

Eve O'Sullivan

Subject: FW: AA screening
Attachments: Moate Landfill Stage 1 Screening Assessment .pdf

From: Leo Buckley [mailto:Leo.Buckley@westmeathcoco.ie]
Sent: 06 September 2018 17:38
To: Magnus Amajirionwu
Cc: Ciaran Jordan
Subject: RE: AA screening

Magnus,

See AA Screening attached.

The site is in the ownership of Westmeath County Council and has been since at least 1914. The site was used as a landfill from ca 1970 to ca 1990. Since then it's been used for agricultural purposes (grazing) from time to time.

Regards,

Leo Buckley,

Assistant Engineer | Environment | Westmeath County Council.
Áras an Chontae, Mullingar, Co. Westmeath
Tel: 044 9332281

From: Magnus Amajirionwu [mailto:M.Amajirionwu@epa.ie]
Sent: 06 September 2018 15:51
To: Leo Buckley
Subject: AA screening

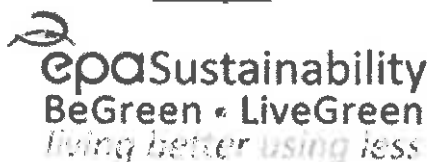
Leo,
Was an appropriate assessment screening carried out for the Moate site? If Yes, can you forward a copy to me at your earliest convenience.

Is the site in current ownership of the Council? Please provide a brief site ownership history.

Thanks and kind regards
Magnus

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NATURA IMPACT STATEMENT
STAGE 1 SCREENING
FORMER MUNICIPAL LANDFILL
MOATE,
COUNTY WESTMEATH

Prepared For: -

Westmeath County Council,
County Buildings,
Mullingar,
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Prepared By: -

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March 2013

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1. INTRODUCTION

1.1 Background

In 2011, Westmeath County Council (the Council) appointed O' Callaghan Moran & Associates (OCM) to undertake Tier 3 environmental assessment of a former Council operated landfill in Moate. The objective of the assessment was to quantify the environmental impacts associated with waste deposition; evaluate the risk presented to current and future landuse and identify appropriate remediation monitoring measures.

The assessment concluded that the waste did not present a significant risk to either surface water or groundwater; however landfill gas did present a risk to any future development to the north of site and potentially to the adjoining children's playground and civic amenity area. At present the risk to users of both the playground and civic amenity area is negligible given the absence of enclosed spaces in which landfill gases can accumulate.

Although the volumes of gas being generated will decline over time, as the residual organic matter is depleted, the levels currently being produced would require the implementation of remedial measures, if the proposed residential development within 50m of the site is to proceed or it is intended to construct buildings/provide enclosed spaces at the playground/civic amenity area.

OCM recommended that the existing landfill gas monitoring wells be maintained and used for long term monitoring purposes. The monitoring should be carried out at 6 monthly intervals to confirm that the gas levels within the waste body remain at levels that do not present a risk to the existing dwellings. If it is decided to proceed with the development of the residential area to the north of the waste deposition area, gas control measures should be provided.

1.2 Need for Appropriate Assessment Screening

The Council intends to apply to the Environmental Protection Agency (EPA) with an application for a Historic Landfill Certificate of Authorisation. Guidance issued by the EPA in November 2012 such an application to be accompanied by a Screening Assessment that evaluates the risks presented by the site to Natura 2000 sites.

The basis for the EPA's position is Article 6(3) of the European Union (EU) Habitats Directive (92/43/EEC), which states that any plan or project not directly connected with or necessary to the management of a Natura 2000 site, but likely to have a significant effect thereon, either

individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives

The Habitats Directive and the EU Birds Directive (2009/147/EC) identify designated areas (Special Areas of Conservation (SAC) and Special Protection Areas (SPA) respectively) that are collectively known as Natura 2000 Sites.

Guidance documents issued by Department of Environment, Heritage and Local Government and the National Parks and Wildlife Services recommend that the assessment be completed in a series of Stages. The purpose of the Stage 1 Screening is to determine, on the basis of a preliminary assessment and objective criteria, whether a plan or project, alone and in combination with other plans or projects, could have significant effects on a Natura 2000 site in respect of the site's conservation objectives.

1.3 Methodology

The Stage 1 Screening was based on the findings of the Tier 2 and 3 assessments completed by OCM. It was conducted in accordance with the guidance presented in the "Assessment of Plans and Projects significantly affecting Natura 2000 sites, Methodological Guidance on the provisions of Articles 6(3) and 6(4) of the Habitats Directive 92/43/EEC" (2001); The Department of Environment, Heritage and Local Government (2009, revised February 2010) Appropriate Assessment of Plans and Projects in Ireland and the National Parks and Wildlife Services (2010) Circular NPW 1/10 & PSSP 2/10 Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities.

2. DESCRIPTION OF PROJECT

2.1 Site Location & Description

The site is located in the townland of Killeenyboylegan, on the southern outskirts of Moate. The site occupies an area of 3.4 hectares and is bordered to the north by a stone wall, to the east by a roadway and to the west and south by hedgerows. A stream runs along the southern site boundary, with a tributary drain running along the western boundary. The topography of the site has been altered by the deposition of the waste, however the surrounding lands slope from the north to the south.

The use of the site as a landfill started sometime ca 1970 and continued up to ca 1990. The site was used to dispose of household waste collected by the Council in Moate and its environs. The original ground comprised peat overlying gravels. At some time peat, and possibly part of underlying gravel, were excavated from across the most of the site.

In the northern and central areas the waste was placed directly on the gravels, while in the south the waste was placed on the peat. The average thickness of the waste is 3.3m. The waste has been covered with thin layer of topsoil, which is underlain by a gravely clay, ranging from 0.2 to 1.2m across the site, being thickest in the central area

A playground and civic amenity area were provided on the eastern part of the waste deposition area in 2009. The construction of the playground involved the placement of aggregate on a geotextile layer which was then covered with approximately 324m² of soft asphalt.

2.2 Surrounding Land use

There are houses immediately to the north and within 10 metres of the site boundary, and a farm building to the east. The lands to the south, east and west of the site are agricultural. The Council's Wastewater Treatment Plant is approximately 500m to the south.

2.3 Hydrology

The fill area is domed and slopes from the centre of the site to the north, east, west and south.

There is a stream along the southern site boundary, the source which appears to be a spring that rises to the east of the site and flows to the west. A field drain along the western boundary confluences with the stream to the south west of the site. Surface water run off from the play ground is piped to the stream. The stream flows to the south and is a tributary of the Cloghatanny River, which flows to the south east to join the River Brosna approximately 7km from the site. The Brosna is a tributary of the River Shannon, which it joins approximately 27km from the site

2.4 Geology & Hydrogeology

The natural subsoils over most of the site comprise dense grey gravelly sand, with a proven minimum thickness of 5m. A peat layer that is present in the south east of the site, ranging from 0.2 to 0.4m thick, appears to be original ground. The subsoils are not significantly water bearing.

The site is underlain by the Waulsortian Limestone Formation, which is described as a massive pale grey limestone. The formation is classified by the GSI as a locally important aquifer (LI), being moderately productive only in local zones. The bedrock aquifer vulnerability is classified as Moderate It is estimated that groundwater flow is from north to south.

2.5 Risk Assessment

2.5.1 Conclusions

The Tier 3 Assessment concluded that the site categorised as High Risk based on the risks presented by the potential for leachate migration to the surface water and the landfill gas risk to potential future developments. The risk presented to groundwater is low.

There is a weak leachate within the waste body. The risk this presents to surface water is based on the precautionary assumption, given the proximity of the waste to the channel and the presence of surface water drains in the children's play area, that there is a direct pathway between the waste and the stream along the southern boundary. It must be emphasised that there is no evidence that such a direct pathway exists and the surface water monitoring carried out in 2007 and 2011 did not identify any impact on water quality in the stream.

Given the distance to the existing residences from the edge of the fill area (>80m) and the measured gas concentrations, it is considered that landfill gas generated by the waste does not present a risk to these dwellings. However the gas does present a risk to future residential development in the undisturbed northern part of the site and potentially to the children's playground and civic amenity area. At present the risk to users of both the

playground and civic amenity area is negligible given the absence of enclosed spaces in which landfill gases can accumulate.

2.5.2 Recommendations

It was recommended that surface water monitoring is carried out in the stream annually to confirm that the waste is not affecting water quality.

It was recommended that the landfill gas monitoring wells be maintained and used for long term monitoring purposes. Monitoring should be carried out at 6 monthly intervals to confirm that the gas levels within the waste body remain at levels that do not present a risk to the existing dwellings.

It was recommended that no buildings or enclosed spaces be constructed or provided at the playground or civic amenity area.

Should it be decided to proceed with the development of the residential area to the north of the waste deposition area, gas control measures should be provided. Subject to the results of the landfill gas monitoring, these may include;

- The layout of any proposed residential area should be such that the houses are the maximum practical distance from the edge of the fill area. If possible, the rear gardens should be 10 m from the edge of the fill.
- Incorporating appropriate gas protection measures, as specified in the DOE Guidance, into the building design.
- The installation of a landfill gas migration barrier north of the northern edge of the waste between it and the proposed residential area. The barrier should extend the full length of northern edge and may comprise a trench excavated to approximately 5m below ground level, with a flexible membrane liner (e.g. High Density Polyethylene) placed against the northern face and the trench backfilled with granular material.

3. NATURA 2000 SITES

3.1 NATURA 2000 Sites

A list of designated Natura 2000 sites within 15 km of the facility is given in Table 3.1 and the locations are shown on Figure 3.1

Table 3.1. Natura 2000 Sites Within 15 km of the Moate Landfill

Site	Code	Distance
SAC		
Carn Park Bog	002336	10kn North West
Crosswood Bog	002337	12km West
Lough Rea	00440	15km West
River Shannon Callows	000216	15km West
Split Hills and Long Hill Eskers	001831	
Clara Bog	000572	8km South East
Moyclare Bog	000581	15km South
Ferbane Bog	000575	15km South
Lough Ennell	000685	15km North East
Mongan Bog	000580	15km West
SPA		
Lough Rea	004064	15km East
Middle Shannon Callows	004096	15km West
Lough Ennell	004044	15km North East

3.2 Qualifying Interests

SACs are selected for the conservation and protection of habitats listed on Annex I and species (other than birds) listed on Annex II of the Habitats Directive and their habitats. SPAs are selected for the conservation and protection of bird species listed on Annex I of the Birds Directive and regularly occurring migratory species, and their habitats, particularly wetlands.

