



Moyvannan Electricity Substation

Environmental Impact Assessment Report

Annex 5.6: Site Synopses

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Site Name: Ballynamona Bog and Corkip Lough SAC

Site Code: 002339

Ballynamona Bog and Corkip Lough is situated approximately 9 km west of Athlone, mainly in the townlands of Skeanamuck, Carrowkeeran and Pollalaher, in Co. Roscommon. The site comprises a relatively small portion of what was once a large bog complex, and includes areas of high bog and cutover bog, and also the turlough, Corkip Lough.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[3180] Turloughs*
[7110] Raised Bog (Active)*
[7120] Degraded Raised Bog
[7150] Rhynchosporion Vegetation
[91D0] Bog Woodland*

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 Rhynchosporion habitat occurs in wet depressions, pool edges and erosion channels where the vegetation includes White Beak-sedge (*Rhynchospora alba*) and/or Brown Beak-sedge (*R. fusca*), and at least some of the following associated species, Bog Asphodel (*Narthecium ossifragum*), sundews (*Drosera* spp.), Deergrass (*Scirpus cespitosus*) and Carnation Sedge (*Carex panicea*).

The high bog consists of a single dome, with a large area of bog woodland and flush in the centre. It is surrounded on three sides by esker ridges and limestone bedrock. These ridges are host to areas of species-rich grassland. Cutover bog occurs all around the margins of the high bog, some sections of which flood at times, and there is an area of commercial forestry at the eastern margin. The lake retains a small area of open water in the summer. It is surrounded by lowland wet grassland which is flooded in the winter.

This site contains an example of a Midland Raised Bog, with species such as Heather (*Calluna vulgaris*), Bog Asphodel, Common and Hare's-tail Cottongrasses (*Eriophorum*

angustifolium and *E. vaginatum*), Carnation Sedge and Cranberry (*Vaccinium oxycoccos*). Also occurring are the bog mosses *Sphagnum cuspidatum*, *S. magellanicum* and *S. papillosum*, amongst others. There are areas on the high bog with apparently old pools which are now infilled with Bog Asphodel, and algal pools are also found. The hummock and hollow topography typical of raised bogs is absent from this site. There are a number of stands of Bog-myrtle (*Myrica gale*) scattered over the bog. The central flush on the high bog contains an area of bog woodland, with Downy Birch (*Betula pubescens*) of various age classes. Cranberry is abundant here and the vegetation is lush in places, with many bog moss species occurring. Scarce species found here include Brown Beak-sedge and Bog-sedge (*Carex limosa*). The lichens on the bark and branches are of exceptional abundance and diversity. The treeless flush which surrounds the wooded area has an abundance of bog mosses, Heather and cottongrasses. Mosses other than *Sphagnum* found in the flushes include *Aulacomnium palustre*, *Hypnum jutlandicum* and *Breutelia chrysocoma*. An unusual feature of the flush is the occurrence of small specimens of Royal Fern (*Osmunda regalis*) scattered uniformly over the area.

The cutover areas associated with the high bog are mostly dominated by Heather, Purple Moor-grass (*Molinia caerulea*), Soft Rush (*Juncus effusus*), and Gorse (*Ulex europaeus*) and Downy Birch scrub. An area of cutover bog at the north of the site is frequently flooded and is dominated by Purple Moor-grass and Black Bog-rush (*Schoenus nigricans*). A very small, but extremely species-rich, damp calcareous stony community is found at the north of the site where a gravel ridge disappears under the cutover bog. Here, Black Bog-rush, Mountain Everlasting (*Antennaria dioica*), Lesser Clubmoss (*Selaginella selaginoides*) and many other species are found, including a diverse lichen flora. Other, more calcareous and drier grassland areas support species such as Carlina Thistle (*Carlina vulgaris*), Wild Thyme (*Thymus praecox*) and Mouse-ear Hawkweed (*Hieracium pilosella*).

Corkip Lough, a turlough, is fringed by Common Reed (*Phragmites australis*) and sedges (*Carex* spp.), along with many wetland herbs. Other species found here include Common Club-rush (*Scirpus lacustris*), Greater Spearwort (*Ranunculus lingua*), Water Plantain (*Alisma plantago-aquatica*) and Mare's-tail (*Hippuris vulgaris*). The surrounding grassland hosts a number of species of interest, including Few-flowered Spike-rush (*Eleocharis quinqueflora*), Grass-of-parnassus (*Parnassia palustris*) and Water Germander (*Teucrium scordium*). The latter species is of particular interest as it is otherwise known only from the banks of the River Shannon and in some turloughs in Counties Clare and Tipperary.

Apart from its unusual flora, Corkip Lough is also important for local birdlife. There are large nesting colonies of Lapwing and Redshank, and occasional Snipe. The wetter areas are popular feeding grounds for many species of waders. In the winter, large numbers of Plover, Curlew and Lapwing are found here. It is also frequented by smaller songbirds such as Reed Bunting and Sedge Warblers. Red Grouse, a species which is becoming increasingly rare in Ireland, has been recorded from Ballynamona Bog.

The rare aquatic invertebrate *Eurycercus glacialis* (Order Cladocera) is found at Corkip Lough, one of the few sites in Ireland where it occurs.

Current land use on the site consists of limited peat-cutting at the north-east and south-west of the site. There is a small area of commercial forestry at the east of the site. Some areas of cutover bog at the south have been reclaimed for agriculture. Damaging activities associated with these land uses include frequent burning. This recurrent burning is having a serious drying effect on the bog. Drainage, for the most part, is restricted to the cutover areas of the bog. These are all 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.

Ballynamona Bog and Corkip Lough is a site of considerable conservation significance as it consists of a raised bog, a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland. Ireland has a high proportion of the total E.U. resource of raised bog (over 60%) and so has a special responsibility for its conservation at an international level. Active raised bog, bog woodland and turlough are listed as priority habitats on Annex I of the E.U. Habitats Directive. Priority status is given to habitats and species that are threatened throughout the E.U. Areas of species-rich calcareous grassland add to the diversity of the site.

Site Name: Carn Park Bog SAC

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 Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[7110] Raised Bog (Active)* [7120] Degraded Raised Bog

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.

This 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, and thus the main body of the bog lies south of the ridge. The surface of the southern section is very wet with undulating hummock/hollow micro-topography. 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 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 micro-topography. 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 (*E. angustifolium*). Bog mosses cover much of the surface, forming hummocks of *S. papillosum* and the rarer *S. imbricatum* and *S. fuscum*.

Heather, Hare's-tail Cottongrass (*E. 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 land use 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 land uses 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 as it comprises 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.

Site Name: Castlesampson Esker SAC

Site Code: 001625

Castlesampson Esker is a complex site with esker, turlough and raised bog all found. The esker is the most westerly of an important group of eskers centred on Adrnacloon Hill in south-east Co. Roscommon, 9 km west of Athlone. It forms a steep-sided, crescent-shaped hill composed of glacial gravels, situated on the south side of a metalled road. Although gravel is being quarried all around the esker and gravel pits occur within the site, the esker ridge itself is largely intact and fairly undisturbed. Lying to the east of the esker is a raised bog, whilst to its west is a turlough.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[3180] Turloughs* [6210] Orchid-rich Calcareous Grassland*

The vegetation of most of the esker consists of dry grassland, with small amounts of scrub scattered throughout. Some improved grassland is found at the base of the esker. The dry grassland on the site is quite species-rich and the following are commonly found: Mountain Everlasting (*Antennaria dioica*), Wild Thyme (*Thymus praecox*), Common Bird's-foot-trefoil (*Lotus corniculatus*), Carlina Thistle (*Carlina vulgaris*), St. John's-wort species (*Hypericum pulchrum* and *H. perforatum*), Fairy Flax (*Linum catharticum*), Kidney Vetch (*Anthyllis vulneraria*), Crested Hair-grass (*Koeleria cristata*), Glaucous Sedge (*Carex flacca*), Sheep's-fescue (*Festuca ovina*), Hairy Oat-grass (*Avenula pubescens*) and Spring Sedge (*Carex caryophyllea*). The esker grassland supports several species not often seen on eskers, e.g. Goldenrod (*Solidago virgaurea*) and Sea Plantain (*Plantago maritima*), as well as some regional rarities, e.g. Hedge Bedstraw (*Galium mollugo*). The grassland is also notable for the variety of orchids it supports, e.g. Early-purple Orchid (*Orchis mascula*), Pyramidal Orchid (*Anacamptis pyramidalis*), Common Spotted-orchid (*Dactylorhiza fuchsii*) and Fragrant Orchid (*Gymnadenia conopsea*).

Three gravel pits are included within the site. One of these contains a number of fen species, including Black Bog-rush (*Schoenus nigricans*) and Grass-of-parnassus (*Parnassia palustris*). All of the pits contain Blue Fleabane (*Erigeron acer*), a species listed in the Red Data Book, while one pit contains the protected (Flora (Protection) Order, 1999) species Basil Thyme (*Acinos arvensis*).

The raised bog adjacent and to the east of the esker is fairly intact and has a good cover of bog mosses (*Sphagnum* spp). It includes areas of pools and flats with such species as Bogbean (*Menyanthes trifoliata*), Bog Pondweed (*Potamogeton polygonifolius*), Great Sundew (*Drosera anglica*), Carnation Sedge (*Carex panicea*), Bog Asphodel (*Narthecium ossifragum*), Brown Beak-sedge (*Rhynchospora fusca*) and White Beak-sedge (*R. alba*), while hummocks support Bog-rosemary (*Andromeda polifolia*), Hare's-tail Cottongrass (*Eriophorum vaginatum*) and the moss *Racomitrium lanuginosum*. The eastern edge of the bog is notable for supporting a population of the grass Wood Small-reed (*Calamagrostis epigejos*), its only known Co. Roscommon site. This is a rare species in Ireland and is protected under the Flora (Protection) Order, 1999.

The western section of the site comprises an undulating area of glacially-derived mounds and seasonally flooded basins, Corraree turlough. The main turlough basin extends southwards into two arms that are separated by higher ground of glacial sediments. It includes areas dominated by Black Bog-rush and by Purple Moor-grass (*Molinia caerulea*), areas of wet grassland that hold a typical suite of turlough species and areas of marsh and fen. Certain sections of the turlough flood more frequently than others. Flooding appears to emanate largely from a few swallow holes in the south, which fill when the underlying karst limestone aquifer is full from river flooding. However, at least one swallow hole is known in the northern part of the turlough also. A few small areas not connected to the main turlough basin also flood. The areas liable to flooding are surrounded by low mounds covered in dry grassland, which have been improved to a greater or lesser extent.

The Castlesampson Esker site is of high conservation for the proximity and juxtaposition of esker, raised bog and turlough. The esker itself is of high importance for its almost intact structure (something which is very rare in Irish eskers), its relatively undisturbed state and for the presence of good quality, species-rich dry calcareous grassland, a habitat that is listed with priority status on Annex I of the E.U. Habitats Directive. It is also notable for the good variety of rare or unusual vascular plant species that it supports. The transitional area between esker and raised bog vegetation is of interest, and notable for supporting a population of a protected vascular plant species. The raised bog itself is fairly intact and includes areas of active raised bog, degraded raised bog and Rhynchosporion vegetation, all habitats that are listed on Annex I of the E.U. Habitats Directive. The turlough section of the site contains a wide range of grassland and turlough habitats and includes some areas of excellent quality. Its floristic diversity is high and it is of particular interest for the remarkable contrast shown by the vegetation of grazed and ungrazed areas. The pattern of flooding is also unusual, appearing to come mostly from a few swallow holes in the south. Turlough is a habitat listed with priority status on Annex I of the E.U. Habitats Directive.

