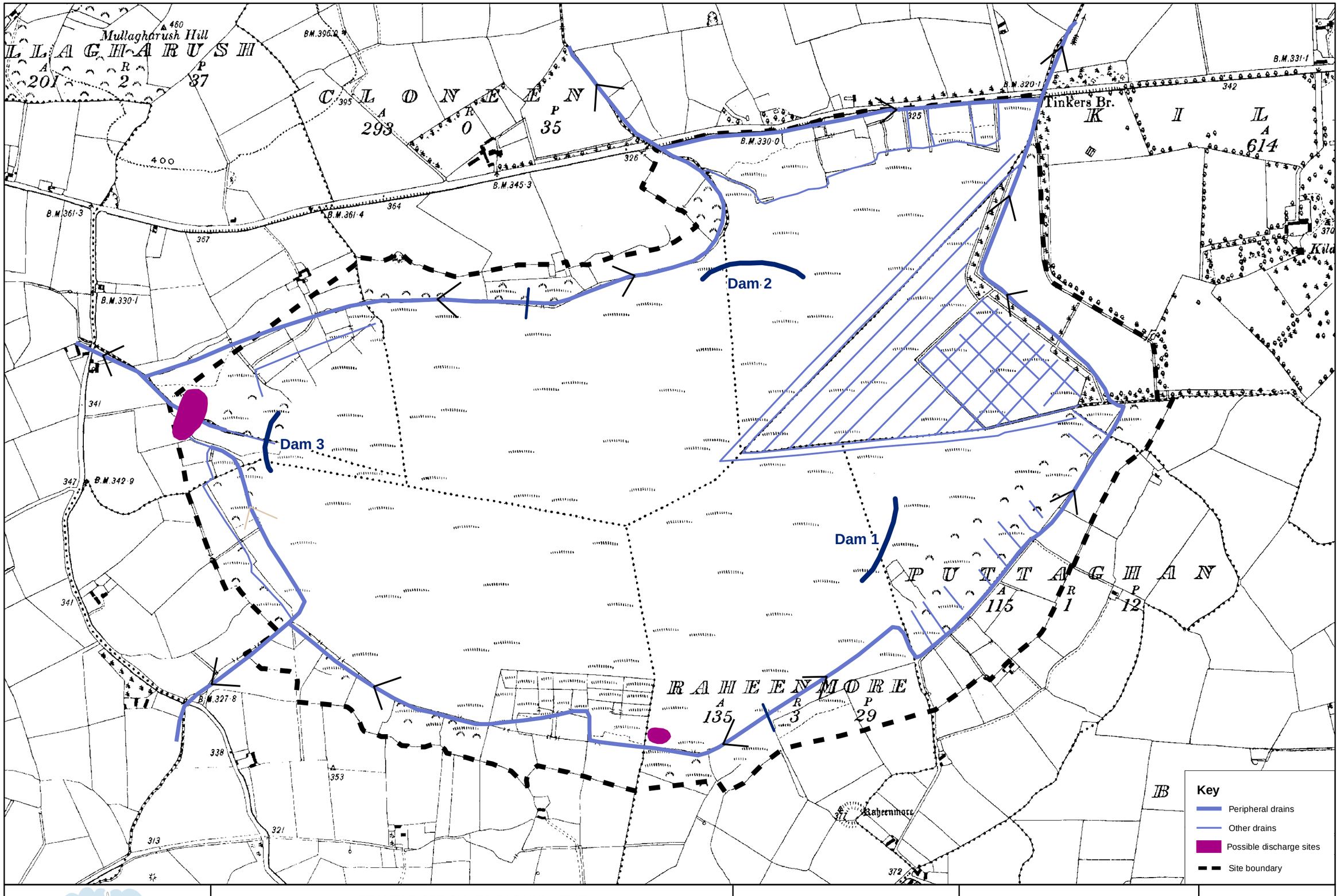
1:7,500

MAP 4:
MANAGEMENT ZONES MAP

Map to be read in conjunction with the conservation plan.

SITE CODE

cSAC 000582
Version 1.00



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CANDIDATE SPECIAL AREA OF CONSERVATION

RAHEENMORE BOG

6 inch sheet of010

0 50 100 200 M

1:7,500

MAP 5:
DRAINAGE HYDROLOGY MAP

Map to be read in conjunction with the conservation plan.