Copies of the site Synopses for the Natura 2000 sites, which provide details of the particular species and habitats (Qualifying Interests) for each site are in Appendix 1.

3.3 Conservation Objectives

The statement of Conservation Objectives prepared for each designated site identifies the qualifying interests or conservation features. The purpose is to ensure that the relevant habitats and species present on a site are maintained and, where necessary restored, to Favourable Conservation Status.

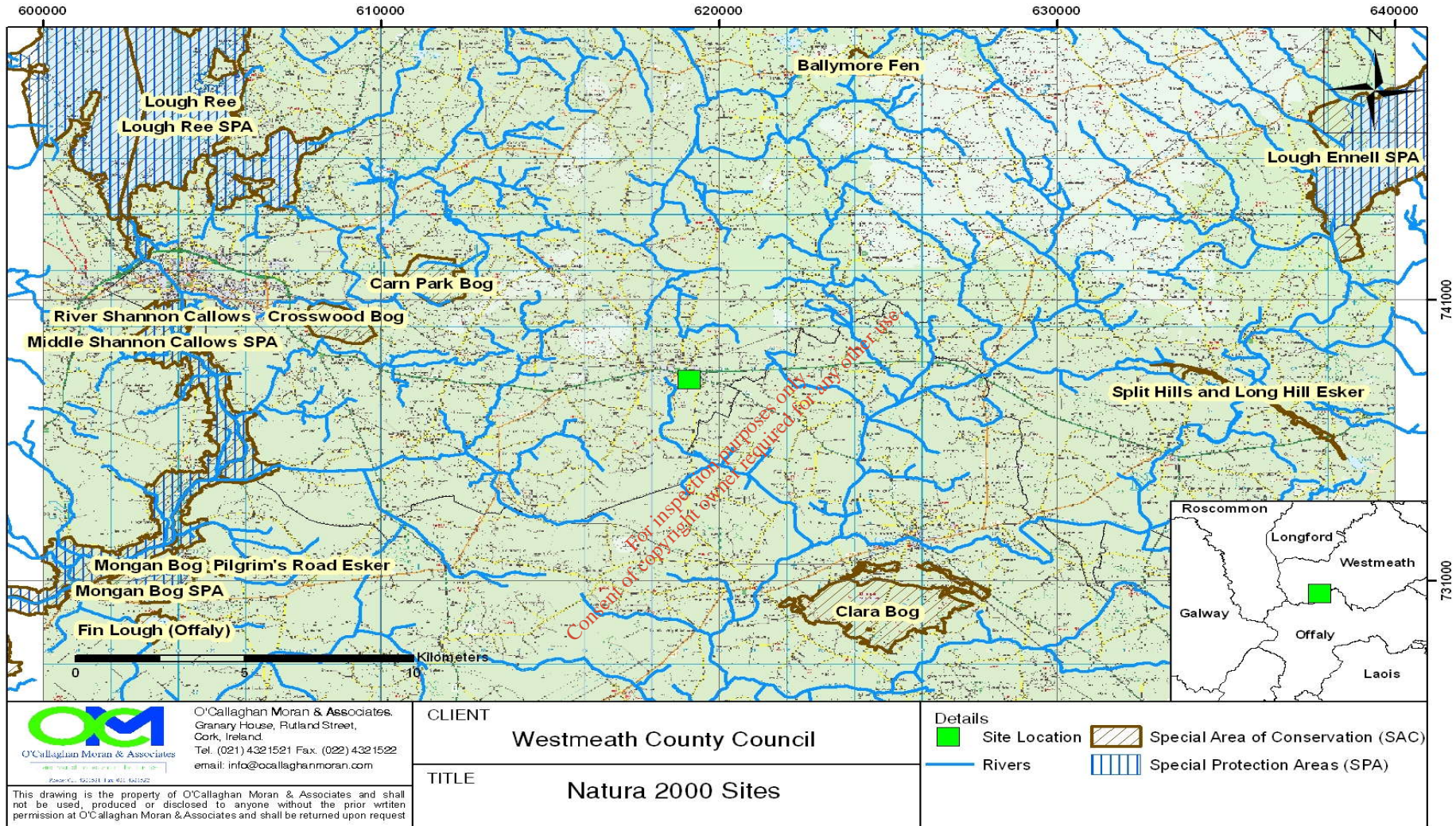
The Favourable Conservation Status of a habitat, as defined in the 2011 Birds and Natural Habitats Regulations, is when:

- its natural range, and area 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.

The Favourable Conservation Status of a species is when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

The Conservation Objectives for designated sites listed in Section 3.1 are to maintain or restore the Favourable Conservation Status of the Annex I habitat(s) and/or the Annex II species listed in Appendix 1.



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CLIENT

Westmeath County Council

TITLE

Natura 2000 Sites

Details

- Site Location
- Special Area of Conservation (SAC)
- Rivers
- Special Protection Areas (SPA)

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4. LIKELY EFFECTS

4.1 Setting

The facility is not located in or adjacent to a Natura 2000 Site. The closest Natura 2000 Site is Clara Bog, which is 8km of the site with the other Sites being between 10 and 15 km from the site.

4.2 Project

The site does not currently present a significant environmental risk and there is no need for remedial works. Surface water and landfill gas monitoring will continue to be carried out to confirm the site is not having a significant adverse environmental impact. Landfill gas control measures will be required in the future, if residential development is carried out on the lands to the north of the site. These works will not involve the disturbance of the waste or give rise to new emission sources to surface water.

4.3 Assessment of Effects

Given the absence of any pathway by which the landfill gas can migrate to the Natura 2000 sites, the gas does not present any risk to the Conservation Objectives for these sites. The only potential pathway by which contaminants from the site can leave the site is the stream that flows along the southern boundary. This is a tributary of the Cloghatanny River. The Cloghatanny is a tributary of the River Brosna, which it joins approximately 7km from the site. The Brosna is a tributary of the Shannon, which it joins approximately 27km from the site

The leachate monitoring has established that leachate is only present in the southern part of the site and that the contaminant levels are not very high. The surface water monitoring has established that there is no evidence of any impact on water quality in the stream.

Given the direction of surface water drainage from the site, which is to the south-east, the site presents no risk to the Natura 2000 sites to the west, north and east. The Cloghtanny River and the River Brosna do not flow through any Natura 2000 Sites. The Brosna confluence with the Shannon is within the River Shannon Callows SAC. Based on the results of the surface water quality monitoring in the stream along the southern boundary and the distance to the SAC, the site both in its current condition and when remediated does not and will not present a significant risk to the Conservation Objectives of the Shannon Callows SAC.

5. SCREENING CONCLUSION & STATEMENT

The landfill in its current condition does not present any significant risk to the Conservation Objectives of any of the Natura 2000 Sites within 15km of the landfill. The remedial works that may be carried out at some time in the future also do not present any risk to the Natura 2000 sites. Therefore a Stage 2 Appropriate Assessment is not required.

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APPENDIX 1

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SITE SYNOPSIS

SITE NAME: CARN PARK BOG

SITE CODE: 002336

Carn Park Bog is situated 8 km east of Athlone, in the townlands of Tullywood, Carn Park, Cappaghbrack, Warren High and Moydrum, Co. Westmeath. The site comprises a raised bog that includes both areas of high bog and cutover bog. The margins of the site are bounded by roads on the north, west and southern margins and forestry on the east.

The site is a candidate Special Area of Conservation selected for active raised bog and degraded raised bog, habitats that are listed on Annex I of the E.U. Habitats Directive. Active raised bog comprises areas of high bog that are wet and actively peat-forming, where the percentage cover of bog mosses (*Sphagnum* spp.) is high, and where some or all of the following features occur: hummocks, pools, wet flats, *Sphagnum* lawns, flushes and soaks. Degraded raised bog corresponds to those areas of high bog whose hydrology has been adversely affected by peat cutting, drainage and other land use activities, but which are capable of regeneration.

The site consists of a bog which has developed in a basin, which is almost divided into two by a ridge of mineral material. North of this ridge, there is only a narrow strip of bog. The main body of the bog lies south of the ridge. The surface of the southern section is very wet with undulating hummock/hollow microtopography. Forestry plantations occur on the east and southern margins of the site and are present on the high bog in the south-east and south-west. Extensive areas of cutover are found all around the margins of the high bog and in particular in the north and west.

Much of the high bog has vegetation typical of the Midlands Raised Bog type, in particular the expanse of uncut bog to the south and south-east. The vegetation consists of Ling Heather (*Calluna vulgaris*), Carnation Sedge (*Carex panicea*) and the lichen *Cladonia portentosa*. Cottongrasses (*Eriophorum vaginatum* and *E. angustifolium*) replace Carnation Sedge as co-dominants in the southern and central areas. The surface is very wet with an undulating hummock/hollow microtopography. Pools and some drains have become infilled on the high bog with bog mosses (*Sphagnum cuspidatum*, *S. magellanicum* and *S. capillifolium*), White Beak-sedge (*Rhynchospora alba*) and Common Cottongrass (*Eriophorum angustifolium*). Bog mosses cover much of the surface, forming hummocks of *S. papillosum* and the rarer *S. imbricatum* and *S. fuscum*. Ling Heather, Hare's-tail Cottongrass (*Eriophorum vaginatum*), Bog-rosemary (*Andromeda polifolia*) and Cranberry (*Vaccinium oxycoccos*) cover the hummocks. Carpets of bog moss (*S. capillifolium*, *S. magellanicum*, and *S. cuspidatum*) occur throughout the site. The abundance of a nationally rare species of bog moss, *Sphagnum pulchrum*, is noteworthy. This moss frequently dominates wet channels on the high bog. Fir Clubmoss (*Huperzia selago*) is also found on the bog. Scots Pine (*Pinus sylvestris*) is colonising the eastern part of the bog.

Current landuse on the site consists of mechanised peat-cutting, forestry and agricultural reclamation around the edge of the high bog. Peat-cutting is carried out along the track and road, which form the northern and north-western site boundaries. Afforestation occurs on the bog margins and extends onto intact or high bog. Some agricultural grassland has been reclaimed from cutover bog to the south and north-west of the site. Damaging activities associated with these landuses include drainage throughout the site (both old and recent) and extensive burning of the bog. These are all activities that have resulted in loss of habitat and damage to the hydrological status of the site, and which pose a continuing threat to its viability.

Carn Park Bog is a site of considerable conservation significance comprising as it does a raised bog, a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland. This site supports a good diversity of raised bog microhabitats, including hummock/hollow complexes, pools and *Sphagnum* lawns, as well as the rare species *Sphagnum pulchrum*. Active raised bog is listed as a priority habitat on Annex I of the E.U. Habitats Directive. Priority status is given to habitats and species that are threatened throughout the E.U. Ireland has a high proportion of the E.U. resource of this habitat type (over 60%) and so has a special responsibility for its conservation at an international level.