Site Name: Crosswood Bog SAC

Site Code: 002337

Crosswood Bog is situated approximately 5 km east of Athlone, Co. Westmeath, mainly in the townlands of Crosswood, Glenaghanvoneen, 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 Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[7110] Raised Bog (Active)* [7120] Degraded Raised Bog

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 areas occur on all margins of the bog.

Much of the high bog has vegetation typical of the Midlands Raised Bog type, consisting of 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 are 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 *S. cuspidatum*. Regenerating bog moss hummocks (*S. magellanicum*) 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 also are found Hare's-tail Cottongrass (*Eriophorum vaginatum*), 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*), 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 also. Fir Clubmoss (*Huperzia selago*) is also found on the bog. Old cutover bog supports scrub vegetation of Heather, gorse (*Ulex* sp.), Downy Birch and willows (*Salix* spp.).

Current land use 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 land uses 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 as it comprises 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.

Site Name: Fortwilliam Turlough SAC

Site Code: 000448

Fortwilliam Turlough is situated close to the eastern shore of Lough Ree, 6 km south of Lanesborough, in Co. Longford. The surrounding countryside is flat, with a thin cover of drift. The floor of the basin is at two levels, a lower central area with several lakes and ponds, and a higher surrounding area of till with scattered rocks, extending north-westwards into flat fields and woodland. There is a little surface flow into the basin and floodwater appears to be strongly calcareous.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[3180] Turloughs*

The central part of Fortwilliam Turlough is marly and contains Shoreweed (*Littorella uniflora*), Various-leaved Pondweed (*Potamogeton gramineus*), Broad-leaved Pondweed (*Potamogeton natans*) and the moss *Scorpidium scorpioides* in the wetter parts, together with Lesser Water-plantain (*Baldellia ranunculoides*), sedges (including *Carex serotina*) and Jointed Rush (*Juncus articulatus*). At the southern end, the wettest areas support stands of Common Club-rush (*Scirpus lacustris*), with Greater Spearwort (*Ranunculus lingua*) and Mare's-tail (*Hippuris vulgaris*), and occasional patches of Amphibious Bistort (*Polygonum amphibium*). Slightly drier areas support a community dominated by Common Sedge (*Carex nigra*), Creeping Cinquefoil (*Potentilla reptans*) and abundant Adder's-tongue (*Ophioglossum vulgatum*).

Towards the turlough margin is a broad band of heath in the south and west. A calcareous influence is evident in the presence of Black Bog-rush (*Schoenus nigricans*), with the eyebright *Euphrasia micrantha*, Tormentil (*Potentilla erecta*), Creeping Cinquefoil (*Potentilla reptans*) and Sneezewort (*Achillea ptarmica*). Tall herbs occur in places, including Meadowsweet (*Filipendula ulmaria*), Tall Fescue (*Festuca arundinacea*), Agrimony (*Agrimonia eupatorium*) and the vetches *Vicia cracca* and *Lathyrus pratensis*. This community merges into a Blackthorn (*Prunus spinosa*) and Hawthorn (*Crataegus monogyna*) scrub, which has adjacent woodland consisting of Ash (*Fraxinus excelsior*) and Elder (*Sambucus nigra*).

Snipe and Mallard nest in the area.

Threats to turloughs stem mainly from drainage and agricultural improvement. Fortwilliam seems largely unaffected by drainage, and standing water may persist throughout the summer. It is an oligotrophic site, which indicates that it has escaped

significant nutrient input but renders it sensitive to damage should this occur. The turlough is grazed by cattle and sheep, but is undivided.

Fortwilliam is the only extant large turlough in Longford and one of only two east of the River Shannon. It has a high diversity caused by a semi-permanent waterbody, abundant marl precipitation, a relative lack of grazing and small outcrops of limestone, so it is a very representative example of the habitat. The turlough basin seems intact, its basin and hydrology largely unmodified. Its oligotrophic status is valuable, as this feature is becoming rarer in the context of modern agriculture. Due to these factors, Fortwilliam Turlough is a site of considerable ecological value.

Site Name: Four Roads Turlough SAC

Site Code: 001637

Four Roads Turlough is located south-west of Four Roads village, 2.5 km from the River Suck, in Co. Roscommon. It lies below a low scarp of limestone hills and is an open, shallow basin without permanent standing water which seems to flood predictably and dry out early.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[3180] Turloughs*

The turlough has a relatively uniform vegetation structure, with the eastern part predominantly of grass, mostly Creeping Bent (*Agrostis stolonifera*), and the western part consisting mainly of sedges, with Common Sedge (*Carex nigra*) most frequent. There are a few low-lying places where Bottle Sedge (*Carex rostrata*) and Bogbean (*Menyanthes trifoliata*) grow, and a few pools with Thread-leaved Water-crowfoot (*Ranunculus trichophyllus*), Lesser Water-plantain (*Baldellia ranunculoides*) and Lesser Marshwort (*Apium inundatum*). No oligotrophic fen vegetation occurs and only a few tufts of Black Bog-rush (*Schoenus nigricans*) are found. The soil is peaty, and there are occasional tree stumps.

Four Roads Turlough has long been recognised as an area of ornithological importance for the large numbers of waterfowl that use it in winter, and it is part of a Wildfowl Sanctuary. As with most turloughs, bird numbers are highly variable. There are times when the whole of the River Suck population of Greenland White-fronted Goose (500) use the site, along with 2,600 wildfowl and 8,000 waders. At other times bird numbers are as low as several hundred. Except where indicated, the following numbers are the average of 11 counts over 3 seasons, 1984/85-1986/87: Wigeon (983), Teal (870), Shoveler (81), Bewick's Swan (21), Greenland White-fronted Goose (177, one count in 1987/88), Mallard (235), Pintail (40), Golden Plover (317), Lapwing (473) and Curlew (103). A single count on January 17 1988 emphasises the importance of assessing bird populations of turloughs based on as large a series of counts as possible - present on that date were 3,600 Wigeon, 2,500 Teal, 177 Greenland White-fronted Goose and 2,900 Lapwing. The site is also used by Whooper Swan (recent count of 60) and breeding Lapwing, Redshank and Snipe. Several of these species are listed in the Red Data Book and on Annex I of the E.U. Birds Directive.

The site is undrained, in spite of a few past attempts around the margins, and is fertilized in the eastern half. It is intensively grazed and in some areas there is poaching of the peaty soil.

This turlough has a relatively uniform vegetation, but does still support some interesting species (e.g. Lesser Water-plantain). Turloughs are listed with priority status on Annex I of the E.U. Habitats Directive and, as such, are of considerable conservation significance. The site is very important as a refuge or feeding area for wildfowl and waders, some of which occur in numbers of national importance.

SITE SYNOPSIS

SITE NAME: FOUR ROADS TURLOUGH SPA

SITE CODE: 004140

Four Roads Turlough (also known as Cloonlaughnan Turlough) is located 6 km south of Athleague, Co. Roscommon and just over 2 km east of the River Suck. It lies below a low scarp of limestone hills and is an open, shallow basin without permanent standing water which floods regularly and dries out early.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Greenland White-fronted Goose and Golden Plover. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Four Roads Turlough is an important site for wintering waterfowl. In most winters it is visited by the nationally important River Suck population of Greenland White-fronted Goose (93 – four year mean peak for four of the five winters between 1994/95 and 1998/99). The site also supports a nationally important population of Golden Plover (3,717) – all figures are mean peaks for three of the five winters between 1995/96 and 1999/2000). Other species which occur regularly include Wigeon (307), Teal (657), Mallard (84), Shoveler (28) and Lapwing (1,521). It is also occasionally used by Whooper Swan. Breeding species include Lapwing and Snipe. Much of the site is a Wildfowl Sanctuary.

Four Roads Turlough SPA is of ornithological importance because it is regularly utilised by the nationally important River Suck Greenland White-fronted Goose flock. A nationally important population of Golden Plover also occurs at the site. The regular occurrence of these two species, which are listed on Annex I of the E.U. Birds Directive, is of note.

Site Name: Killeglan Grassland SAC

Site Code: 002214

Killeglan grassland is situated in Co. Roscommon, approximately 9.5 km north of Ballinasloe. The underlying geology is Upper Carboniferous Limestone. A shallow rendzina type soil formation has developed in places between the outcropping limestone boulders and the shattered limestone formations. The topography of the site is undulating.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[6210] Orchid-rich Calcareous Grassland*
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The calcareous grassland vegetation at this site is species-rich and comprises low-growing plants such as Red Fescue (*Festuca rubra*), Wild Thyme (*Thymus praecox*), Cat's-ear (*Hypochoeris radicata*), Mouse-ear Hawkweed (*Hieracium pilosella*), Devil's-bit Scabious (*Succisa pratensis*), Mountain Everlasting (*Antennaria dioica*), Carline Thistle (*Carlina vulgaris*), Dandelion (*Taraxacum* agg.), sedges (*Carex* spp.), Ribwort Plantain (*Plantago lanceolata*), Bulbous Rush (*Juncus bulbosus*), Heather (*Calluna vulgaris*), Crested Dog's-tail (*Cynosurus cristatus*), Cock's-foot (*Dactylis glomerata*), Common Bent (*Agrostis capillaris*), Yorkshire-fog (*Holcus lanatus*), Carnation Sedge (*Carex panicea*), Sheep's Sorrel (*Rumex acetosella*), Yellow-rattle (*Rhinanthus minor*), Daisy (*Bellis perennis*), Yarrow (*Achillea millefolium*), clovers (*Trifolium* spp.) and Selfheal (*Prunella vulgaris*).

Orchid species recorded from the site include the Red Data Book species, Green-winged Orchid (*Orchis morio*) and Early-purple Orchid (*Orchis mascula*), Common Spotted-orchid (*Dactylorhiza fuchsii*), Fragrant Orchid (*Gymnadenia conopsea*), Pyramidal Orchid (*Anacamptis pyramidalis*), Lesser Butterfly-orchid (*Platanthera bifolia*) and Autumn Lady's-tresses (*Spiranthes spiralis*).

On the out-cropping limestone Herb-Robert (*Geranium robertianum*), Wall-rue (*Asplenium ruta-muraria*), Hart's-tongue (*Phyllitis scolopendrium*), Wild Thyme, Cat's-ear, Mouse-ear Hawkweed, Mountain Everlasting, Fairy Flax (*Linum catharticum*) and many mosses and lichens are present. Patches of Gorse (*Ulex europaeus*) and Bracken (*Pteridium aquilinum*) occur, with occasional specimens of Yew (*Taxus baccata*).

Badger and Hare, both listed in the Irish Red Data Book, occur on this site. Birds recorded include Kestrel, Sparrowhawk, Pheasant, Stonechat, Wheatear and Raven.