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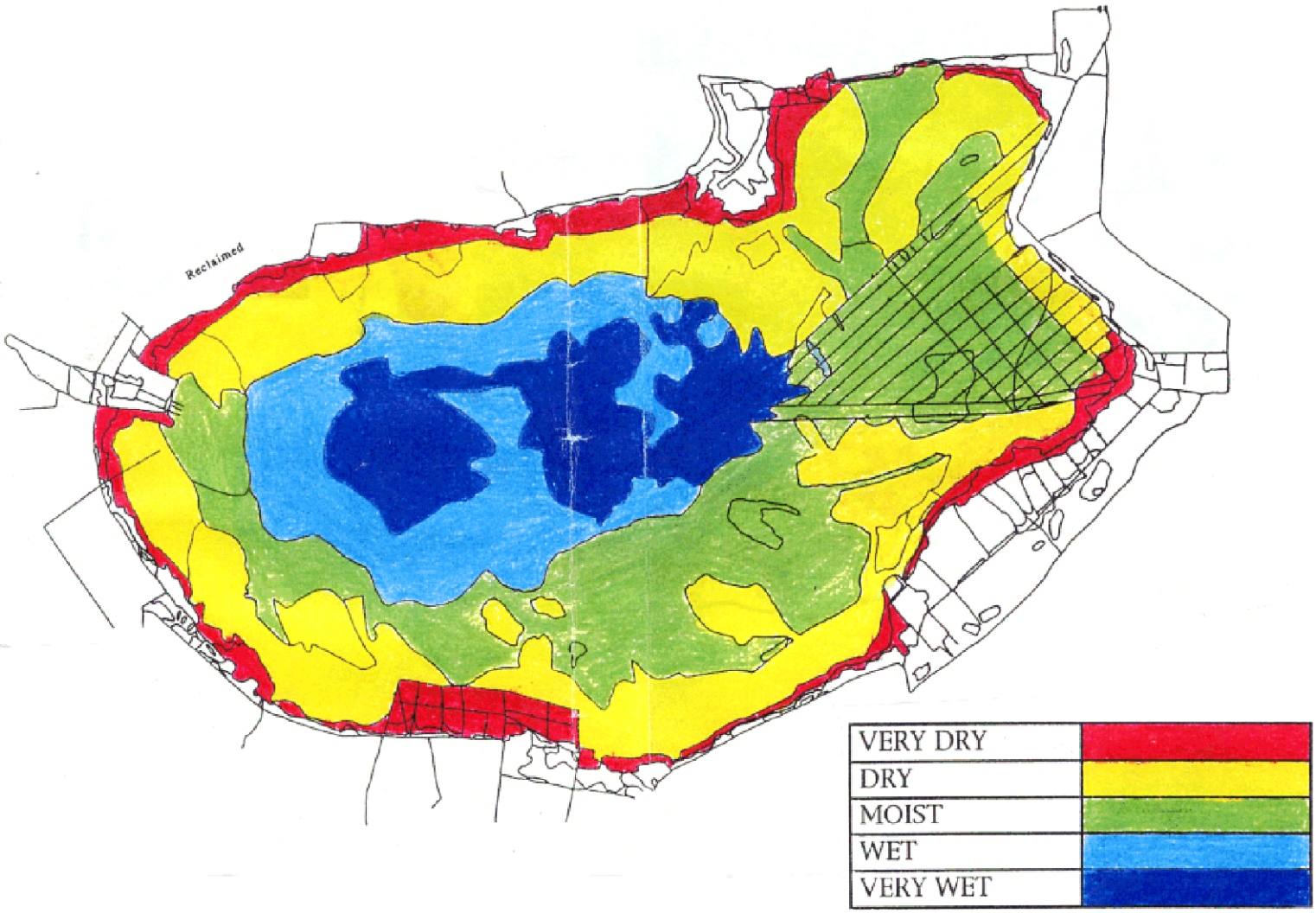

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6 inch sheet: of010

From Kelly 1993
Not to Scale

MAP 6: DESICCATION

Map to be read in conjunction with the conservation plan.

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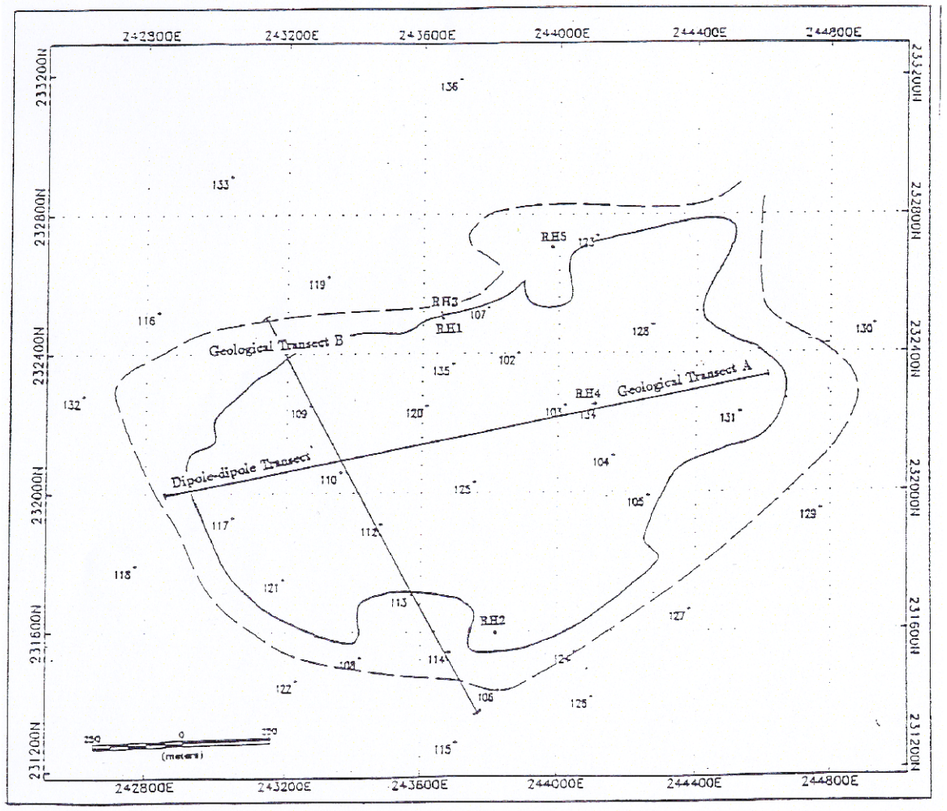