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SITE SYNOPSIS

SITE NAME: CROSSWOOD BOG

SITE CODE: 002337

Crosswood Bog is situated approximately 5 km east of Athlone, Co. Westmeath, mainly in the townlands of Crosswood, Glenaghavoneen, and Creggan Lower. The site comprises a raised bog that includes both areas of high bog and cutover bog. The northern margin of the bog lies along the southern side of the Dublin-Galway railway line.

The site is a candidate Special Area of Conservation selected for active raised bog and degraded raised bog, habitats that are listed on Annex I of the E.U. Habitats Directive. Active raised bog comprises areas of high bog that are wet and actively peat-forming, where the percentage cover of bog mosses (*Sphagnum* spp.) is high, and where some or all of the following features occur: hummocks, pools, wet flats, *Sphagnum* lawns, flushes and soaks. Degraded raised bog corresponds to those areas of high bog whose hydrology has been adversely affected by peat cutting, drainage and other land use activities, but which are capable of regeneration.

The site consists of a quaking bog, with a well-developed sequence of pools, hollows and hummocks, and a flush supporting woodland. Cutover occurs on all margins of the bog.

Much of the high bog has vegetation typical of the Midlands Raised Bog type, consisting of Ling Heather (*Calluna vulgaris*), Bog Asphodel (*Narthecium ossifragum*) and the bog moss *Sphagnum magellanicum*. The northern and eastern parts of the bog are locally wet and occasionally quaking and characterised by flats with Bog Asphodel and hummocks of *Sphagnum imbricatum* – this is a scarce species both on the site and nationally. There are well-developed pools with healthy populations of bog moss (*S. cuspidatum*). Regenerating bog moss (*S. magellanicum*) hummocks and a good bog moss carpet (*S. capillifolium* and *S. papillosum*) can be observed to the north-west. A flush is located in the centre of the bog and supports a thick carpet of mosses and liverworts, such as *Aulacomnium palustre*, *Polytrichum commune* and *Pleurozium schreberi*. Here are also found Hare's-tail Cottongrass (*Eriophorum vaginatum*), Ling Heather, Cranberry (*Vaccinium oxycoccos*), Crowberry (*Empetrum nigrum*), Downy Birch (*Betula pubescens*), pines (*Pinus* spp.) and Sessile Oak (*Quercus petraea*). The south-western end is drier with a poorer cover of *Sphagnum* and an abundance of Carnation Sedge (*Carex panicea*), Deergrass (*Scirpus cespitosus*), Ling Heather, Bog Asphodel and lichens (*Cladonia* spp.). The site is noteworthy for the presence of the rare bog moss *Sphagnum pulchrum* which is locally frequent in the pool system and the quaking flats to the east; *Sphagnum fuscum*, a relatively scarce species, is found on the drier hummocks here. Fir Clubmoss (*Huperzia selago*) is also found on the bog. Old cutover bog supports scrub vegetation of Ling Heather, Gorse (*Ulex* sp.), Downy Birch and willows (*Salix* spp.).

Current landuse on the site consists of peat-cutting around the edge of the high bog; it is more intensively cut on the western and southern margins. While the northern margin has drains that extend into the intact bog it is relatively protected from development due to the proximity to the railway. Forestry is found to the south of the site on areas of cutover bog. Some fields on old cutover are used for pasture and are presently undergoing further reclamation. Damaging activities associated with these landuses include drainage throughout the site (both old and recent) and extensive burning of the high bog. These are activities that have resulted in loss of habitat and damage to the hydrological status of the site, and pose a continuing threat to its viability.

Crosswood Bog is a site of considerable conservation significance comprising as it does a raised bog, a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland. This site supports a good diversity of raised bog microhabitats, including hummock/hollow complexes, pools and wooded flushes. Furthermore, it supports a population of the rare bog moss *Sphagnum pulchrum*. Active raised bog is listed as a priority habitat on Annex I of the E.U. Habitats Directive. Priority status is given to habitats and species that are threatened throughout the E.U. Ireland has a high proportion of the total E.U. resource of this habitat type (over 60%) and so has a special responsibility for its conservation at an international level.

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SITE SYNOPSIS

SITE NAME : LOUGH REE

SITE CODE : 000440

Lough Ree is the third largest lake in the Republic of Ireland and is situated, in an ice-deepened depression in Carboniferous Limestone, on the River Shannon system between Lanesborough and Athlone. Some of its features (including the islands) are based on glacial drift. It has a very long, indented shoreline and hence has many sheltered bays. Although the main habitat, by area, is the lake itself, interesting shoreline, terrestrial and semi-aquatic habitats also occur.

The greater part of Lough Ree is less than 10m in depth, but there are six deep troughs running from north to south, reaching a maximum depth of about 36m just west of Inchmore. The lake has been classified as mesotrophic in quality, but the size of the system means that a range of conditions prevail depending on, for example, rock type. This gives rise to local variations in nutrient status and pH, which in turn result in variations in the phytoplankton and macrophyte flora, and species indicative of oligotrophic, mesotrophic, eutrophic and base-rich situations occur. The water of Lough Ree tends to be strongly peat-stained, restricting macrophytes to depths of less than 2m, and as a consequence, macrophytes are restricted to sheltered bays, where a typical Shannon flora occurs. Species present include Intermediate Bladderwort (*Utricularia intermedia*), Pondweeds (*Potamogeton* spp.), Quillwort (*Isoetes lacustris*), Greater Duckweed (*Spirodela polyrhiza*), Stoneworts (*Chara* spp., including *C. pedunculata*) and Arrowhead (*Sagittaria sagittifolia*). The latter is a scarce species which is almost confined in its occurrence to the Shannon Basin.

Reedbeds of Common Reed (*Phragmites australis*) are an extensive habitat in a number of more sheltered places around the lake, but single-species 'swamps' consisting of such species as Common Club-rush (*Scirpus lacustris*), Slender Sedge (*Carex lasiocarpa*), Saw Sedge (*Cladium mariscus*) and two scarce species of Sedge (*Carex appropinquata* and *C. elata*) also occur in suitable places. Some of these grade up into species-rich calcareous fen with Black Bog-rush (*Schoenus nigricans*) and Whorl-grass (*Catabrosa aquatica*), or freshwater marsh with abundant Water Dock (*Rumex hydrolapathum*) and Hemp-agrimony (*Eupatorium cannabinum*).

Lowland wet grassland is found in abundance around the shore and occurs in two types. One is 'callowland', grassland which floods in winter. This provides feeding for winter waterfowl and breeding waders. The other is an unusual community on stony wet lakeshore all around the lake, and is characterized by Water Germander (*Teucrium scordium*), a scarce plant species almost confined to this lake and Lough Derg.

Dry calcareous grassland occurs scattered around the lake shore. This supports typical species such as Yellow-wort (*Blackstonia perfoliata*), Carline Thistle (*Carlina*

vulgaris) and Quaking Grass (*Briza media*). Orchids also feature in this habitat e.g. Bee Orchid (*Ophrys apifera*) and Common Spotted-orchid (*Dactylorhiza fuchsia*).

Dry, broad-leaved, semi-natural woodland occurs in several places around the lake, most notably at St John's Wood and on Hare Island. St John's Wood is recognised as the largest and most natural woodland in the Midlands. Its canopy is dominated by Hazel (*Corylus avellana*), Pedunculate Oak (*Quercus robur*), Holly (*Ilex aquifolium*) and Ash (*Fraxinus excelsior*), but a range of other trees and shrubs occur, including Wych Elm (*Ulmus glabra*), Yew (*Taxus baccata*), Wild Cherry (*Prunus avium*) and Irish Whitebeam (*Sorbus hibernica*). The ground flora of St. John's Wood is species-rich, and is remarkable for the presence of two species, Toothwort (*Lathraea squamaria*) and Bird's-nest Orchid (*Neottia nidus-avis*), which tend to occur in sites with a long history of uninterrupted woodland cover. The tree species composition on Hare Island is similar to that in St. John's Wood, with additional non-native species such as Sycamore (*Acer pseudoplatanus*) and Beech (*Fagus sylvatica*). This wood also has an exceptionally rich ground flora. Some of the smaller areas of woodland around Lough Ree are mixed woodland with a high percentage of exotics such as Beech. Some areas of well-developed Hazel scrub also occur.

Pockets of wet woodland occur around the lake: most of these are dominated by Willows (*Salix* spp.), Alder (*Alnus glutinosa*) and Downy Birch (*Betula pubescens*). In one such wood, at Ross Lough, the terrestrial alga *Trentopohlia* spp. has a specialised niche on the Willow trunks, while the ground layer has a rich bryophyte flora (*Calliargon* spp. and *Sphagnum* spp.), scattered clumps of Greater Tussock-sedge (*Carex paniculata*) and a good diversity of herb species, including Water Dock (*Rumex hydrolapathum*) and Fen Bedstraw (*Galium uliginosum*).

Small examples of raised bog occur which are of interest in that they show a natural transition through wet woodland and/or swamp to lakeshore habitats. A good example of bog woodland occurs at St. John's Wood. This grows on cutaway peat and is dominated by Birch (*Betula pubescens*) and Alder Buckthorn (*Frangula alnus*). The occurrence of the latter species in such abundance is unusual in Ireland. Other examples of bog woodland occur scattered around the site. Bog woodland is of particular conservation importance and is listed with priority status on the EU Habitats Directive. Smaller lakes occur around the lakeshore, especially on the east side, and these often have the full range of wetland habitats contained within them. A number of small rivers pass through the site.

The site supports a number of rare plant species which are listed in the Irish Red Data Book, Alder Buckthorn (*Frangula alnus*) and Bird Cherry (*Prunus padus*) are woodland components at St. John's Wood and elsewhere. Narrow-leaved Helleborine (*Cephalanthera longifolia*) and Betony (*Stachys officinalis*), which is legally protected under The Flora Protection Order (1987), occur among the ground flora of Hare's Island (where the former occurs in notable abundance) and a number of other woods. The Stonewort (*Chara tomentosa*) is present in shallow water around the lake, and Marsh Pea (*Lathyrus palustris*) occurs on some of the callowland. The rare Myxomycete fungus, *Echinostelium colliculosum*, has been recorded from St John's Wood.

The lake itself contains one of only two populations of the endangered fish species, Pollan (*Coregonus autumnalis*), which is genetically different from Continental European stock. The shrimp (Crustacean) *Mysis relicta* occurs in this lake and is a relict of the glacial period in Ireland.