Most of this site appears to be managed in a manner which is suitable for the continued conservation of the grasslands. Low numbers of cattle are grazed during winter and low numbers of sheep in summer and autumn. Horses are occasional grazers. The grasslands have been improved in the past and limestone boulders have been cleared and placed in heaps scattered throughout the site. The site is divided into a number of small field systems that are defined by dry stone walls. Neighbouring lands have recently been cleared of boulders and shattered pavement, and have been re-seeded and heavily fertilised. Reclamation within the site would pose a significant threat to the conservation interest of the grassland.

Overall, the site is of outstanding quality and provides an excellent example of the Annex I priority habitat orchid-rich calcareous grasslands. It plays host to an important population of the Red Data Book plant species Green-winged Orchid, along with a number of Red Data Book mammals.

Site Name: Lisduff Turlough SAC

Site Code: 000609

Lisduff Turlough is located just south of Athleague in Co. Roscommon, about 3 km from the River Suck. It lies in a shallow basin among low hills of glacial drift, with occasional rock outcrops. There is a semi-permanent over-ground inflow from the north-west arm of the turlough and the site is relatively wet. Some pools persist into the summer months and have a good development of fen peat. The ground water is highly calcareous and there is precipitation of marl.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[3180] Turloughs*

The vegetation of Lisduff turlough reflects the oligotrophic and strongly calcareous groundwater chemistry of the area. It is dominated by sedges (*Carex* spp.), except in the hollows that occur in a line on the eastern edge, where Amphibious Bistort (*Polygonum amphibium*) is found. The central pools contain Shoreweed (*Littorella uniflora*), Common Sedge (*Carex nigra*), Bulbous Rush (*Juncus bulbosus*) and the moss, *Scorpidium scorpioides*, and at their edges give way to Common Sedge, Carnation Sedge (*Carex panicea*) and Jointed Rush (*Juncus articulatus*), with some Purple Moor-grass (*Molinia caerulea*) and Common Spike-rush (*Eleocharis palustris*). At the highest edges of the turlough, the vegetation grades to sedge heath, with scattered clumps of Black Bog-rush (*Schoenus nigricans*), Heath-grass (*Danthonia decumbens*) and Sea Plantain (*Plantago maritima*). Grassland dominated by Tall Fescue (*Festuca arundinacea*) is present at the southern end and the north-west corner, while patches of calcareous grassland occur around outcropping rock in the north-east.

The site is of ornithological importance for its waders and wintering wildfowl: Wigeon (310), Teal (97), Mallard (67), Pintail (5), Pochard (119), Golden Plover (143), Lapwing (250) and Curlew (70). The above figures are the average of 5 counts made over 3 seasons, 1984/85-1986/87. Bewick's Swan and Snipe also occur regularly at the site. Snipe, Redshank (1 pair) and Dunlin (1-5 pairs) nest at the site. Dunlin, Pintail, Pochard and Golden Plover are listed in the Red Data Book, the latter species and Bewick's Swan also on Annex I of the E.U. Birds Directive.

The site is little-modified by grazing or drainage, and there is little human influence on the site at present.

Lisduff Turlough has a good zonation of oligotrophic vegetation types, including some communities that are rare in turloughs. It is of high ecological value as one of the few turloughs in near-pristine condition. The birdlife of the site adds significantly to its importance.

Site Name: Lough Croan Turlough SAC

Site Code: 000610

Lough Croan turlough is located south of the Athlone to Mount Talbot road in Co. Roscommon. It is a linear wetland, aligned north-west/south-east, which lies in a relatively flat area of glacial till. It is split into two main parts - the east functions as a typical turlough, with a wet area dominated by Common Reed (*Phragmites australis*) at the centre; at the west is a fen, with floating vegetation in places, which also floods in winter. In between there is undulating ground. There is little over-ground flow, but both basins retain some water all year round.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[3180] Turloughs*

Lough Croan Turlough is a large, complex site which supports a multitude of vegetation types. The midline of the turlough is generally the wettest ground and, particularly in the western half of the site, there are beds of Common Reed, with Tufted-sedge (*Carex elata*), Bottle Sedge (*Carex rostrata*) and Water Horsetail (*Equisetum fluviatile*). Cowbane (*Cicuta virosa*), Lesser Water-parsnip (*Berula erecta*), Greater Spearwort (*Ranunculus lingua*) and Yellow Iris (*Iris pseudacorus*) are frequent, and there are occasional clumps of Rusty Willow (*Salix cinerea* subsp. *oleifolia*). Drains on the site support aquatic vegetation, with Bogbean (*Menyanthes trifoliata*), Whorled Water-milfoil (*Myriophyllum verticillatum*) and Lesser Pondweed (*Potamogeton pusillus*).

At the eastern end a larger waterbody holds similar vegetation, with substantial areas of Common Club-rush (*Scirpus lacustris*), Tufted-sedge and Bogbean, mixed with Bracted bur-reed (*Sparganium erectum*) and Yellow Iris. On the southern side a distinct band of annual plants follows the edge of the sedges on the whitish mud. Here the rare, Red Data Book species Northern Yellow-cress (*Rorippa islandica*) occurs frequently, along with Marsh Cudweed (*Gnaphalium uliginosum*), Red Goosefoot (*Chenopodium rubrum*) and Toad Rush (*Juncus bufonius*).

Outside of these wet areas the turlough bottom is covered with sedge-dominated vegetation, particularly Common Sedge (*Carex nigra*); the occurrence here of Purple Moor-grass (*Molinia caerulea*), Tufted Hair-grass (*Deschampsia cespitosa*) and Marsh Horsetail (*Equisetum palustre*) reflect the high peat content of the soil. Peat is especially thick at the western end where Blunt-flowered Rush (*Juncus subnodulosus*), Bogbean, Marsh Lousewort (*Pedicularis palustris*) and Water Horsetail are scattered

through vegetation of Common Sedge, Bottle Sedge and Brown Sedge (*Carex disticha*). An area of sedge fen with Devil's-bit Scabious (*Succisa pratensis*), a little Black Bog-rush (*Schoenus nigricans*) and Slender Sedge (*Carex lasiocarpa*) is also found here.

Around the margins grassland is the most common habitat; calcareous grassland at the southern end where the shore rises abruptly, but elsewhere grassland which is more nutrient-enriched and generally species-poor.

Lough Croan is an important ornithological site and is a Wildfowl Sanctuary. The following species use the site (except where indicated, numbers are the average of 11 counts over 3 seasons, 1984/85-1986/87): Shoveler (154), Wigeon (483), Gadwall (10, 1 count), Teal (473), Mallard (32), Pintail (17), Coot (42), Lapwing (445; 2,600 in 1988), Curlew (103), Golden Plover (160; occasionally numbers between 1000 and 3000 are recorded), Whooper Swan (11) and Bewick's Swan (18, 1 count). Pochard (6 breeding pairs in 1991), Shoveler (proved breeding in 1993), Mute Swan and Black-headed Gull also occur at the site and nest, as do Snipe, Curlew and Lapwing. Greenland White-fronted Goose regularly utilise this turlough for feeding and, when water is high, for roosting. These birds are part of the River Suck population. Numbers vary, but in most winters between 150 and 300 individuals are recorded. Short-eared Owl has once been recorded from the site; this species, Whooper Swan, Golden Plover and Greenland White-fronted Goose are listed in the Red Data Book and, along with Bewick's Swan, on Annex I of the E.U. Birds Directive.

Lough Croan Turlough is an unusual wetland that contains fen, reedswamp and turlough vegetation communities in juxtaposition. The vegetation is highly diverse, with a total of 17 different communities occurring, several of which are rare or unusually large in extent. The site is notable for the presence of the rare, Northern Yellow-cress, which occurs frequently. The wintering waterfowl numbers are large and the site is especially useful to dabbling duck species. This is an important site because of its overall size, its birdlife and the rare plant communities and species it supports. Turloughs are rare and threatened habitats that are listed, with priority status, on Annex I of the E.U. Habitats Directive and, as such, are of considerable conservation significance.

SITE SYNOPSIS

SITE NAME: LOUGH CROAN TURLOUGH SPA

SITE CODE: 004139

Situated approximately 6 km east of the River Suck in Co. Roscommon, Lough Croan Turlough is a linear wetland, aligned north-west/south-east, which lies in a flattish area of glacial till. It is split into two main parts - the east functions as a typical turlough, with a wet, reedy centre, while the west is a fen, floating in places, which also floods in winter.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Greenland White-fronted Goose, Shoveler and Golden Plover. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Lough Croan supports nationally important numbers of Greenland White-fronted Goose (164) - mean peak counts for the period 1994/95 to 1998/99. The geese that utilise this site are part of an internationally important flock that are based along the River Suck. The site also supports nationally important populations of Shoveler (157), and Golden Plover (2,025) - figures are mean peak counts for four of the five winters between 1995/96 and 1999/2000. The Shoveler population is one of the largest in the country. Other species that occur at the site include Whooper Swan (15), Wigeon (392), Gadwall (7), Teal (330), Mallard (56), Pintail (22), Lapwing (661), Curlew (93) and Black-headed Gull (59). Some of these species use the turlough both as a feeding and roost site.

Lough Croan is also a site for breeding birds - Pochard and Shoveler, which are both rare breeding species in Ireland, have bred at the site in recent years and it is considered that they probably attempt to nest every year. Mute Swan also breeds and Black-headed Gull has bred in the past.

Lough Croan Turlough SPA is of high ornithological importance, primarily for its Greenland White-fronted Goose population, but also because of its nationally important Shoveler and Golden Plover populations. The presence of Greenland White-fronted Goose, Golden Plover and Whooper Swan is of particular note as these are listed on Annex I of the E.U. Birds Directive. Part of the site is a Wildfowl Sanctuary.

Site Name: Lough Derg, North-east Shore SAC

Site Code: 002241

Lough Derg, the lowest order lake on the River Shannon, is one of the largest bodies of freshwater in Ireland. This SAC, however, only includes the northern shore of the lake from the mouth of the Cappagh River in the north-west to just below Black Lough at the north-eastern shore. The greater part of this site lies on Carboniferous limestone, although there is Old Red Sandstone on the southern shores of the eastern section.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[5130] Juniper Scrub
[7210] <i>Cladium</i> Fens*
[7230] Alkaline Fens
[8240] Limestone Pavement*
[91E0] Alluvial Forests*
[91J0] Yew Woodlands*

The geology of the lake shore is principally limestone and in places this protrudes at the surface in the form of boulders and rubble, and can be classified as limestone pavement. These are often bryophyte-rich surfaces or else support a calcareous grassland or heath flora, as well as some woody species, such as Yew (*Taxus baccata*) and Juniper (*Juniperus communis*). Examples occur at Cornalack, Kyleneilly and Portumna. The last two named areas were partly afforested but are proposed for restoration under a Coillte E.U. LIFE Programme. The geographical location of these examples of limestone pavement within the country is notable.

A second priority Annex I habitat, *Cladium* fen, occurs occasionally along the lake margins, mainly in association with alkaline fens, Common Reed (*Phragmites australis*) and other swamp vegetation. Typically, Great Fen-sedge (*Cladium mariscus*), which can be up to 2 m in height, forms dense stands. Associated species include Common Reed, Black Bog-rush (*Schoenus nigricans*), Water Horsetail (*Equisetum fluviatile*), Bottle Sedge (*Carex rostrata*) and occasional Slender Sedge (*Carex lasiocarpa*). This community generally merges with alkaline fen dominated by Black Bog-rush, with Purple Moor-grass (*Molinia caerulea*), Marsh Horsetail (*E. palustre*), Meadowsweet (*Filipendula ulmaria*) and scattered tussocks of Greater Tussock-sedge (*Carex paniculata*).