Figure 1.8 a, b, c Cross-sections through the Quaternary sediments of Raheenmore Bog basin

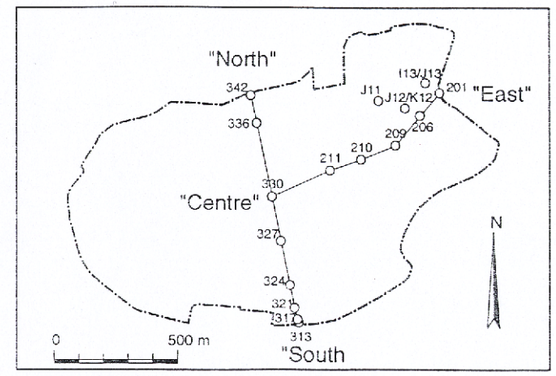

Fig. 6.1 Sampling sites on Raheenmore Bog

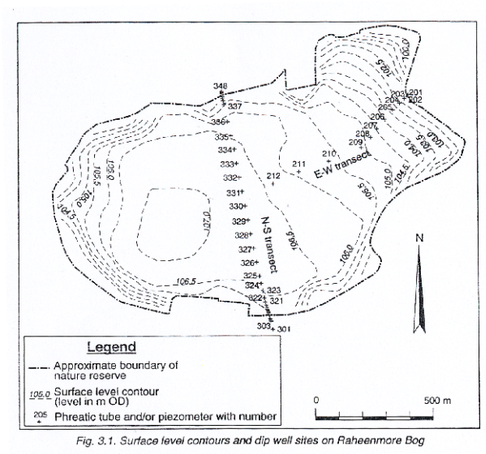

Fig. 3.1. Surface level contours and dip well sites on Raheenmore Bog

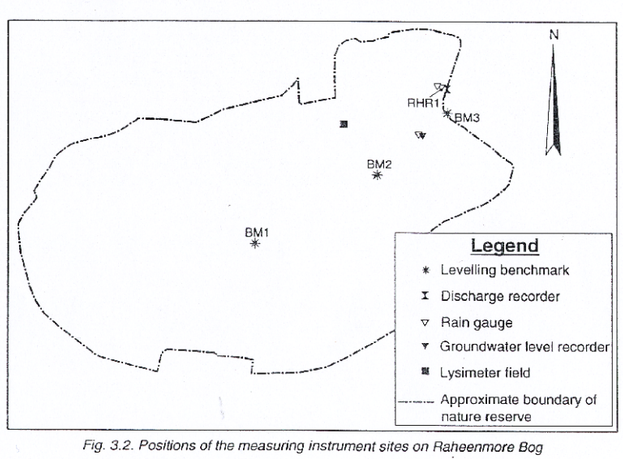

Fig. 3.2. Positions of the measuring instrument sites on Raheenmore Bog

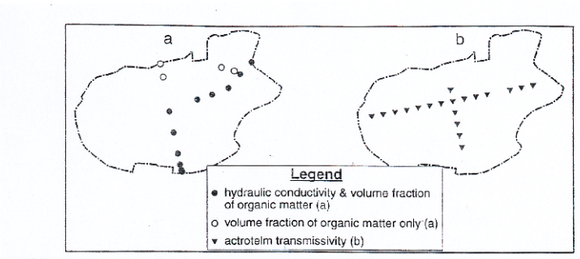

Fig. 3.3. Positions of the sites for measurement of hydraulic conductivity (a), volume fraction of organic matter for estimating subsidence (a) and acrotelm transmissivity profiles (b) on Raheenmore Bog

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MAP 7:
MEASUREMENT AND MEASURING SITES

Map to be read in conjunction with the conservation plan.

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