Small flocks of Greenland White-fronted Goose, an Annex I species on the Birds Directive, use several areas of callowland around the lake in winter. An average spring count of 92 individuals was obtained for this species over the six seasons 1988/89 to 1993/94, indicating that Lough Ree is a nationally important site for this species. The following bird counts are derived from 6 counts during the period 1984/85 to 1986/87. Nationally important populations of Golden Plover (1,350), an Annex I species, Wigeon (1,306), Teal (584), Tufted Duck (1,317) and Coot (798) occur. Other winter visitors are Whooper Swan (32), an Annex I species, Mute Swan (91), Little Grebe (48), Cormorant (91), Mallard (362), Shoveler (40), Pochard (179), Goldeneye (97), Curlew (178), Lapwing (1,751) and Dunlin (48). The callowland is also used by Black-tailed Godwit and others on migration.

Some of the lake islands provide nesting sites for Common Tern, a species listed on Annex I of the European Birds Directive. The Lough Ree colony, 86 pairs in 1995, is estimated as one of the largest of this species on midland lakes. The lake also provides excellent breeding habitat for wildfowl, including Common Scoter (30-40 pairs), a rare breeding species listed as "Endangered" in the Red Data Book, and Tufted Duck (>200 pairs).

The woodlands and scrub around the lake and on the islands are a stronghold of the Garden Warbler (74 territories in 1997), a bird species mainly confined to the Shannon Lakes in Ireland.

There is a population of Otters around the lake. This species is listed in the Red Data Book as being threatened in Europe and is protected under Annex II of the European Habitats Directive.

Landuses within the site include recreation in the form of cruiser hire, angling, camping, picnicking and shooting. Chalet accommodation occurs at a few locations around the lake. Low-intensity grazing occurs on dry and wet grassland around the shore and some hay is made within the site. Some of these activities are damaging, but in a very localised way, and require careful planning. The main threat to the aquatic life in the lake comes from artificial enrichment of the waters by agricultural and domestic waste, and also by peat silt in suspension which is increasingly limiting the light penetration, thus restricting aquatic flora to shallower waters. At present Lough Ree is less affected by eutrophication than L. Derg.

Lough Ree and its adjacent habitats are of major ecological significance. Some of the woodlands around the lake are of excellent quality and include some of the best examples of this habitat in Ireland. St. John's Wood is particularly important; it is considered to be one of the very few candidates for ancient woodland in Ireland. The lake itself is an excellent example of a mesotrophic to moderate-eutrophic system, supporting a rare fish species and a good diversity of breeding and wintering birds.

SITE SYNOPSIS

SITE NAME: RIVER SHANNON CALLOWS

SITE CODE: 000216

The River Shannon Callows is a long and diverse site which consists of seasonally flooded, semi-natural, lowland wet grassland, along and beside the river between the towns of Athlone and Portumna. It is approximately 50 km long and averages about 0.75 km wide (reaching 1.5 km wide in places). Along most of its length the site is bordered by raised bogs - many, but not all, in the process of large-scale harvesting - esker ridges and limestone-bedrock hills. The soils grade from silty-alluvial to peat. This site has a common boundary, and is closely associated, with two other sites of similar habitats, River Suck Callows and Little Brosna Callows.

The River Shannon Callows is mainly composed of lowland wet grassland. Different plant communities occur, depending on elevation, and therefore their flooding patterns. Two habitats listed on Annex I of the EU Habitats Directive are well represented within the site – *Molinia* meadows and lowland hay meadows. The former is characterised by the presence of the Meadow Thistle (*Cirsium dissectum*) and Purple Moor-grass (*Molinia caerulea*), while typical species in the latter include Meadow Fescue (*Festuca pratensis*), Rough Meadow-grass (*Poa trivialis*), Downy Oat-grass (*Avenula pubescens*), Common Knapweed (*Centaurea nigra*), Ribwort Plantain (*Plantago lanceolata*) and Common Sorrel (*Rumex acetosa*). In places these two habitats grade into one another.

Low-lying areas of the callows with more prolonged flooding are characterised by Floating Sweet-grass (*Glyceria fluitans*), Marsh Foxtail (*Alopecurus geniculatus*) and wetland herbs such as Yellow Cress (*Rorippa* spp.), Water Forget-me-not (*Myosotis scorpioides*) and Common Spike-rush (*Eleocharis palustris*). Most of the callows consist of a plant community characterised by Creeping Bent (*Agrostis stolonifera*), Brown Sedge (*Carex disticha*), Common Sedge (*Carex nigra*), and herbs such as Marsh Marigold (*Caltha palustris*) and Marsh Bedstraw (*Galium palustre*). While the more elevated and peaty areas are characterised by low-growing sedges, particularly Yellow Sedge (*Carex flava* agg.) and Star Sedge (*Carex echinata*). All these communities are very diverse in their total number of plant species, and include the scarce species Meadow-rue (*Thalictrum flavum*), Summer Snowflake (*Leucojum aestivum*), and Marsh Stitchwort (*Stellaria palustris*).

Two further Annex I habitats, both listed with priority status, have a minor though important presence within the site. Alluvial forest occurs on a series of alluvial islands just below the ESB weir near Meelick. Several of the islands are dominated by well grown woodland of mainly Ash (*Fraxinus excelsior*) and Willows (*Salix* spp.). The islands are prone to regular flooding from the river.

At Clorhane, an area of limestone pavement represents the only known example in Co Offaly. It is predominantly colonised by mature hazel woodland, with areas of open limestone and calcareous grassland interspersed. The open limestone pavement comprises bare or moss covered rock or rock with a very thin calcareous soil cover

supporting a short grassy turf. The most notable plant in the grassy area is a substantial population of Green-winged Orchid (*Orchis morio*), which occurs with such species as Sweet Vernal-grass (*Anthoxanthum odoratum*), Quaking Grass (*Briza media*), sedges (*Carex caryophyllea*, *C. flacca*), Common Bird's-foot-trefoil (*Lotus corniculatus*), Common Knapweed (*Centaurea nigra*), and Narrow-leaved Plantain (*Plantago lanceolata*). Ferns associated with the cracks in the paving include *Asplenium trichomanes*, *A. ruta-muraria*, *A. adiantum-nigrum*, *Polypodium australe*. Bryophytes include *Grimmia apocarpa* and *Orthotrichum cf. anomalum*. Anthills are common within the open grassland. The Hazel wood is well-developed and has herbaceous species such as Primrose (*Primula vulgaris*), Common Dog-violet (*Viola riviniana*), Wood Sorrel (*Oxalis acetosella*) and Herb Robert (*Geranium robertianum*). The wood is noted for its luxuriant growth of epiphytic mosses and liverworts, with such species as *Neckera crispa* and *Hylocomium brevirostre*. Yew (*Taxus baccata*) occurs at one area.

Other habitats of smaller area but equal importance within the site are lowland dry grassland, drainage ditches, freshwater marshes and reedbeds. The dry grassland areas, especially where they exist within hay meadows, are species-rich, and of two main types: calcareous grassland on glacial material, and dry grassland on levees of river alluvium. The former can contain many Orchid species, Cowslip (*Primula veris*), abundant Adder's-tongue Fern (*Ophioglossum vulgatum*) and Spring-sedge (*Carex caryophyllea*), and both contain an unusually wide variety of grasses, including False Oatgrass (*Arrhenatherum elatius*), Yellow Oatgrass (*Trisetum flavescens*), Meadow Foxtail (*Alopecurus pratense*), and Meadow Brome (*Bromus commutatus*). In places Summer Snowflake also occurs.

Good quality habitats on the edge of the callows included in the site are wet broad-leaved semi-natural woodland dominated by both Birch (*Betula pubescens*) and Alder (*Alnus glutinosa*) and dry broad-leaved woodland dominated by Hazel (*Corylus avellana*). There are also areas of raised bog, fen on old cut-away bog with Black Bog-rush (*Schoenus nigricans*), and a 'petrifying stream' with associated species-rich calcareous flush which supports Yellow Sedge (*Carex lepidocarpa*), Blunt-flowered Rush (*Juncus subnodulosus*) and Stoneworts (*Chara* spp.).

Two legally-protected plant species (Flora (Protection) Order 1999) occur in the site: Opposite-leaved Pondweed (*Groenlandia densa*) in drainage ditches, and Meadow Barley (*Hordeum secalinum*) on dry alluvial grassland. This is one of only two known inland sites for the Meadow Barley in Ireland. The Red Data Book plant Green-winged Orchid (*Orchis morio*) is known from dry calcareous grasslands within the site, while the site also supports a healthy population of Marsh Pea (*Lathyrus palustris*).

The site is of International Importance for wintering waterfowl as numbers regularly exceed the 20,000 threshold (mean of 34985 for 5 winters 1994/94-1998/99). Of particular note is an Internationally Important population of Whooper Swans (287). A further five species have populations of national importance (all figures are means for 5 winters 1995/96-1999/00): Mute Swan (349), Wigeon (2972), Golden Plover (4254), Lapwing (11578) and Black-tailed Godwit (388). Species which occur in numbers of regional or local importance include Bewick's Swan, Tufted Duck, Dunlin, Curlew and Redshank. The population of Dunlin is notable as it is one of the few regular inland flocks in Ireland. Small flocks of Greenland White-fronted Goose

use the Shannon Callows; these are generally associated with larger flocks which occur on the adjacent Little Brosna Callows and River Suck Callows.

Shoveler (an estimated 12 pairs in 1987) and Black-tailed Godwit (Icelandic race) (one or two pairs in 1987) breed within this site. These species are listed in the Red Data Book as being threatened in Ireland. The scarce bird Quail is also known to breed within the area. The Callows continues to hold over 40% of the Irish population of the globally endangered Corncrake, although numbers have declined in recent years. A total of 66 calling birds were recorded in 1999. The total population of breeding waders (Lapwing, Redshank, Snipe and Curlew) in 1987 was one of three major concentrations in Ireland and Britain. The breeding Redshank, numbers was estimated at 10% of the Irish population, making it Nationally significant. Also, the Annex I species Merlin and Hen Harrier are regularly reported hunting over the callows during the breeding season and in autumn and winter.

This site holds a population of Otter, a species listed on Annex II of the EU Habitats Directive, while the Irish Hare, which is listed in the Irish Red Data Book, is a common sight on the callows.