Yew woods in Ireland are mostly confined to the west of the country. However, a substantial area of Yew is located on limestone at Cornalack, where Yew forms a scrub woodland along the east shore of Lough Derg. Here, Yew is found in association with small amounts of Juniper, which forms protection against grazing for the young Yew. Other notable species present include Hawthorn (*Crataegus monogyna*), Hazel (*Corylus avellana*), Holly (*Ilex aquifolium*), Small-leaved Cotoneaster (*Cotoneaster microphyllus*), along with occasional Ivy (*Hedera helix*), Wild Strawberry (*Fragaria vesca*), Bramble (*Rubus fruticosus* agg.) and Wood-sorrel (*Oxalis acetosella*). Elsewhere, small stands of Yew up to 5 m high occur with Spindle (*Euonymus europaeus*), Blackthorn (*Prunus spinosa*), Gorse (*Ulex europaeus*) and Ash (*Fraxinus excelsior*). Due to shading, and in places cattle trampling, the ground flora supports few herbs. However, the bryophyte layer is well developed with many moss covered rocks present.

Juniper occurs throughout this site in a range of habitats, associated with calcareous grasslands, heath and limestone outcrops. Some of the finest examples of Juniper formations in Ireland occur along the lake edge where upright, bushy Juniper shrubs up to 3 m tall are found. Typically, Juniper forms dense hedges with Ash, Hawthorn, Gorse, Hazel and Bramble, and occasional Yew. These tall Juniper shrubs are a unique feature in Ireland, where it is more typically found growing in prostrate form. In places along the lake shore Juniper forms a mosaic with Black Bog-rush and Great Fen-sedge fen. The best examples are seen at the north and north-east of the site. On drier ground above the flood level, Juniper occurs in association with species-rich calcareous grassland with Mouse-ear Hawkweed (*Hieracium pilosella*), Daisy (*Bellis perennis*), Lady's Bedstraw (*Galium verum*), Wild Thyme (*Thymus praecox*) and Blue Moor-grass (*Sesleria albicans*). An extensive area of this vegetation is seen north of Kilgarvan Quay. Many of the islands also support significant Juniper cover. This is particularly evident on Bounla Island. Juniper generally occurs as fringing vegetation around the islands, which typically have wooded centres. At Cornalack, along the eastern shore of Lough Derg, tall Juniper is found in association with loose limestone rubble with a significant cover of Yew.

Deciduous woodlands are also a notable feature of the site, dominated by oak (*Quercus* spp.), as at Bellevue, and Hazel/Ash at many of the examples along the north-eastern shore. Typically the ground layer includes Early-purple Orchid (*Orchis mascula*), violets (*Viola* spp.), Ivy, Lesser Celandine (*Ranunculus ficaria*), Bluebell (*Hyacinthoides non-scripta*), Wood Anemone (*Anemone nemorosa*), Wood-sorrel, Primrose (*Primula vulgaris*), Bramble, Ground Ivy (*Glechoma hederacea*), Pignut (*Conopodium majus*) and Honeysuckle (*Lonicera periclymenum*). Wet woodland is frequent along the lake shore, and in some areas this conforms well with the E.U. Annex I habitat, alluvial woodland. At Kyleneamelly wood, where some planting of commercial forestry has occurred, there are extensive areas of alluvial woodland which are subject to flooding. These woods are dominated by willows (*Salix* spp.) and Alder (*Alnus glutinosa*), with Downy Birch (*Betula pubescens*) and Ash also present. The ground flora of the undisturbed alluvial sites is often dominated by Yellow Iris (*Iris pseudacorus*), with a range of other species commonly present, including Bogbean (*Menyanthes trifoliata*), Marsh-marigold (*Caltha palustris*),

Meadowsweet, Purple Loosestrife (*Lythrum salicaria*), horsetails (*Equisetum* spp.), Wild Angelica (*Angelica sylvestris*), Greater Tussock-sedge and Remote Sedge (*Carex remota*). Further examples of alluvial woodland occur at Portumna. Beech (*Fagus sylvatica*) and Scots Pine (*Pinus sylvestris*) are often present at the lake edge along areas which were once parts of estates. Some areas of coniferous forestry have been included within the site.

The only known site in the country for the Red Data Book plant Irish Fleabane (*Inula salicina*) occurs along the lake shore. This plant is legally protected under the Flora (Protection) Order, 1999. Other Red Data Book species present within this site are Marsh Pea (*Lathyrus palustris*) and Ivy Broomrape (*Orobanche hederæ*). The Red Data Book stonewort *Chara tomentosa* has its stronghold in Lough Derg.

The lake is rated as nationally important for waterfowl. The entire lake, including all of the islands, is a designated SPA (Special Protection Area). Counts from 1995/96 carried out at seven locations on the lake indicate that the lake holds nationally important numbers for Mute Swan, Cormorant, Mallard, Teal, Tufted Duck and Goldeneye. The lake also supports a number of Greenland White-fronted Goose, a bird species listed on Annex I of the E.U. Birds Directive. There is a Wildlife Sanctuary at the north western edge of the lake.

Lough Derg is of conservation interest also for its fish and freshwater invertebrates. Lampreys, listed under Annex II of the E.U. Habitats Directive, are known to occur and the lake contains an apparently self-sustaining landlocked population of Sea Lamprey (*Petromyzon marinus*). A landlocked population, where the fish are feeding and not completing a seaward migration, is unique in an Irish context, though there are several such populations in the U.S. and one is known from Loch Lomond in Scotland. Brook Lamprey (*Lampetra planeri*) is known to be common in the lower Shannon catchment where all three lamprey species breed.

The endangered fish species Pollan (*Coregonus autumnalis pollan*) is recorded from Lough Derg, one of only three sites in Ireland and in western Europe. The Pollan is a landlocked species of Coregonid or 'White Fish', thought to have colonised Irish waters after the last Ice Age. Its nearest relative, the Arctic Cisco, is found as far away as Alaska, Northern Canada and Siberia. Although it is anadromous throughout most of its northern range, the Irish population are all non-migratory and purely freshwater. Lough Derg is also a well known fishing lake with a good Trout (*Salmo trutta*) fishery. Atlantic Salmon (*Salmo salar*) also use the lake as a spawning ground. Although this species is still fished commercially in Ireland, it is considered to be endangered or locally threatened elsewhere in Europe and is listed on Annex II of the E.U. Habitats Directive.

Otter and Badger have been recorded within the site. Both of these species are listed in the Irish Red Data Book and are legally protected by the Wildlife Act, 1976.

Land use within the site is mainly of a recreational nature with many boat hire companies, holiday home schemes and angling clubs located at the lake edge.

Recreational disturbance may pose a threat to the wintering wildfowl populations, though tourism is scaled down during the winter. The water body is surrounded mainly by improved pastoral farmland to the south and east, with areas of bog to the south-west and west. Coniferous plantations are present along the west and north-west shore and small areas of these are included within the site. If these areas are felled no further planting should take place as afforestation damages the wetland habitats between the plantation and lake edge.

The main threats to the quality of the site are water polluting activities resulting from intensification of agricultural activities around the lake shore, uncontrolled discharge of sewage, which is causing eutrophication of the lake, and housing and boating development which has resulted in the destruction of lakeshore habitats. There is also significant fishing and shooting pressure on and around the lake. Forestry can result in the loss of some areas of wetland habitat. The spread of Zebra Mussel (*Dreissena polymorpha*) in Lough Derg also poses a threat the ecology of the lake.

This is a site of significant ecological interest, with six habitats listed on Annex I of the E.U. Habitats Directive. Four of these are priority habitats - *Cladium* fen, alluvial woodland, limestone pavement and Yew woodland. Other annexed habitats present include alkaline fen and Juniper scrub formations on heath and calcareous grasslands. In addition, the lake itself is an SPA that supports important numbers of wintering wildfowl, Greenland White-fronted Goose, Common Tern and Cormorant, a number of which are listed under Annex I of the E.U. Birds Directive.

SITE SYNOPSIS

SITE NAME: LOUGH DERG (SHANNON) SPA

SITE CODE: 004058

Lough Derg lies within counties Tipperary, Galway and Clare and is the largest of the River Shannon Lakes, being some 40 km long. Its maximum breadth across the Scarriff Bay -Youghal Bay transect is 13 km but for most of its length it is less than 5 km wide. The lake is relatively shallow at the northern end being mostly 6 m in depth but in the middle region it has an axial trench and descends to over 25 m in places. The narrow southern end of the lake has the greatest average depth, with a maximum of 34 m. The greater part of the lake lies on Carboniferous limestone but the narrow southern section is underlain by Silurian strata. Most of the lower part of the lake is enclosed by hills on both sides, the Slieve Aughty Mountains to the west and the Arra Mountains to the east. The northern end is bordered by relatively flat, agricultural country. The lake shows the high hardness levels and alkaline pH to be expected from its mainly limestone catchment basin, and it has most recently been classified as a mesotrophic system. The lake has many small islands, especially on its western and northern sides. The shoreline is often fringed with swamp vegetation. Aquatic vegetation includes a range of charophyte species, including the Red Data Book species, *Chara tomentosa*. The shoreline is often fringed by swamp vegetation, comprised of such species as Common Reed (*Phragmites australis*), Great Fen-sedge (*Cladium mariscus*) and Bottle Sedge (*Carex rostrata*).

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Cormorant, Tufted Duck, Goldeneye and Common Tern. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Lough Derg is of importance for both breeding and wintering birds. The site supports a nationally important breeding colony of Common Tern (55 pairs recorded in 1995). Management of one of the islands used for nesting has increased the area of suitable habitat available and prevented nests being destroyed by fluctuating water levels. Large numbers of Black-headed Gull have traditionally bred on the many islands (2,176 pairs in 1985) but the recent status of this species is not known. The islands in the lake also support a nationally important Cormorant colony - 167 pairs were recorded in 1995; a partial survey of the lake in 2010 recorded 113 pairs. Lough Derg is also a noted breeding site for Great Crested Grebe (47 pairs in 1995) and Tufted Duck (169 pairs in May 1995).

In winter, the lake is important for a range of waterfowl species, including nationally important populations of Tufted Duck (776) and Goldeneye (157) – all figures are mean peaks for 4 of the 5 seasons between 1995/96 and 1999/2000. Other species which occur in winter include Mute Swan (164), Whooper Swan (18), Wigeon (249), Teal (301), Mallard (376), Little Grebe (14), Cormorant (90), Coot (173), Lapwing

(922), Curlew (66) and Black-headed Gull (732). Areas to north and south west of Lough Derg have been utilised in the past by small numbers of Greenland White-fronted Goose – 19 geese were recorded on callowland near Portumna in 1996/97. A relatively small flock based in the Lough Derg-Lough Graney area and possibly further afield have been recorded in the Scarriff Bay area – 20 geese recorded in 2004. Few sightings, at either location have been made in recent years.

Hen Harrier are also known to roost in the reedbeds on the margins of the site during the winter.

Lough Derg (Shannon) SPA is of high ornithological importance as it supports nationally important breeding populations of Cormorant and Common Tern. In winter, it has nationally important populations of Tufted Duck and Goldeneye, as well as a range of other species including Whooper Swan. The presence of Whooper Swan, Greenland White-fronted Goose, Hen Harrier and Common Tern is of particular note as these are listed on Annex I of the E.U. Birds Directive. Parts of Lough Derg (Shannon) SPA are a Wildfowl Sanctuary.

Site Name: Lough Funshinagh SAC

Site Code: 000611

Lough Funshinagh is located approximately 12 km north-west of Athlone, in Co. Roscommon. The lake, which is underlain by Carboniferous limestone, is classified as a turlough because it fluctuates to a significant extent every year and occasionally dries out entirely (approximately two to three times every ten years). In most years, however, an extensive area of water persists. This is filled with vegetation, providing excellent breeding habitat for wildfowl, and the site is designated a Wildfowl Sanctuary. The lake is fed by springs and a small catchment to the west. It is mesotrophic in quality, with some marl (calcium carbonate) deposition, and is surrounded by pastures.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[3180] Turloughs*

[3270] *Chenopodium rubri* p.p. and *Bidens* p.p. vegetation

Open water at Lough Funshinagh is colonised by large beds of Common Club-rush (*Scirpus lacustris*). This grades into stands of Tufted-sedge (*Carex elata*), Slender Sedge (*Carex lasiocarpa*) and Bottle Sedge (*Carex rostrata*) in some areas, and Common Reed (*Phragmites australis*) at the main inflow. The shallower parts of the lake contain semi-aquatic plants which are variably exposed in summer. Common here are Sharp-flowered Rush (*Juncus acutiflorus*), Carnation Sedge (*Carex panicea*) and Common Sedge (*Carex nigra*), with Water Spearwort (*Ranunculus flammula*), Water Mint (*Mentha aquatica*), Marsh Ragwort (*Senecio aquaticus*), Common Marsh-bedstraw (*Galium palustre*) and Tufted Forget-me-not (*Myosotis laxa*). Other turlough communities here, and on the parts of the shore inundated by high waters, include such species as Various-leaved Pondweed (*Potamogeton gramineus*), Amphibious Bistort (*Polygonum amphibium*), Marsh Cudweed (*Gnaphalium uliginosum*), the moss *Fontinalis antipyretica* and Northern Yellow-cress (*Rorippa islandica*), a rare species which is listed in the Irish Red Data Book. Vegetation ascribable to the E.U. Habitats Directive Annex I type 'rivers with muddy banks with *Chenopodium rubri* p.p. and *Bidens* p.p. vegetation' occurs. Marl deposits with stoneworts (*Chara* spp.) also occur in the shallow water. Internally, the vegetation shows considerable patterning, presumably related to nutrient conditions.

The lake is fringed by wet grassland, with species such as Creeping Bent (*Agrostis stolonifera*), Marsh Pennywort (*Hydrocotyle vulgaris*) and Silverweed (*Potentilla anserina*), which in turn grades into pasture. A number of islands occur on the eastern

side which are never totally flooded. They support Gorse (*Ulex europaeus*) scrub, whose lower limit is controlled by the winter flooding.

Lough Funshinagh is important for wintering waterfowl. The following figures are derived from 13 counts over 3 seasons (1984/85-1986/87). Included among the regular winter visitors are three species which are listed on Annex I of the E.U. Birds Directive, i.e. Bewick's Swan (4, becoming scarcer since 1987), Whooper Swan (10) and Golden Plover (50), as well as Wigeon (310), Teal (263), Mallard (181), Shoveler (17), Pochard (82), Tufted Duck (52), Coot (42), Lapwing (67) and Curlew (29). In summer, the site attracts a good diversity of breeding waterfowl. Species which breed, probably regularly, at the site include Shoveler, Gadwall and Pochard, while Black-necked Grebe and Pintail may breed sporadically - all of these are listed as rare in the Red Data Book. Lapwing and Snipe are regular breeders, and sometimes also Redshank and Ringed Plover. Lough Funshinagh is one of the sites used by the River Suck flock of Greenland White-fronted Goose. Nowadays, however, it is not regularly used, possibly because some of the former feeding areas have become overgrown with scrub.

The Common Frog, a species listed in the Red Data Book as internationally important, breeds within the site. Although widespread and common in Ireland, this species is considered to be vulnerable in Europe. Its habitat is threatened by drainage of wetlands and water pollution.

Some of the major threats to lakes in Ireland arise from drainage and agricultural intensification. In the case of the latter, the application of fertiliser can lead to eutrophication and a general loss of species diversity. Lough Funshinagh is currently mesotrophic, but it has been described in the past as being full of vegetation. Thus it may be that it has not been enriched significantly by agricultural run-off in recent times. There are localised eutrophic patches around the shores where grazing animals congregate, but the lake water is strikingly clear. There have been attempts at drainage in the past, most recently in 1990. As yet, this has resulted in little structural damage to the site.

Lough Funshinagh is of major ecological importance, both from a vegetation and ornithological viewpoint. Turloughs are listed as priority habitat on Annex I of the E.U. Habitats Directive. Lough Funshinagh is a unique and atypical example of this habitat, and has a particular value in being relatively unmodified by grazing and modern agriculture.

Site Name: Lough Ree SAC

Site Code: 000440

Lough Ree is the third largest lake in Ireland and is situated in an ice-deepened depression in Carboniferous limestone on the River Shannon system between Lanesborough and Athlone. The site spans Counties Longford, Roscommon and Westmeath. 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 site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[3150] Natural Eutrophic Lakes
[6210] Orchid-rich Calcareous Grassland*
[7110] Active Raised Bog*
[7120] Degraded Raised Bog
[7230] Alkaline Fens
[8240] Limestone Pavement*
[91D0] Bog Woodland*
[91E0] Alluvial Forests*
[1355] Otter (<i>Lutra lutra</i>)

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 been classified as mesotrophic in quality, but the size of the system means that a range of conditions prevail depending upon, for example, rock type. This gives rise to local variations in nutrient status and pH, which in turn results in variations in the phytoplankton and macrophyte flora. Therefore 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 2 m, 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*), Great Fen-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 alkaline 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 lake shore which is found in many places 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*), Carlina 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 fuchsii*).

Limestone pavement occurs occasionally around the lake shore. The most substantial area is at Rathcline in the extreme north-east. While this has been planted with commercial forestry since the 1950s, it still displays a diverse representation of pavement types, from the typical clint-gryke system to large blocky pavements and scattered boulders. In all cases the pavement is covered by a bryophyte-rich flora, with abundant Ivy (*Hedera helix*), and a scrub layer dominated by Ash (*Fraxinus excelsior*), Hazel (*Corylus avellana*) and some Spindle (*Euonymus europaeus*). The ground flora is variable, though in places it is species-rich.

Dry broadleaved 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, Pedunculate Oak (*Quercus robur*), Holly (*Ilex aquifolium*) and Ash, 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.

At St John's Wood, patches of wet alluvial woodland are present along the lakeshore. They are dominated by Ash, Grey Willow (*Salix cinerea*), Alder (*Alnus glutinosa*) and, in places, Downy Birch (*Betula pubescens*). The ground flora includes Creeping Bent (*Agrostis stolonifera*), Wild Angelica (*Angelica sylvestris*), Meadowsweet (*Filipendula ulmaria*), Common Marsh-bedstraw (*Galium palustre*), Yellow Iris (*Iris pseudacorus*), Gipsywort (*Lycopus europaeus*), Water Mint (*Mentha aquatica*), Reed Canary-grass (*Phalaris arundinacea*), Creeping Buttercup (*Ranunculus repens*) and Wood Dock (*Rumex sanguineus*). Pockets of wet woodland occur elsewhere around the lake. Most of these are dominated by willows (*Salix* spp.), Alder and Downy Birch. In one such wood, at Ross Lough, the terrestrial alga, *Trentopohlia* sp., has a specialised niche on the willow trunks. The ground layer has a rich bryophyte flora (*Calliergon* spp. and *Sphagnum* spp.), scattered clumps of Greater Tussock-sedge (*Carex paniculata*) and a good diversity of herb species, including Water Dock 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. Active Raised Bog (ARB) habitat 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. Results from surveys of the raised bog habitat in 2003 indicate the presence of 5.9 ha of Active Raised Bog (ARB). Also present are examples of Degraded Raised Bog (DRB) capable of regeneration. In general the vegetation of these degraded areas is dominated by typical raised bog species such as Cross-leaved Heath (*Erica tetralix*), Heather (*Calluna vulgaris*), Hare's-tail Cottongrass (*Eriophorum vaginatum*), Bog Asphodel (*Narthecium ossifragum*) and Deergrass (*Scirpus cespitosus*). Typically the degraded bog areas have a low cover of peat-forming bog mosses (*Sphagnum* spp.). The current extent of DRB as estimated using a recently developed hydrological modelling technique, based largely on Light Detection And Ranging (LiDAR) data, is 44.7 ha.

Associated with the extensive raised bog system at Clooncraff/Clonlarge are areas of bog woodland. At least two small areas of woodland occur on the raised bog domes. However it would appear that this habitat is in the early stages of development. The largest area is dominated by low trees of Downy Birch and Lodgepole Pine (*Pinus contorta*). Occasional trees of Scots Pine (*Pinus sylvestris*) also occur. The ground layer is wet and quaking with a lush carpet of mosses present, including various species of *Sphagnum*, *Pleurozium schreberi* and *Aulacomium palustre*. The main vascular plant species in the ground flora are Bog-rosemary (*Andromeda polifolia*), Cranberry (*Vaccinium oxycoccos*), Bog-myrtle (*Vaccinium myrtillus*), Hare's-tail Cottongrass and Deergrass. Bog Woodland is of particular conservation importance and is listed with priority status on the E.U. Habitats Directive.

At St John's Wood, there is an interesting area of woodland that grows on cut-away peat. This is dominated by Downy Birch and Alder Buckthorn (*Frangula alnus*). The occurrence of the latter species in such abundance is unusual in Ireland.

Smaller lakes occur around the lake shore, especially on the east side, and these often have the full range of wetland habitats contained within and around them. A number of small rivers also pass through the site.

The site supports a number of rare plant species which are listed in the Irish Red Data Book. Alder Buckthorn and Bird Cherry (*Prunus padus*) are woodland components at St John's Wood and elsewhere. Narrow-leaved Helleborine (*Cephalanthera longifolia*) and Betony (*Stachys officinalis*), both of which are also legally protected under the Flora (Protection) Order, 1999, occur among the ground flora of Hare Island (where the former occurs in notable abundance). They also occur in a number of other woods. The stonewort *Chara tomentosa* is present in shallow water around the lake. The rare, though not legally protected, Marsh Pea (*Lathyrus palustris*) occurs on some of the callowland and in alluvial woodland at St John's Wood. The rare Myxomycete fungus, *Echinostelium colliculosum*, has been recorded from St John's Wood.

The lake itself contains one of only two populations in Ireland of the endangered fish species, Pollan (*Coregonus autumnalis*), which is genetically different from Continental European stock. The shrimp *Mysis relicta* (Class Crustacea) 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 E.U. 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 the 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). 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 other species on migration.