The Shannon Callows are used for summer dry-stock grazing (mostly cattle, with some sheep and a few horses), and permanent hay meadow. About 30 ha is a nature reserve owned by voluntary conservation bodies. The River Shannon is used increasingly for recreational purposes with coarse angling and boating accounting for much of the visitor numbers. Intermittent and scattered damage to the habitats has occurred due to over-deepening of drains and peat silt deposition, water-skiing, ploughing and neglect of hay meadow (or reversion to pasture). However, none of these can as of yet be said to be serious. Threats to the quality of the site may come from the siting of boating marinas in areas away from centres of population, fertilising of botanically-rich fields, the use of herbicides, reversion of hay meadow to pasture, neglect of pasture and hay meadow, disturbance of birds by boaters, anglers, birdwatchers and the general tourist. The maintenance of generally high water levels in winter and spring benefits all aspects of the flora and fauna, but in this regard, summer flooding is a threat to breeding birds, and may cause neglect of farming.

The Shannon Callows has by far the largest area of lowland semi-natural grassland and associated aquatic habitats in Ireland and one in which there is least disturbance of natural wetland processes. Botanically, it is extremely diverse with two legally protected species of plants and many scarce species. Excellent examples of two habitats listed on Annex I of the EU Habitats Directive occur within the site – *Molinia* meadows and lowland hay meadows with good examples of a further two Annex habitats (both with priority status). In winter the site is internationally important for numbers and species of waterfowl. In spring it feeds large numbers of birds on migration. And in summer it holds very large numbers of breeding waders, rare breeding birds and the endangered Corncrake, as well as a very wide variety of more common grassland and wetland birds. The presence of Otter, an Annex II species, adds further importance to the site.

22.10.2003

SITE SYNOPSIS

SITE NAME : SPLIT HILLS AND LONG HILL ESKER

SITE CODE : 001831

Split Hills and Long Hill Esker is a 5km long site which crosses the main Galway-Dublin road mid-way between Kilbeggan and Tyrrellspass in Co. Westmeath. It is a very prominent feature on the local landscape.

The main habitat is of semi-natural woodland dominated by Hazel (*Corylus avellana*), Ash (*Fraxinus excelsior*), and Hawthorn (*Crataegus monogyna*). Oak (*Quercus robur*), Wych Elm (*Ulmus glabra*) and Irish Whitebeam (*Sorbus hibernica*) are important constituents. There are very fine examples of these trees throughout the site: some Hazel trees, in particular, are impressive. The ground flora is species-rich and includes Primrose (*Primula vulgaris*), Enchanter's Nightshade (*Circaea lutetiana*), Golden Saxifrage (*Chrysosplenium oppositifolium*), Bluebell (*Hyacinthoides non-scripta*), Ground Ivy (*Glechoma hederacea*), Sanicle (*Sanicula europaea*) and other typical woodland plants. The scarce woodland grass, Wood Fescue (*Festuca altissima*), is present, and the scarce Bird's-nest Orchid (*Neottia nidus-avis*) has also been recorded here. The presence of Wych Elm is interesting in view of its decline due to Dutch Elm Disease.

Several areas of species-rich calcareous grassland occur, with typical calcicole species such as Yellow-wort (*Blackstonia perfoliata*), Carline Thistle (*Carlina vulgaris*), Mountain Everlasting (*Antennaria dioica*) and Early-purple Orchid (*Orchis mascula*). These occur on unstable old and active quarry faces, and on cleared woodland areas. Areas of scrub with Blackthorn (*Prunus spinosa*) and Gorse (*Ulex europaeus*) occur, and regenerating Hazel (*Corylus avellana*) scrub exists in some areas where woodland has been cleared. Other habitats in the site include a small lake and freshwater marsh with Slender Sedge (*Carex lasiocarpa*).

Narrow-leaved Bittercress (*Cardamine impatiens*) occurs among the woodland flora at this site. It is an annual or biennial, whose populations are known to 'disappear' in some years only to 'reappear' again. The species is protected under The Flora Protection Order (1999), and this is its only known location in Ireland. Another protected species, Hemp Nettle (*Galeopsis angustifolia*), occurs on more open ground on the esker.

The main threat to the esker is quarrying for sand and gravel: this activity already occurs on the site at several locations. Grazing is a critical factor affecting esker habitats. The presence of too many grazers causes damage to the ground vegetation in both woodlands and grasslands and prevents regeneration of woody species. If the grazing level is too low, grasslands are vulnerable to the encroachment of scrub at the expense of species which require open conditions. Fertiliser application, associated with agricultural

improvement, also leads to a reduction in species-richness of grasslands.

Split Hill and Long Hill Esker is one of the finest and longest wooded eskers in the country, one of the very few woodlands in the area and a fine geomorphological feature of great scenic value. The trees are particularly well-grown and impressive and much of the woodland has developed naturally on its steep slopes. The presence of a very species-rich ground flora which includes a rare and legally protected plant, at its only known Irish location, makes this site of great botanical and ecological importance. The site also supports some excellent examples of calcareous grassland which is rich in orchids. The increasing rarity of this habitat (due to agricultural intensification) is recognised in that it is awarded priority status on Annex I of the European Habitats Directive.

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12.03.2002

SITE SYNOPSIS

SITE NAME: CLARA BOG

SITE CODE: 000572

Clara Bog is situated some 2 km south of Clara village. Much of it is state-owned and designated a statutory Nature Reserve.

Clara Bog has long been regarded as one of the most important lowland raised bogs in the country, being the largest remaining example of the true Midland sub-type. It has well developed hummock and hollow complexes and one of the few remaining soak systems. The bog vegetation has been much studied and is well known. Variations in the proportions of Bog moss (*Sphagnum* spp.), Heather (*Calluna vulgaris*) and Cottongrass (*Eriophorum* spp.) has been related to ecological features such as pools, soaks and ridges.

Several rare invertebrate species are associated with the soak, including the midge, *Lasiodiamesa sphagnicola*, for which Clara Bog is its only known Irish site, a click beetle, *Ampedus pomorum* and another midge, *Parhelophilus consimilis*. The bog is also important for the rare moss, *Tetraplodon angustatus*, at its only known Irish station here.

Clara Bog supports breeding Merlin (12 pairs), a scarce species in Ireland and one that is listed on Annex I of the EU Birds Directive. Red Grouse also breeds, along with other common bogland species such as Meadow Pipit and Skylark.

To the east the transition into calcareous woodland, and to the north the transition to the esker ridge have been retained and some excellent examples of esker grassland occur in the site. Some peripheral reclaimed farmland is also included in the site, because management undertaken in these areas can have a profound effect upon the rest of the bog.

The site has been divided into a western and an eastern section by a road. The eastern part of the site has been damaged by previous drainage attempts, however, restoration work is in progress. Continuing peat extraction from the southern margins is also damaging and has potential effect upon much of the internal bog, including the soak system. Ideally the whole bog should be managed as a hydrological unit.

Active raised bogs, once characteristic of central Ireland, are now rare and vulnerable, and have been recognised by the European Union as a habitat of international importance. Ireland has a special responsibility to conserve the best of its remaining bogs. Further drainage, peat extraction, burning or attempted land reclamation is not consistent with this responsibility.

25.2.1999

SITE SYNOPSIS

SITE NAME: MOYCLARE BOG

SITE CODE: 000581

Moyclare Bog is a small raised bog situated 4 km west of Ferbane - its mean height above sea level is 54 m. On the western edge of the bog, a low peatface with no perimeter drain lies adjacent to wet peaty pasture, which has a spring-line at its junction with mineral soil. The water from this spring disappears under the peat dome of the bog.

Much of the bog surface is very wet, though not quaking, with an almost 100% cover of bog mosses (*Sphagnum* spp.) beneath a sparse cover of Heather (*Calluna vulgaris*) and abundant Deergrass (*Scirpus cespitosus*). Cranberry (*Vaccinium oxycoccos*) is especially abundant on lawns of the moss *Sphagnum magellanicum*.

Numerous small pools, mostly filled with the moss *Sphagnum cuspidatum* are present. Active bog moss growth approaches unusually close to the western margin of the bog, where some trees of Scots Pine (*Pinus sylvestris*) occur.

A small flushed hollow on the dome of the bog contains Soft Rush (*Juncus effusus*) and the moss *Sphagnum cuspidatum*. The bog becomes drier towards the northern boundary, especially north of an old track which traverses the dome.

Fir Clubmoss (*Huperzia selago*), the rare Brown Beaked-sedge (*Rhynchospora fusca*) and the liverwort (*Pleurozia purpurea*) occur on the bog.

Moyclare Bog has a largely intact and relatively wet dome with a uniformly active cover of bog mosses. It is a bog of good quality in an area where large scale harvesting of peat is on-going, and where only small bogs remain - most of those are degraded and dry. As actively growing raised bogs are a rare habitat throughout Europe, those found in Ireland have a particular scientific and conservation value.

10.1.1997

SITE SYNOPSIS

SITE NAME: FERBANE BOG

SITE CODE: 000575

Ferbane Bog is a relatively large, domed, raised bog located about 10 km east of Shannonbridge. It is underlain by low permeability Waulsortian limestone and clay-rich tills.

Much of the surface of the bog is very wet and spongy and the cover of Bog Mosses (*Sphagnum* spp.) and lichens is generally good. A wet quaking area to the east occurs in a depression and is characterised by a dominant growth of Hare's-tail Cottongrass (*Eriophorum vaginatum*), while another very wet quaking area on the western side of the site has well-developed inter-connecting pools. Around these wet areas is found a slightly drier area with lawns of *Sphagnum magellanicum* and hummocks of *S. papillosum*, *S. capillifolium* and *S. imbricatum*. Carnation Sedge (*Carex panicea*) is present in abundance throughout the site, but particularly so on sloping areas. Purple Moor-grass (*Molinia caerulea*) and Bog-myrtle (*Myrica gale*) occur in scattered patches throughout the bog. Bog-rosemary (*Andromeda polifolia*) and Cranberry (*Vaccinium oxycoccos*) are also found. A flushed area occurs on the northern part of the site.

Scots Pine (*Pinus sylvestris*) and Birch (*Betula* sp.) trees have encroached onto the high bog in the north, south, east and north-west. In the north and south these extend approximately 300 m into the site. An area of mixed woodland is included in the site for hydrological reasons.

The vegetation of the older cutaway areas to the west, north and east of the site is dominated by Birch and Gorse (*Ulex europaeus*), with areas of Bracken (*Pteridium aquilinum*), Willow (*Salix* sp.), Bilberry (*Vaccinium myrtillus*), Scots Pine and Rhododendron (*Rhododendron ponticum*) also found.

Raised bogs, due to the high water content of peat are vulnerable to activities which increase water loss. Drainage is extensive at the site and has caused significant drying out. Past peat-cutting and some active peat-cutting have also speeded up water loss. However, although the high bog has suffered some water loss, it is still in restorable condition.