Some of the lake islands provide nesting sites for Common Tern, a species listed on Annex I of the E.U. 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 Otter 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 E.U. Habitats Directive.

Land uses 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, and thus restricting aquatic flora to shallower waters. At present Lough Ree is less affected by eutrophication than Lough Derg.

Lough Ree and its adjacent habitats are of major ecological significance. Some of the woodlands around the lake are of excellent. St John's Wood is particularly important; it is one of the very few remaining ancient woodlands 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: 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.

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.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Whooper Swan, Wigeon, Teal, Mallard, Shoveler, Tufted Duck, Common Scoter, Goldeneye, Little Grebe, Coot, Golden Plover, Lapwing and Common Tern. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Lough Ree is one of the most important Midland sites for wintering waterfowl, with nationally important populations of Little Grebe (52), Whooper Swan (139), Wigeon (2,070), Teal (1,474), Mallard (1,087), Shoveler (54), Tufted Duck (1,012), Goldeneye (205), Coot (338), Golden Plover (3,058) and Lapwing (5,793) – all figures are three year mean peaks for the period 1997/98 to 1999/2000. Other species which occur in winter include Great Crested Grebe (29), Cormorant (99), Curlew (254) and Black-headed Gull (307) as well as the resident Mute Swan (85). Greenland White-fronted Goose has been recorded on occasion on the flooded margins of the site.

The site supports a nationally important population of Common Tern (90 pairs in 1995). 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 a noted site for breeding duck and grebes: Tufted Duck (202 pairs) and Great Crested Grebe (32 pairs) – records from 1995. 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. Surveys have recorded 39 pairs and 32 pairs in 1995 and 1999 respectively. Cormorant also breeds on some of the islands within the site – 86 nests were recorded in 2010. 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.

Lough Ree SPA is of high ornithological importance for both wintering and breeding birds. It supports nationally important populations of eleven wintering waterfowl species. The site has a range of breeding waterfowl species, notably nationally important populations of Common Scoter and Common Tern. Of particular note is the regular presence of three species, Whooper Swan, Golden Plover and Common Tern, which are listed on Annex I of the E.U. Birds Directive. Parts of Lough Ree SPA are Wildfowl Sanctuaries.

Site Name: Lower River Shannon SAC

Site Code: 002165

This very large site stretches along the Shannon valley from Killaloe in Co. Clare to Loop Head/ Kerry Head, a distance of some 120 km. The site thus encompasses the Shannon, Feale, Mulkear and Fergus estuaries, the freshwater lower reaches of the River Shannon (between Killaloe and Limerick), the freshwater stretches of much of the Feale and Mulkear catchments and the marine area between Loop Head and Kerry Head. Rivers within the sub-catchment of the Feale include the Galey, Smearlagh, Oolagh, Allaughaun, Owveg, Clydagh, Caher, Breanagh and Glenacarney. Rivers within the sub-catchment of the Mulkear include the Killeenagarraiff, Annagh, Newport, the Dead River, the Bilboa, Glashacloonaraveela, Gortnageragh and Cahernahallia.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

- [1110] Sandbanks
- [1130] Estuaries
- [1140] Tidal Mudflats and Sandflats
- [1150] Coastal Lagoons*
- [1160] Large Shallow Inlets and Bays
- [1170] Reefs
- [1220] Perennial Vegetation of Stony Banks
- [1230] Vegetated Sea Cliffs
- [1310] *Salicornia* Mud
- [1330] Atlantic Salt Meadows
- [1410] Mediterranean Salt Meadows
- [3260] Floating River Vegetation
- [6410] *Molinia* Meadows
- [91E0] Alluvial Forests*
- [1029] Freshwater Pearl Mussel (*Margaritifera margaritifera*)
- [1095] Sea Lamprey (*Petromyzon marinus*)
- [1096] Brook Lamprey (*Lampetra planeri*)
- [1099] River Lamprey (*Lampetra fluviatilis*)
- [1106] Atlantic Salmon (*Salmo salar*)
- [1349] Bottle-nosed Dolphin (*Tursiops truncatus*)
- [1355] Otter (*Lutra lutra*)

The Shannon and Fergus Rivers flow through Carboniferous limestone as far as Foynes, but west of Foynes Namurian shales and flagstones predominate (except at Kerry Head, which is formed from Old Red Sandstone). The eastern sections of the Feale catchment flow through Namurian rocks and the western stretches through Carboniferous limestone. The Mulkear flows through Lower Palaeozoic rocks in the upper reaches before passing through Namurian rocks, followed by Lower Carboniferous shales and Carboniferous limestone. The Mulkear River itself, immediately north of Pallas Green, passes through an area of Rhyolites, Tuffs and Agglomerates.

The Shannon and Fergus Estuaries form the largest estuarine complex in Ireland. They form a unit stretching from the upper tidal limits of the Shannon and Fergus Rivers to the mouth of the Shannon Estuary (considered to be a line across the narrow strait between Kilcredaun Point and Kilconly Point). Within this main unit there are several tributaries with their own 'sub-estuaries' e.g. the Deel River, Mulkear River, and Maigue River. To the west of Foynes, a number of small estuaries form indentations in the predominantly hard coastline, namely Poulmasherry Bay, Ballylongford Bay, Clonderalaw Bay and the Feale or Cashen River estuary.

Both the Fergus and inner Shannon Estuaries feature vast expanses of intertidal mudflats, often fringed with saltmarsh vegetation. The smaller estuaries also feature mudflats, but have their own unique characteristics, e.g. Poulmasherry Bay is stony and unusually rich in species and biotopes. Plant species are typically scarce on the mudflats, although there are some eelgrass (*Zostera* spp.) beds and patches of green algae (e.g. *Ulva* sp. and *Enteromorpha* sp.). The main macro-invertebrate community which has been noted from the inner Shannon and Fergus estuaries is a *Macoma-Scrobicularia-Nereis* community.

In the transition zone between mudflats and saltmarsh, specialised colonisers of mud predominate. For example, swards of Common Cord-grass (*Spartina anglica*) frequently occur in the upper parts of the estuaries. Less common are swards of Glasswort (*Salicornia europaea* agg.). In the innermost parts of the estuaries, the tidal channels or creeks are fringed with species such as Common Reed (*Phragmites australis*) and club-rushes (*Scirpus maritimus*, *S. tabernaemontani* and *S. triquetrus*). In addition to the nationally rare Triangular Club-rush (*Scirpus triquetra*), two scarce species are found in some of these creeks (e.g. Ballinacurra Creek): Lesser Bulrush (*Typha angustifolia*) and Summer Snowflake (*Leucojum aestivum*).

Saltmarsh vegetation frequently fringes the mudflats. Over twenty areas of estuarine saltmarsh have been identified within the site, the most important of which are around the Fergus estuary and at Ringmoylan Quay. The dominant type of saltmarsh present is Atlantic salt meadow occurring over mud. Characteristic species occurring include Common Saltmarsh-grass (*Puccinellia maritima*), Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Sea-milkwort (*Glaux maritima*), Sea Plantain (*Plantago maritima*), Red Fescue (*Festuca rubra*), Creeping Bent (*Agrostis stolonifera*), Saltmarsh Rush (*Juncus gerardi*), Long-bracted Sedge (*Carex extensa*), Lesser Sea-spurrey

(*Spergularia marina*) and Sea Arrowgrass (*Triglochin maritima*). Areas of Mediterranean salt meadows, characterised by clumps of Sea Rush (*Juncus maritimus*) occur occasionally. Two scarce species are found on saltmarshes in the vicinity of the Fergus estuary: a type of robust saltmarsh-grass (*Puccinellia foucaudii*), sometimes placed within the species Common Saltmarsh-grass (*P. maritima*) and Hard-grass (*Parapholis strigosa*).

Saltmarsh vegetation also occurs around a number of lagoons within the site, two of which have been surveyed as part of a National Inventory of Lagoons. Cloonconeen Pool (4-5 ha) is a natural sedimentary lagoon impounded by a low cobble barrier. Seawater enters by percolation through the barrier and by overwash. This lagoon represents a type which may be unique to Ireland since the substrate is composed almost entirely of peat. The adjacent shore features one of the best examples of a drowned forest in Ireland. Aquatic vegetation in the lagoon includes typical species such as Beaked Tasselweed (*Ruppia maritima*) and green algae (*Cladophora* sp.). The fauna is not diverse, but is typical of a high salinity lagoon and includes six lagoon specialists (*Hydrobia ventrosa*, *Cerastoderma glaucum*, *Lekanesphaera hookeri*, *Palaemonetes varians*, *Sigara stagnalis* and *Enochrus bicolor*). In contrast, Shannon Airport Lagoon (2 ha) is an artificial saline lake with an artificial barrier and sluiced outlet. However, it supports two Red Data Book species of stonewort (*Chara canescens* and *Chara cf. connivens*).

Most of the site west of Kilcredaun Point/Kilconly Point is bounded by high rocky sea cliffs. The cliffs in the outer part of the site are sparsely vegetated with lichens, Red Fescue, Sea Beet (*Beta vulgaris* subsp. *maritima*), Sea Campion (*Silene vulgaris* subsp. *maritima*), Thrift and plantains (*Plantago* spp.). A rare endemic type of sea-lavender, *Limonium recurvum* subsp. *pseudotranswallianum*, occurs on cliffs near Loop Head. Cliff-top vegetation usually consists of either grassland or maritime heath. The boulder clay cliffs further up the estuary tend to be more densely vegetated, with swards of Red Fescue and species such as Kidney Vetch (*Anthyllis vulneraria*) and Common Bird's-foot-trefoil (*Lotus corniculatus*).

The site supports an excellent example of a large shallow inlet and bay. Littoral sediment communities in the mouth of the Shannon Estuary occur in areas that are exposed to wave action and also in areas extremely sheltered from wave action. Characteristically, exposed sediment communities are composed of coarse sand and have a sparse fauna. Species richness increases as conditions become more sheltered. All shores in the site have a zone of sand hoppers at the top, and below this each of the shores has different characteristic species giving a range of different shore types.

The intertidal reefs in the Shannon Estuary are exposed or moderately exposed to wave action and subject to moderate tidal streams. Known sites are steeply sloping and show a good zonation down the shore. Well developed lichen zones and littoral reef communities offering a high species richness in the sublittoral fringe and strong populations of the Purple Sea Urchin *Paracentrotus lividus* are found. The communities found are tolerant to sand scour and tidal streams. The infralittoral reefs range from sloping platforms with some vertical steps, to ridged bedrock with

gullies of sand between the ridges, to ridged bedrock with boulders or a mixture of cobbles, gravel and sand. Kelp is very common to about 18 m. Below this it becomes rare and the community is characterised by coralline crusts and red foliose algae.

Other coastal habitats that occur within the site include stony beaches and bedrock shores (these support a typical zonation of seaweeds such as *Fucus* spp., *Ascophyllum nodosum* and kelps), shingle beaches (with species such as Sea Beet, Sea Mayweed - *Matricaria maritima*, Sea Campion and Curled Dock - *Rumex crispus*), sandbanks which are slightly covered by sea water at all times (e.g. in the area from Kerry Head to Beal Head) and sand dunes (a small area occurs at Beal Point, where Marram - *Ammophila arenaria* is the dominant species).