Ferbane Bog is a good example of a raised bog of a particular topographical type and is of considerable conservation significance. Raised bogs are becoming increasingly rare in Ireland and Europe and are listed as a priority habitat on Annex I of the EU Habitats Directive.

4.2.1997

SITE SYNOPSIS

SITE NAME: LOUGH ENNELL

SITE CODE: 000685

Lough Ennell is a large, open, steep-sided lake, located 3km south of Mullingar, Co. Westmeath. The lake bottom is of limestone with a marl deposit. The water is markedly alkaline and mesotrophic, possibly owing to effluents received from Mullingar town and to fertilizer inputs from farmland surrounding the lake. The River Brosna flows into the lake from the north, at Butler's Bridge, and out from the south.

Lough Ennell supports a diverse aquatic flora; seven Stonewort species have been identified including two Red Data Book species, *Chara denudata* and *C. tomentosa*. Scharff's Char (*Salvinus scharffi*), a distinct race of char which was once found only in Lough Owel and Lough Ennell, is now thought to be extinct. Notable aquatic invertebrates recorded from the lake include *Tinodes maculicornis*, *Metalype fragilis*, *Limnephilus nigriceps* (Trichoptera); *Picromerus bidens*, *Monarthia humili* (Hemiptera) and *Donacia obscura* (Coleoptera).

Much of the lakeshore is rather dry, stony ground, which was formerly part of the lake bed but is now exposed by drainage, and colonised by calcareous grassland. Species such as Mountain Everlasting (*Antennaria dioica*), Hairy Lady's-mantle (*Alchemilla filicaulis* subsp. *vestita*), Frog Orchid (*Coeloglossum viride*), Fairy Flax (*Linum catharticum*) and Yellow-wort (*Blackstonia perfoliata*) occur here. Alkaline fen, a habitat listed on Annex I of the EU Habitats Directive, is also found on the lake shore with species such as Grass-of-parnassus (*Parnassia palustris*), Marsh Pennywort (*Hydrocotyle vulgaris*) and Bottle Sedge (*Carex rostrata*). In wet marshy patches along the shore Marsh-marigold (*Caltha palustris*), Brookweed (*Samolus valerandi*) and Lesser Water-plantain (*Baldellia ranunculoides*) are common.

Reedbeds and species-poor swamp vegetation occasionally fringe the lake, particularly around the points of inflow and outflow and on the eastern shore, around Tudenham Park. Common Reed (*Phragmites australis*) is abundant here. Water-plantain (*Alisma plantago-aquatica*), Cowbane (*Cicuta virosa*), Frogbit (*Hydrocharis morsus-ranae*) and Tufted Sedge (*Carex elata*) also occur. The latter two species are of note in that they are of occasional in the eastern midlands but are rarely recorded elsewhere. The rare Fibrous Tussock-sedge (*Carex appropinquata*) has been recorded here also. This species has a disjunct distribution, being recorded only from Co. Clare and from two midland counties (Westmeath and Offaly).

Mixed woodland of Beech (*Fagus sylvatica*), Ash (*Fraxinus excelsior*) and Downy Birch (*Betula pubescens*) fringes the lakeshore to the northwest. Bluebell (*Hyacinthoides non-scripta*) and Lords-and-ladies (*Arum maculatum*) are among the woodland ground flora.

A species of blue-green alga (*Schizothrix fasciculata*), which forms little pebbles of lime that are cast up on the lakeshore, occurs in Lough Ennell and has not been recorded from anywhere else in Ireland.

Yellow Archangel (*Lamiastrum galeobdolon*), a rare plant listed in the Red Data Book, has been recorded in the woods along the eastern shores of Lough Ennell. This is the only record for this species outside the south-east of Ireland. The rare Myxomycete fungus, *Licea castanea*, has been recorded from woodland in the site.

This site shares an internationally important Greenland White-fronted Goose flock with Loughs Iron, Glen and Owel. The numbers of Geese which visit Lough Ennell are lower than for the other lakes: 91 birds (3 year average peak). Nationally important bird populations which have been recorded on Lough Ennell are: Cormorant (average peak 149; absolute maximum 448); Mute Swan (average peak 424); Pochard (average peak 889; maximum 2,600 on 8/11/85); Tufted Duck (average peak 720) and Coot (average peak 639). All of these data were compiled from counts made over 3 seasons, 1984/85 - 1986/87. A single count of 522 Golden Plover was obtained in that period, i.e. a regionally important population.

Lough Ennell is an important amenity area, much used for fishing, boating and camping. Sections of the shoreline are managed for visitor access and amenity. The chemical composition of effluent from the Mullingar sewage treatment plant has a significant impact on the water quality of Lough Ennell. The mid-1970s saw the introduction of treatment of the sewage to reduce phosphates, with a resulting improvement in water quality (according to data compiled during 1987-90). However, levels of planktonic algal growth in the lake water continue to fluctuate, in response to the variable efficiency of the phosphate removal facility at the sewage treatment plant and the re-mobilization of phosphate from the lake sediments.

Lough Ennell is of significance as a highly productive lake which supports a rich variety of lower plant and invertebrate species. Its lakeshore habitats, which include alkaline fen, a habitat listed on Annex I of the EU Habitats Directive, support a diverse flora. These habitats also provide important refuges for wildfowl.

SITE SYNOPSIS

SITE NAME: MONGAN BOG

SITE CODE: 000580

Mongan Bog is a midland raised bog of medium size situated immediately east of the monastic site of Clonmacnoise, Co. Offaly, and 12 km south of Athlone. It is situated in a basin, surrounded on 95% of its perimeter by high ground on mineral soil. At two points in the north it shares a common boundary with the Pilgrim's Road Esker. Most of the bog is a Statutory Nature Reserve, established in 1987. The bog has been the subject of on-going intensive research since 1972.

The bog has a very well-developed microtopography of hummocks, pools and lawns. A variety of vascular plants, bog mosses (*Sphagnum* spp.) and other bryophytes are found. An unusually large number of hummocks, sometimes 1m high, largely composed of the moss *Leucobryum glaucum* are widespread on the bog. Pools found on the site contain Lesser Bladderwort (*Utricularia minor*), Great Sundew (*Drosera anglica*), the liverwort *Cladopodiella fluitans* and the bog mosses *Sphagnum cuspidatum* and *S. auriculatum*. The scarce Brown Beak-sedge (*Rhynchospora fusca*) is found on the site. The presence of the moss *Pleurozium scheberi* and Carnation Sedge (*Carex panicea*) indicate an oceanic influence. The bog supports a rich lichen flora, including *Cladonia portentosa*, *C. arbuscula*, *C. tenuis*, *C. floerkeana* and *C. glauca*, due, in part, to the absence of burning over much of it. Many of the lichens occur on old Heather (*Calluna vulgaris*).

A small strip of cut-away bog, part of which is colonised by Willow (*Salix* spp.) and Birch (*Betula* spp.) scrub on both the north and the south side of the bog add diversity to the site.

Several rare invertebrate species occur on the bog, including *Chrysops sepulchralis*, *Dixella serotina*, *Coenonympha tullia*, *Tachina grossa* and *Saturnia pavonia*. One species of spider, *Gongylidiellum latebricola*, and two species of moth, *Biselachista serricornis* and *Aristotelia ericinella*, were first recorded from Ireland from the bog. The invertebrate fauna of the pools have been shown to be highly productive.

A study of the birds of Mongan Bog has shown that Mallard, Snipe, Curlew, Skylark and Meadow Pipit breed on the peat dome. In winter, the bog is occasionally used as a refuge by Greenland White-fronted Geese (up to 40 individuals). The cutaway area of bog provides habitat for a range of bird species, including birds of prey, thrushes, warblers and finches.

Mongan Bog is a mostly intact and unusually wet raised bog with classic hummock and pool formations over a large proportion of the surface, largely due to its unusual surrounding topography. It has several features of special zoological interest. In addition its lowest strata are among the oldest in Ireland. Scenically it is part of an area rich in intact natural features (callows, eskers, limestone pavement) which

enhances its importance even more. Raised bogs which are actively growing are a rare habitat in Europe and are listed on Annex I of the EU Habitats Directive as a priority habitat. The ongoing intensive research on all aspects of bog ecology reinforces its international importance.

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10.1.1997

SITE SYNOPSIS

SITE NAME: LOUGH REE SPA

SITE CODE: 004064

Situated on the River Shannon between Lanesborough and Athlone, Lough Ree is the third largest lake in the Republic of Ireland. It lies in an ice-deepened depression in Carboniferous Limestone. Some of its features (including the islands) are based on glacial drift. The main inflowing rivers are the Shannon, Inny and Hind, and the main outflowing river is the Shannon. The greater part of Lough Ree is less than 10 m in depth, but there are six deep troughs running from north to south, reaching a maximum depth of about 36 m just west of Inchmore. The lake has a very long, indented shoreline and hence has many sheltered bays. It also has a good scattering of islands, most of which are included in the site. The lake is classified as a mesotrophic system, but the size of the system means that a range of conditions prevail depending on, for example, rock type. This gives rise to local variations in nutrient status and pH, which in turn result in variations in the phytoplankton and macrophyte flora. In the most recent assessment of water quality a reduced planktonic growth was noted, which may be due to the spread of the Zebra Mussel (*Dreissena polymorpha*), which feeds on phytoplankton.

The waters of Lough Ree tend to be strongly peat-stained, restricting macrophytes to depths of less than 2 m. The aquatic flora includes such species as Intermediate Bladderwort (*Utricularia intermedia*), pondweeds (*Potamogeton* spp.), Quillwort (*Isoetes lacustris*), stoneworts (*Chara* spp., including *C. pedunculata*) and Arrowhead (*Sagittaria sagittifolia*). Beds of Common Reed (*Phragmites australis*) are an extensive habitat in a number of the more sheltered places around the lake; monodominant stands of Common Club-rush (*Scirpus lacustris*), Slender Sedge (*Carex lasiocarpa*) and Saw Sedge (*Cladium mariscus*) also occur as swamps in suitable places. Some of these grade into species-rich calcareous fen or freshwater marsh. Lowland wet grassland, some of which floods in winter, occurs frequently around the shore. Dry, broad-leaved, semi-natural woodland occurs in several places around the lake, and on some of the islands within the site, notably on Hare Island. Pockets of wet woodland also occur around the lake, most of which are dominated by willows (*Salix* spp.), Alder (*Alnus glutinosa*) and Downy Birch (*Betula pubescens*).

Lough Ree is one of the most important Midland sites for wintering waterfowl, with nationally important populations of Wigeon (1,475), Teal (912), Pintail (35), Tufted Duck (661), Goldeneye (137), Golden Plover (2,035) and Lapwing (3,870) occurring – all figures are average peaks for the 5 seasons 1995/96-1999/00. Regionally important numbers of Whooper Swan (89) and Greenland White-fronted Goose (92) are found feeding in the vicinity of the lake, as are Golden Plover, Lapwing and, to some extent, Wigeon and Teal. Other species which occur in winter include Cormorant (64), Mallard (675), Coot (250), Shoveler (40), Curlew (167) and Great Crested Grebe (23), as well as the resident Little Grebe (34) and Mute Swan (93).

The site supports a nationally important population of Common Tern (90 pairs in 1990). It is a traditional breeding site for Black-headed Gull and whilst a full survey has not been carried out in recent years, substantial numbers of nesting birds were present on at least one island in 2003. Lesser Black-backed Gull and Common Gull have bred in the past and may still breed. Lough Ree is an important site for breeding duck and grebes, with Tufted Duck (265 individuals in late May 1995) and Great Crested Grebe (89 individuals in late May 1995) having populations of national importance. Of particular note is that Lough Ree is one of the two main sites in the country for breeding Common Scoter, a Red Data Book species. The most recent full census of the site for the species (in 1999) gave a population of *c.* 32 pairs. The woodland around the lake is a stronghold for Garden Warbler and this scarce species probably occurs on some of the islands within the site.

Otter, a species listed on Annex II of the E.U. Habitats Directive occurs frequently within the site. The endangered, Red Data Book fish species, Pollan (*Coregonus autumnalis pollan*) is recorded from Lough Ree, one of only four sites (L. Neagh, L. Erne, L. Ree and L. Derg) in which it occurs. The shrimp, *Mysis relicta*, occurs in the lake and is a relic of the glacial period in Ireland.

Whilst recently classified as a mesotrophic system, Lough Ree had been moderately eutrophic in the mid-1990s. It is vulnerable to artificial enrichment of the waters by agricultural and domestic waste. The recent reduction in phytoplanktonic growth has coincided with the invasion of the Shannon system by the Zebra Mussel; however, in the long-term this invasive bivalve may threaten the ecology of the lake. Recreational activities, especially boating, presently cause some disturbance to the birds and an increase in such activities would be of concern. Developments above the lakeshore could affect feeding grounds of some of the wintering waterfowl and nesting habitat for duck species.

Lough Ree is of high ornithological importance for both wintering and breeding birds. It supports nationally important populations of seven wintering waterfowl species, as well as other important species including Whooper Swan and Greenland White-fronted Goose (both of which are listed on Annex I of E.U. Birds Directive). The site has a range of breeding waterfowl, notably nationally important populations of Common Scoter, Great Crested Grebe and Tufted Duck. It also has a colony of Common Tern, another species listed on Annex I of the E.U. Birds Directive.

18.4.2005

SITE SYNOPSIS

SITE NAME: MIDDLE SHANNON CALLOWS SPA

SITE CODE: 004096

The Middle Shannon Callows SPA is a long and diverse site which extends for approximately 50 km from the town of Athlone (at southern point of Lough Ree) to the town of Portumna (northern point of Lough Derg). The site averages about 0.75 km in width though in places is up to 1.5 km wide. Water levels on the site are greatly influenced by the very small fall between Athlone and Portumna and by the weir at Meelick. The Shannon Callows has a common boundary with two other sites of similar habitats, the River Suck Callows and the Little Brosna Callows, both of which are also Special Protection Areas.

The site has extensive areas of callow, or seasonally flooded, semi-natural, lowland wet grassland, along both sides of the river. The callows are mainly too soft for intensive farming but are used for hay or silage or for summer grazing. Other habitats of smaller area which occur alongside the river include lowland dry grassland, freshwater marshes, reedbeds and wet woodland. Along most of its length the site is bordered by raised bogs, now mostly exploited for peat, esker ridges and limestone-bedrock hills. The diversity of semi-natural habitats and the sheer size of the site attracts an excellent diversity of bird species and significant populations of several species.

The composition of the lowland wet grassland varies, depending on elevation and flooding patterns. Two habitats listed on Annex I of the EU Habitats Directive are well represented within the site – *Molinia* meadows and lowland hay meadows. The former is characterised by the presence of the Meadow Thistle (*Cirsium dissectum*) and Purple Moor-grass (*Molinia caerulea*), while typical species in the latter include Meadow Fescue (*Festuca pratensis*), Rough Meadow-grass (*Poa trivialis*), Downy Oat-grass (*Avenula pubescens*) and Common Sorrel (*Rumex acetosa*). In places these two habitats grade into one another.

Low-lying areas of the callows with more prolonged flooding are characterised by Floating Sweet-grass (*Glyceria fluitans*), Marsh Foxtail (*Alopecurus geniculatus*) and wetland herbs such as Yellow Cress (*Rorippa* spp.), Water Forget-me-not (*Myosotis scorpioides*) and Common Spike-rush (*Eleocharis palustris*). Most of the callows, however, consist of a plant community characterised by Creeping Bent (*Agrostis stolonifera*), Brown Sedge (*Carex disticha*), Common Sedge (*Carex nigra*), and herbs such as Marsh Marigold (*Caltha palustris*) and Marsh Bedstraw (*Galium palustre*). Scarce plant species associated with the grassland include Meadow-rue (*Thalictrum flavum*), Summer Snowflake (*Leucojum aestivum*) and Marsh Stitchwort (*Stellaria palustris*).

The dry grassland areas, especially where they exist within hay meadows, are species-rich, and can contain many orchid species and such species as Cowslip (*Primula*

veris), Adder's-tongue Fern (*Ophioglossum vulgatum*) and Spring-sedge (*Carex caryophyllea*), as well as an unusually wide variety of grasses. In places along the edge of the callows there occurs wet broad-leaved woodland dominated by both Birch (*Betula pubescens*) and Alder (*Alnus glutinosa*) and dry broad-leaved woodland dominated by Hazel (*Corylus avellana*). There are also areas of raised bog and fen on old cut-away bog with species such as Black Bog-rush (*Schoenus nigricans*).

Two legally-protected plant species (Flora (Protection) Order 1999) occur in the site: Opposite-leaved Pondweed (*Groenlandia densa*) in drainage ditches, and Meadow Barley (*Hordeum secalinum*) on dry alluvial grassland. The Red Data Book plant Green-winged Orchid (*Orchis morio*) is known from dry calcareous grasslands within the site, while the site also supports a healthy population of Marsh Pea (*Lathyrus palustris*).

The Middle Shannon Callows qualifies as a site of International Importance for wintering waterfowl both on the total numbers regularly exceeding 20,000 birds (for example 27,581 in winter 1998/99) and for the Whooper Swan population (287 – average peak count 1995/96-1999/00). Whooper Swan is listed on Annex I of the EU Birds Directive. Five further species occur in numbers of national importance (all figures are average peaks for winters 1995/96-1999/00) - Mute Swan 349, Wigeon 2,972, Golden Plover (listed on Annex I of the EU Birds Directive) 4,254, Lapwing 11,578 and Black-tailed Godwit 388. For some of these species, peak counts in the period have been considerably higher than the averages, such as 1,096 Black-tailed Godwits and 23,839 Lapwings. The importance of the site for species like Black-tailed Godwit and Whimbrel may have been underestimated if count coverage missed the brief spring peaks for these species. A wide range of other species occur in numbers of regional or local importance, including Bewick's Swan (listed on Annex I of the EU Birds Directive) 7, Teal 70, Tufted Duck 33, Dunlin 369, Curlew 129, Redshank 31 and Black-headed Gull 1,061. Small numbers of Greenland White-fronted Goose (listed on Annex I of the EU Birds Directive) use the Shannon Callows (average 21, peak 55) and these are generally associated with larger flocks which occur on the adjacent Little Brosna Callows and River Suck Callows. The callow grasslands provide optimum feeding grounds for these various species of waterfowl, while many of the birds also roost or rest within the site.

The site is also of national importance for breeding waterfowl. The total population of breeding waders (Lapwing, Redshank, Snipe and Curlew) on the Shannon and Little Brosna Callows in 1987 was one of three major concentrations in Ireland and Britain. Since then, however, numbers of at least Lapwing and Redshank have shown serious declines (a full survey of the callows is being carried out in 2002). For example, at a monitoring site at the callows at Shannon Harbour, numbers of Lapwing fell from 29 to 10 pairs and Redshank from 26 to 10 pairs between 1987 and 1994. Black-tailed Godwit, a very rare breeding species in Ireland, nests or attempts to nest in small numbers each year within the site. A further scarce breeding species, Shoveler, also nests in small numbers each year (an estimated 12 pairs in 1987).

The Shannon Callows continues to hold approximately 40% of the Irish population of Corncrake, a species of global conservation concern that is also listed on Annex I of the EU Birds Directive. Between 1997 and 2001, the average number of calling birds

was 60, with a peak of 69. BirdWatch Ireland, in association with Dúchas and the RSPB, operate a grant scheme to encourage farming practices that favour the Corncrake and this has probably been responsible for the stabilisation of numbers in recent years. A related scarce species, the Quail, is also known to breed within the callow grasslands.

A good variety of other bird species are attracted to this site. Birds of prey, including scarce species such as Merlin (listed on Annex I of the EU Birds Directive) and wintering Hen Harrier (listed on Annex I of the EU Birds Directive), are regularly reported hunting over the callows. A range of passerine species associated with grassland and swamp vegetation breed, including Sedge Warbler, Grasshopper Warbler, Skylark and Reed Bunting. Kingfisher (listed on Annex I of the EU Birds Directive) is also regularly seen within the site. Whinchat, an uncommon breeding species, occur in small numbers.

The wintering waterfowl within the Shannon Callows are difficult to monitor due to the size and inaccessibility of large parts of the site. In each winter there is usually one complete aerial census, as well as partial land-based counts. The population of Corncrake within the site is monitored each year and research is carried out on various aspects of the species' ecology. The breeding waders are also surveyed at intervals. About 30 ha of the callows is a nature reserve owned by voluntary conservation bodies.

The Shannon Callows has by far the largest area of lowland semi-natural grassland and associated aquatic habitats in Ireland and one in which there is least disturbance of natural wetland processes. Botanically it is extremely diverse. In winter the site is internationally important for the total numbers of birds (regularly exceed 20,000) and for Whooper Swan in particular. It also holds nationally important populations of a further five species. Some of the wintering species are listed on Annex I of the EU Birds Directive, including Whooper Swan, Greenland White-fronted Goose and Golden Plover. In summer the site supports important populations of breeding waders. Perhaps the most important species which occurs in the site is Corncrake (the site holds 40% of the national total), as this is listed on Annex I of the EU Birds Directive and is Ireland's only globally endangered species.