Freshwater rivers have been included in the site, most notably the Feale and Mulkear catchments, the Shannon from Killaloe to Limerick (along with some of its tributaries, including a short stretch of the Kilmastulla River), the Fergus up as far as Ennis, and the Cloon River. These systems are very different in character: the Shannon is broad, generally slow flowing and naturally eutrophic; the Fergus is smaller and alkaline; while the narrow, fast flowing Cloon is acid in nature. The Feale and Mulkear catchments exhibit all the aspects of a river from source to mouth. Semi-natural habitats, such as wet grassland, wet woodland and marsh occur by the rivers, but improved grassland is the most common habitat type. One grassland type of particular conservation significance, *Molinia* meadows, occurs in several parts of the site and the examples at Worldsend on the River Shannon are especially noteworthy. Here are found areas of wet meadow dominated by rushes (*Juncus* spp.) and sedges (*Carex* spp.), and supporting a diverse and species-rich vegetation, including such uncommon species as Blue-eyed Grass (*Sisyrinchium bermudiana*) and Pale Sedge (*C. pallescens*).

Floating river vegetation characterised by species of water-crowfoot (*Ranunculus* spp.), pondweeds (*Potamogeton* spp.) and the moss *Fontinalis antipyretica* are present throughout the major river systems within the site. The rivers contain an interesting bryoflora with *Schistidium alpicola* var. *alpicola* recorded from in-stream boulders on the Bilboa, new to Co. Limerick.

Alluvial woodland occurs on the banks of the Shannon and on islands in the vicinity of the University of Limerick. The woodland is up to 50 m wide on the banks and somewhat wider on the largest island. The most prominent woodland type is gallery woodland where White Willow (*Salix alba*) dominates the tree layer with occasional Alder (*Alnus glutinosa*). The shrub layer consists of various willow species with Rusty Willow (*Salix cinerea* ssp. *oleifolia*) and what appear to be hybrids of *S. alba* x *S. viminalis*. The herbaceous layer consists of tall perennial herbs. A fringe of bulrush (*Typha* sp.) occurs on the river side of the woodland. On slightly higher ground above the wet woodland and on the raised embankment remnants of mixed oak-ash-alder woodland occur. These are poorly developed and contain numerous exotic species but locally there are signs that it is invading open grassland. Alder is the principal tree species, with occasional Pedunculate Oak (*Quercus robur*), elm (*Ulmus glabra* and *U. procera*), Hazel (*Corylus avellana*), Hawthorn (*Crataegus monogyna*) and

the shrubs Guelder-rose (*Viburnum opulus*) and willows. The ground flora is species-rich.

While woodland is infrequent within the site, however Cahiracon Wood contains a strip of old oak woodland. Sessile Oak (*Q. petraea*) forms the canopy, with an understorey of Hazel and Holly (*Ilex aquifolium*). Great Wood-rush (*Luzula sylvatica*) dominates the ground flora. Less common species present include Great Horsetail (*Equisetum telmateia*) and Pendulous Sedge (*Carex pendula*).

In the low hills to the south of the Slievefelim Mountains, the Cahernahallia River cuts a valley through the Upper Silurian rocks. For approximately 2 km south of Cappagh Bridge at Knockanavar, the valley sides are wooded. The woodland consists of birch (*Betula* spp.), Hazel, oak, Rowan (*Sorbus aucuparia*), some Ash (*Fraxinus excelsior*) and willow (*Salix* spp.). Most of the valley is not grazed by stock, and as a result the trees are regenerating well. The ground flora features prominent Great wood-rush and Bilberry (*Vaccinium myrtillus*), along with a typical range of woodland herbs. Bracken (*Pteridium aquilinum*) is a feature in areas where there is more light available.

The valley sides of the Bilboa and Gortnageragh Rivers, on higher ground north-east of Cappamore, support patches of semi-natural broadleaf woodland dominated by Ash, Hazel, oak and birch. There is a good scrub layer with Hawthorn, willow, Holly and Blackthorn (*Prunus spinosa*) common. The herb layer in these woodlands is often open, with a typically rich mixture of woodland herbs and ferns. Moss species diversity is high. The woodlands are ungrazed. The Hazel is actively coppiced in places.

There is a small area of actively regenerating cut-away raised bog at Ballyrorheen. It is situated approximately 5 km north-west of Cappamore in Co. Limerick. The bog contains some wet areas with good cover of bog mosses (*Sphagnum* spp.). Species of particular interest include Cranberry (*Vaccinium oxycoccos*) and White Sedge (*Carex curta*), along with two regionally rare mosses, including the bog moss *S. fimbriatum*. The site is being invaded by Downy Birch (*Betula pubescens*) scrub woodland. Both commercial forestry and the spread of Rhododendron (*Rhododendron ponticum*) has greatly reduced the overall value of the site.

A number of plant species that are listed in the Irish Red Data Book occur within the site, and several of these are protected under the Flora (Protection) Order, 1999. These include Triangular Club-rush (*Scirpus triquetrus*), a species which is only found in Ireland only in the Shannon Estuary, where it borders creeks in the inner estuary. Opposite-leaved Pondweed (*Groenlandia densa*) is found in the Shannon where it passes through Limerick City, while Meadow Barley (*Hordeum secalinum*) is abundant in saltmarshes at Ringmoylan and Mantlehill. Hairy Violet (*Viola hirta*) occurs in the Askeaton/Foynes area. Golden Dock (*Rumex maritimus*) is noted as occurring in the River Fergus estuary. Finally, Bearded Stonewort (*Chara canescens*), a brackish water specialist, and Convergent Stonewort (*Chara connivens*) are both found in Shannon Airport Lagoon.

Overall, the Shannon and Fergus Estuaries support the largest numbers of wintering waterfowl in Ireland. The highest count in 1995-96 was 51,423 while in 1994-95 it was 62,701. Species listed on Annex I of the E.U. Birds Directive which contributed to these totals include: Great Northern Diver (3; 1994/95), Whooper Swan (201; 1995/96), Pale-bellied Brent Goose (246; 1995/96), Golden Plover (11,067; 1994/95) and Bar-tailed Godwit (476; 1995/96). In the past, three separate flocks of Greenland White-fronted Goose were regularly found, but none were seen in 1993/94.

Other wintering waders and wildfowl present include Greylag Goose (216; 1995/96), Shelduck (1,060; 1995/96), Wigeon (5,976; 1995/96), Teal (2,319; 1995-96), Mallard (528; 1995/96), Pintail (45; 1995/96), Shoveler (84; 1995/96), Tufted Duck (272; 1995/96), Scaup (121; 1995/96), Ringed Plover (240; 1995/96), Grey Plover (750; 1995/96), Lapwing (24,581; 1995/96), Knot (800; 1995/96), Dunlin (20,100; 1995/96), Snipe (719; 1995/96), Black-tailed Godwit (1,062; 1995/96), Curlew (1,504; 1995/96), Redshank (3,228; 1995/96), Greenshank (36; 1995/96) and Turnstone (107; 1995/96). A number of wintering gulls are also present, including Black-headed Gull (2,216; 1995/96), Common Gull (366; 1995/96) and Lesser Black-backed Gull (100; 1994/95). This is the most important coastal site in Ireland for a number of the waders including Lapwing, Dunlin, Snipe and Redshank. It also provides an important staging ground for species such as Black-tailed Godwit and Greenshank.

A number of species listed on Annex I of the E.U. Birds Directive breed within the site. These include Peregrine Falcon (2-3 pairs), Sandwich Tern (34 pairs on Rat Island, 1995), Common Tern (15 pairs: 2 on Sturamus Island and 13 on Rat Island, 1995), Chough (14-41 pairs, 1992) and Kingfisher. Other breeding birds of note include Kittiwake (690 pairs at Loop Head, 1987) and Guillemot (4,010 individuals at Loop Head, 1987).

There is a resident population of Bottle-nosed Dolphin in the Shannon Estuary. This is the only known resident population of this E.U. Habitats Directive Annex II species in Ireland. The population is estimated (in 2006) to be 140 ± 12 individuals. Otter, a species also listed on Annex II of this Directive, is commonly found on the site.

Five species of fish listed on Annex II of the E.U. Habitats Directive are found within the site. These are Sea Lamprey (*Petromyzon marinus*), Brook Lamprey (*Lampetra planeri*), River Lamprey (*Lampetra fluviatilis*), Twaite Shad (*Allosa fallax fallax*) and Salmon (*Salmo salar*). The three lampreys and Salmon have all been observed spawning in the lower Shannon or its tributaries. The Fergus is important in its lower reaches for spring salmon, while the Mulkear catchment excels as a grilse fishery, though spring fish are caught on the actual Mulkear River. The Feale is important for both types. Twaite Shad is not thought to spawn within the site. There are few other river systems in Ireland which contain all three species of lamprey.

Two additional fish species of note, listed in the Irish Red Data Book, also occur, namely Smelt (*Osmerus eperlanus*) and Pollan (*Coregonus autumnalis pollan*). Only the former has been observed spawning in the Shannon.

Freshwater Pearl Mussel (*Margaritifera margaritifera*), a species listed on Annex II of the E.U. Habitats Directive, occurs abundantly in parts of the Cloon River.

There is a wide range of land uses within the site. The most common use of the terrestrial parts is grazing by cattle, and some areas have been damaged through over-grazing and poaching. Much of the land adjacent to the rivers and estuaries has been improved or reclaimed and is protected by embankments (especially along the Fergus estuary). Further, reclamation continues to pose a threat, as do flood relief works (e.g. dredging of rivers). Gravel extraction poses a major threat on the Feale.

In the past, cord-grass (*Spartina* sp.) was planted to assist in land reclamation. This has spread widely, and may oust less vigorous colonisers of mud and may also reduce the area of mudflat available to feeding birds.

Domestic and industrial wastes are discharged into the Shannon, but water quality is generally satisfactory, except in the upper estuary where it reflects the sewage load from Limerick City. Analyses for trace metals suggest a relatively clean estuary with no influences of industrial discharges apparent. Further industrial development along the Shannon and water polluting operations are potential threats.

Fishing is a main tourist attraction on the Shannon and there are a large number of angler associations, some with a number of beats. Fishing stands and styles have been erected in places. The River Feale is a designated Salmonid Water under the E.U. Freshwater Fish Directive. Other uses of the site include commercial angling, oyster farming, boating (including dolphin-watching trips) and shooting. Some of these may pose threats to the birds and dolphins through disturbance. Specific threats to the dolphins include underwater acoustic disturbance, entanglement in fishing gear and collisions with fast moving craft.

This site is of great ecological interest as it contains a high number of habitats and species listed on Annexes I and II of the E.U. Habitats Directive, including the priority habitats lagoon and alluvial woodland, the only known resident population of Bottle-nosed Dolphin in Ireland and all three Irish lamprey species. A good number of Red Data Book species are also present, perhaps most notably the thriving populations of Triangular Club-rush. A number of species listed on Annex I of the E.U. Birds Directive are also present, either wintering or breeding. Indeed, the Shannon and Fergus Estuaries form the largest estuarine complex in Ireland and support more wintering wildfowl and waders than any other site in the country. Most of the estuarine part of the site has been designated a Special Protection Area (SPA), under the E.U. Birds Directive, primarily to protect the large numbers of migratory birds present in winter.