20.6.2002

SITE SYNOPSIS

SITE NAME: LOUGH ENNELL SPA

SITE CODE: 004044

Lough Ennell is a large, limestone lake. It has a length of approximately 6.5 km along its long axis and is mostly *c.* 2 km wide. The River Brosna is the principal inflowing and outflowing river. It is a relatively shallow lake, with a maximum depth of *c.* 30 m. The water is hard, with low colour and markedly alkaline pH. The lake is classified as a mesotrophic system though it has been eutrophic in the past. The lake bottom is of limestone with a marl deposit.

Lough Ennell supports a diverse aquatic flora, with a particularly well-developed charophyte flora, including two Red Data Book species, *Chara denudata* and *C. tomentosa*. Reedbeds and species-poor swamp vegetation fringe part of the lake, particularly around the points of inflow and outflow and on the eastern shore, around Tudenham Park, where Common Reed (*Phragmites australis*) is abundant. Waterplantain (*Alisma plantago-aquatica*), Cowbane (*Cicuta virosa*), Frogbit (*Hydrocharis morsus-ranae*) and Tufted Sedge (*Carex elata*) also occur. Much of the lakeshore is rather dry, stony ground, which was formerly part of the lake bed but is now exposed by drainage, and colonised by calcareous grassland. Alkaline fen also occurs on the lake shore. There are several islands within the lake. Lough Ennell is an important Trout fishery.

Lough Ennell is one of the most important Midland lakes for wintering waterfowl, with nationally important populations of Mute Swan (340), Pochard (738), Tufted Duck (1,303) and Coot (433) all figures are average peaks for the 5 seasons 1995/96-1999/00. The population of Tufted Duck represents over 3% of the national total. At times, the lake is utilised as a roost (with limited feeding) by the internationally important Midland lakes population of Greenland White-fronted Goose (*c.* 400 strong). The site also attracts Golden Plover (200) and Lapwing (673) though these feed mainly outside of the site, as well as Little Grebe (30), Mallard (93), Great Crested Grebe (24) and Goldeneye (22).

Lough Ennell is very vulnerable to pollution from agricultural and domestic sources though water quality has been satisfactory in recent years. A deterioration in water quality could affect bird populations (as shown by marked fluctuations in some populations in the past). It is an important amenity area, much used for fishing, boating and camping. Parts of the shoreline are managed for visitor access and amenity. Increases in such recreational activities could cause disturbance to the birds.

Lough Ennell is of ornithological significance for wintering waterfowl, with four species having populations of national importance. The occurrence of a further two species in the vicinity of the lake, Greenland White-fronted Goose and Golden Plover, is of particular note as these are listed on Annex I of the E.U. Birds Directive.

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13.8.2004

APPENDIX 2

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Conservation Objectives for Carn Park Bog SAC [002336]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area 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.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

- ◆ [7110] * Active raised bogs
- ◆ [7120] Degraded raised bogs still capable of natural regeneration

Citation:

NPWS (2011) Conservation objectives for Carn Park Bog SAC [002336]. Generic Version 3.0. Department of Arts, Heritage & the Gaeltacht.

For more information please go to: www.npws.ie/protectedsites/conservationmanagementplanning



Conservation Objectives for Crosswood Bog SAC [002337]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area 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.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

- ◆ [7110] * Active raised bogs
- ◆ [7120] Degraded raised bogs still capable of natural regeneration

Citation:

NPWS (2011) Conservation objectives for Crosswood Bog SAC [002337]. Generic Version 3.0. Department of Arts, Heritage & the Gaeltacht.

For more information please go to: www.npws.ie/protectedsites/conservationmanagementplanning



Conservation Objectives for Lough Ree SAC [000440]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area 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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

- ◆ [1355] *Lutra lutra*
- ◆ [3150] Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation
- ◆ [6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*)(* important orchid sites)
- ◆ [7120] Degraded raised bogs still capable of natural regeneration
- ◆ [7230] Alkaline fens
- ◆ [8240] * Limestone pavements
- ◆ [91A0] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles
- ◆ [91D0] * Bog woodland

Citation:

NPWS (2011) Conservation objectives for Lough Ree SAC [000440]. Generic Version 3.0. Department of Arts, Heritage & the Gaeltacht.

For more information please go to: www.npws.ie/protectedsites/conservationmanagementplanning



Conservation Objectives for River Shannon Callows SAC [000216]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area 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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

- ◆ [1355] *Lutra lutra*
- ◆ [6410] *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)
- ◆ [6510] Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*)
- ◆ [8240] * Limestone pavements
- ◆ [91E0] * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)

Citation:

NPWS (2011) Conservation objectives for River Shannon Callows SAC [000216]. Generic Version 3.0. Department of Arts, Heritage & the Gaeltacht.

For more information please go to: www.npws.ie/protectedsites/conservationmanagementplanning



Conservation Objectives for Split Hills and Long Hill Esker SAC [001831]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area 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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

- ◆ [6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*)(* important orchid sites)

Citation:

NPWS (2011) Conservation objectives for Split Hills and Long Hill Esker SAC [001831]. Generic Version 3.0.
Department of Arts, Heritage & the Gaeltacht.

For more information please go to: www.npws.ie/protectedsites/conservationmanagementplanning



Conservation Objectives for Clara Bog SAC [000572]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area 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.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

- ◆ [1065] *Euphydryas (Eurodryas, Hypodryas) aurinia*
- ◆ [6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*)(* important orchid sites)
- ◆ [7110] * Active raised bogs
- ◆ [7120] Degraded raised bogs still capable of natural regeneration
- ◆ [7150] Depressions on peat substrates of the *Rhynchosporion*
- ◆ [91D0] * Bog woodland

Citation:

NPWS (2011) Conservation objectives for Clara Bog SAC [000572]. Generic Version 3.0. Department of Arts, Heritage & the Gaeltacht.

For more information please go to: www.npws.ie/protectedsites/conservationmanagementplanning

Conservation Objectives for Moyclare Bog SAC [000581]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area 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.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

- ◆ [7110] * Active raised bogs
- ◆ [7120] Degraded raised bogs still capable of natural regeneration
- ◆ [7150] Depressions on peat substrates of the *Rhynchosporion*

Citation:

NPWS (2011) Conservation objectives for Moyclare Bog SAC [000581]. Generic Version 3.0. Department of Arts, Heritage & the Gaeltacht.

For more information please go to: www.npws.ie/protectedsites/conservationmanagementplanning



Conservation Objectives for Ferbane Bog SAC [000575]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area 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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

- ◆ [7110] * Active raised bogs
- ◆ [7120] Degraded raised bogs still capable of natural regeneration
- ◆ [7150] Depressions on peat substrates of the *Rhynchosporion*

Citation:

NPWS (2011) Conservation objectives for Ferbane Bog SAC [000575]. Generic Version 3.0. Department of Arts, Heritage & the Gaeltacht.

For more information please go to: www.npws.ie/protectedsites/conservationmanagementplanning



Conservation Objectives for Lough Ennell SAC [000685]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area 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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

- ◆ [7230] Alkaline fens

Citation:

NPWS (2011) Conservation objectives for Lough Ennell SAC [000685]. Generic Version 3.0. Department of Arts, Heritage & the Gaeltacht.

For more information please go to: www.npws.ie/protectedsites/conservationmanagementplanning



Conservation Objectives for Mongan Bog SAC [000580]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area 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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

- ◆ [7110] * Active raised bogs
- ◆ [7120] Degraded raised bogs still capable of natural regeneration
- ◆ [7150] Depressions on peat substrates of the *Rhynchosporion*

Citation:

NPWS (2011) Conservation objectives for Mongan Bog SAC [000580]. Generic Version 3.0. Department of Arts, Heritage & the Gaeltacht.

For more information please go to: www.npws.ie/protectedsites/conservationmanagementplanning



Conservation Objectives for Lough Ree SPA [004064]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area 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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

◆ <i>Tachybaptus ruficollis</i>	[wintering]
◆ <i>Cygnus cygnus</i>	[wintering]
◆ <i>Anas penelope</i>	[wintering]
◆ <i>Anas crecca</i>	[wintering]
◆ <i>Anas platyrhynchos</i>	[wintering]
◆ <i>Anas clypeata</i>	[wintering]
◆ <i>Aythya fuligula</i>	[wintering]
◆ <i>Melanitta nigra</i>	[breeding]
◆ <i>Bucephala clangula</i>	[wintering]
◆ <i>Fulica atra</i>	[wintering]
◆ <i>Pluvialis apricaria</i>	[wintering]
◆ <i>Vanellus vanellus</i>	[wintering]
◆ <i>Sterna hirundo</i>	[breeding]
◆ Wetlands	[]

Citation:

NPWS (2011) Conservation objectives for Lough Ree SPA [004064]. Generic Version 4.0. Department of Arts, Heritage & the Gaeltacht.

For more information please go to: www.npws.ie/protectedsites/conservationmanagementplanning



Conservation Objectives for Middle Shannon Callows SPA [004096]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area 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.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

◆ <i>Cygnus cygnus</i>	[wintering]
◆ <i>Anas penelope</i>	[wintering]
◆ <i>Crex crex</i>	[breeding]
◆ <i>Pluvialis apricaria</i>	[wintering]
◆ <i>Vanellus vanellus</i>	[wintering]
◆ <i>Limosa limosa</i>	[wintering]
◆ <i>Chroicocephalus ridibundus</i>	[wintering]
◆ Wetlands	[]

Citation:

NPWS (2011) Conservation objectives for Middle Shannon Callows SPA [004096]. Generic Version 4.0.
Department of Arts, Heritage & the Gaeltacht.

For more information please go to: www.npws.ie/protectedsites/conservationmanagementplanning



Conservation Objectives for Lough Ennell SPA [004044]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area 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.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

- | | |
|--------------------------|-------------|
| ◆ <i>Aythya ferina</i> | [wintering] |
| ◆ <i>Aythya fuligula</i> | [wintering] |
| ◆ <i>Fulica atra</i> | [wintering] |
| ◆ Wetlands | [] |

Citation:

NPWS (2011) Conservation objectives for Lough Ennell SPA [004044]. Generic Version 4.0. Department of Arts, Heritage & the Gaeltacht.

For more information please go to: www.npws.ie/protectedsites/conservationmanagementplanning