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 to the town of Portumna; it lies within Counties Galway, Roscommon, Westmeath, Offaly and Tipperary. 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 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. The diversity of semi-natural habitats present and the sheer size of the site attract an excellent diversity of bird species, including significant populations of several.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Whooper Swan, Wigeon, Corncrake, Golden Plover, Lapwing, Black-tailed Godwit and Black-Headed Gull. It is also of special conservation interest for holding an assemblage of over 20,000 wintering waterbirds. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

The Middle Shannon Callows qualifies as a site of international importance as it regularly supports in excess of 20,000 wintering waterbirds (23,656 – four year mean peak for four of the winters between 1995/96 and 1999/2000). The site also supports internationally important populations of Whooper Swan (305 – five year mean peak for the period 1995/96 to 1999/2000) and Black-tailed Godwit (485 – four year mean peak for four of the winters between 1995/96 and 1999/2000). Four further species of wintering waterbird occur in numbers of national importance, i.e. Wigeon (3,059), Golden Plover (4,133), Lapwing (13,240) and Black-headed Gull (1,209) – all figures are four year mean peaks for four of the winters between 1995/96 and 1999/2000.

The Shannon Callows is the largest site monitored as part of I-WeBS and many parts of it are inaccessible on the ground. Annual monitoring of the wintering waterbirds of the Shannon Callows is undertaken by aerial surveys in January/February with some areas also covered by ground counts. The importance of the site for some species may have been underestimated if count coverage missed the brief spring peaks for these species, e.g. peak counts of Lapwing (23,409) and Black-tailed Godwit (1,096) recorded in the baseline period (1995/96 to 1999/2000) have been considerably higher than the four year means. A wide range of other species occurs within the site, including Mute Swan (407), Teal (88), Tufted Duck (41), Dunlin

(335), Curlew (162) and Redshank (39). Small numbers of Greenland White-fronted Goose use the Shannon Callows (peak 55 in 1998/99) 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 Shannon Callows is also an important site for breeding waders with the total population on the Shannon and Little Brosna Callows being one of three major concentrations in Ireland and Britain in 1987. Numbers of some species have declined since then but a survey of the Shannon Callows in 2002 recorded the following breeding waders - Lapwing (63 pairs), Redshank (116 pairs), Snipe (139 drumming birds) and Curlew (8 pairs). 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 Middle Shannon Callows SPA supports a breeding population of Corncrake (19 pairs - five year mean peak between 2003 and 2007, based on records of calling males).

Corncrake winter in southern and eastern Africa, migrating northwards to arrive on their breeding grounds from early April onwards, departing again in August and September. They require the cover of tall vegetation throughout their breeding cycle and are strongly associated with meadows which are harvested annually, where they nest and feed. Annual cutting of these meadows creates a sward which is easy for the birds to move through. Other habitats, which can provide cover for Corncrake in the early and late stages of the breeding season, are also important for this species.

Corncrake is listed on the 2010 International Union for Conservation of Nature (IUCN) Red List of Threatened Species. This is due to population and range declines of more than 50% in the last 25 years across significant parts of its range.

Quail, a related, scarce species, is also known to breed within the callow grasslands.

A good variety of other bird species are attracted to the site. Birds of prey, including scarce species such as Merlin and wintering Hen Harrier have been recorded 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 is also known to occur within the site. Whinchat, an uncommon breeding species, occurs in small numbers.

The Middle Shannon Callows SPA is an internationally important site that supports an assemblage of over 20,000 wintering waterbirds. It holds internationally important populations of two species - Whooper Swan and Black-tailed Godwit. In addition, there are four species that have wintering populations of national importance. The site also supports a nationally important breeding population of Corncrake. Of particular note is that several of the species which occur regularly are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Corncrake and Golden Plover.

10.1.2012

SITE SYNOPSIS

SITE NAME: MONGAN BOG SPA

SITE CODE: 004017

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 part of its perimeter by high ground on mineral soil.

The bog has a well-developed microtopography of hummocks, pools and lawns. Species such as Ling Heather (*Calluna vulgaris*), Cross-leaved Heath (*Erica tetralix*), cottongrasses (*Eriophorum angustifolium*, *E. vaginatum*), Carnation Sedge (*Carex panicea*) and White Beak-sedge (*Rhynchospora alba*) are common. A good variety of bog mosses (*Sphagnum* spp.) and other bryophytes are found. Strips of cut-away bog, part of which is colonised by willows (*Salix* spp.) and birch (*Betula* sp.) scrub, occur along the margins of the peat dome.

At the time this site was identified for Special Protection Area (SPA) designation it was being utilised by Greenland White-fronted Goose from the internationally important River Suck population. Although Greenland White-fronted Goose does not currently utilise the site, this species is regarded as a special conservation interest for this SPA.

Mongan Bog is one of the raised bogs that was traditionally used as a feeding/roosting site by small numbers of the River Suck population of Greenland White-fronted Goose. These birds utilise the callows near the mouth of the Suck to Shannonbridge and as far as Clonmacnoise. The numbers of Greenland White-fronted Goose using this part of the range was always small (peak count of 26 in 1984/85) and geese have not been recorded using the site in recent years - the last record was 11 individuals in 1989/90.

The cutaway area of bog provides habitat for a range of bird species, including birds of prey, thrushes, warblers and finches. A study of the birds of Mongan Bog in 1985 recorded Mallard, Snipe, Skylark and Meadow Pipit breeding on the peat dome.

Mongan Bog is owned by An Taisce (the National Trust) and is a Ramsar Convention site, a Biogenetic Reserve and a Statutory Nature Reserve.

25.3.2014

SITE SYNOPSIS

SITE NAME: RIVER SHANNON AND RIVER FERGUS ESTUARIES SPA

SITE CODE: 004077

The estuaries of the River Shannon and River Fergus form the largest estuarine complex in Ireland. The site comprises the entire estuarine habitat from Limerick City westwards as far as Doonaha in Co. Clare and Dooneen Point in Co. Kerry.

The site has vast expanses of intertidal flats which contain a diverse macro-invertebrate community, e.g. *Macoma-Scrobicularia-Nereis*, which provides a rich food resource for the wintering birds. Salt marsh vegetation frequently fringes the mudflats and this provides important high tide roost areas for the wintering birds. Elsewhere in the site the shoreline comprises stony or shingle beaches.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Cormorant, Whooper Swan, Light-bellied Brent Goose, Shelduck, Wigeon, Teal, Pintail, Shoveler, Scaup, Ringed Plover, Golden Plover, Grey Plover, Lapwing, Knot, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank, Greenshank and Black-headed Gull. It is also of special conservation interest for holding an assemblage of over 20,000 wintering waterbirds. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

The site is the most important coastal wetland site in the country and regularly supports in excess of 50,000 wintering waterfowl (57,133 - five year mean for the period 1995/96 to 1999/2000), a concentration easily of international importance. The site has internationally important populations of Light-bellied Brent Goose (494), Dunlin (15,131), Black-tailed Godwit (2,035) and Redshank (2,645). A further 17 species have populations of national importance, i.e. Cormorant (245), Whooper Swan (118), Shelduck (1,025), Wigeon (3,761), Teal (2,260), Pintail (62), Shoveler (107), Scaup (102), Ringed Plover (223), Golden Plover (5,664), Grey Plover (558), Lapwing (15,126), Knot (2,015), Bar-tailed Godwit (460), Curlew (2,396), Greenshank (61) and Black-headed Gull (2,681) - figures are five year mean peak counts for the period 1995/96 to 1999/2000. The site is among the most important in the country for several of these species, notably Dunlin (13 % of national total), Lapwing (6% of national total) and Redshank (9% of national total).

The site also supports a nationally important breeding population of Cormorant (93 pairs in 2010).

Other species that occur include Mute Swan (103), Mallard (441), Red-breasted Merganser (20), Great Crested Grebe (50), Grey Heron (38), Oystercatcher (551),

Turnstone (124) and Common Gull (445) - figures are five year mean peak counts for the period 1995/96 to 1999/2000.

Apart from the wintering birds, large numbers of some species also pass through the site whilst on migration in spring and/or autumn.

The River Shannon and River Fergus Estuaries SPA is an internationally important site that supports an assemblage of over 20,000 wintering waterbirds. It holds internationally important populations of four species, i.e. Light-bellied Brent Goose, Dunlin, Black-tailed Godwit and Redshank. In addition, there are 17 species that have wintering populations of national importance. The site also supports a nationally important breeding population of Cormorant. Of particular note is that three of the species which occur regularly are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Golden Plover and Bar-tailed Godwit. Parts of the River Shannon and River Fergus Estuaries SPA are Wildfowl Sanctuaries.

30.5.2015



Site Name: River Shannon Callows SAC

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 much of its length the site is bordered by raised bogs (many, but not all, of which are subject to 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 with similar habitats, River Suck Callows and Little Brosna Callows.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[6410] <i>Molinia</i> Meadows
[6510] Lowland Hay Meadows
[7230] Alkaline Fens
[8240] Limestone Pavement*
[91E0] Alluvial Forests*
[1355] Otter (<i>Lutra lutra</i>)

The River Shannon Callows is mainly composed of lowland wet grassland. Different plant communities occur, depending on elevation, and therefore flooding patterns. Two habitats listed on Annex I of the E.U. 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*).

A further two 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 consisting mainly of 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 (*Corylus avellana*) 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 Ribwort Plantain (*Plantago lanceolata*). Ferns associated with the cracks in the pavement include *Asplenium trichomanes*, *A. ruta-muraria*, *A. adiantum-nigrum* and *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 in one area.

Other habitats of smaller area but also of 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 (*Ophioglossum vulgatum*) and Spring-sedge (*Carex caryophyllea*), and both contain an unusually wide variety of grasses, including False Oat-grass (*Arrhenatherum elatius*), Yellow Oat-grass (*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 broadleaved semi-natural woodland dominated by both Downy Birch (*Betula pubescens*) and Alder (*Alnus glutinosa*), and dry broadleaved woodland dominated by Hazel. 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.).

Immediately south of Portumna Bridge and south east of the town of Portumna the area of low-lying terrestrial land west of the river comprises a large area of the Annex I habitat alkaline fen. The fen comprises a complex of rich-fen plant communities. Sedges (*Carex lasiocarpa*, *Carex acutiformis*) and Bogbean (*Menyanthes trifoliata*) dominate parts of the fens while other small sedges are common throughout. The orchids Early Marsh Orchid (*Dactylorhiza incarnata*), Western Marsh Orchid (*D. majalis*) and Marsh Helleborine (*Epipactis palustris*) and the red-listed plant species Marsh Pea (*Lathyrus palustris*) have been recorded within the fen.

Two species which are legally protected under the Flora (Protection) Order, 2015, 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 Meadow Barley in Ireland. The Red Data Book plant Green-winged Orchid is known from dry calcareous grasslands within the site.

The site is of international importance for wintering waterfowl as numbers regularly exceed the 20,000 threshold (mean of 34,985 for five 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 five 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 has at times held 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, but numbers have dropped significantly since then. The total population of breeding waders (Lapwing, Redshank, Snipe and Curlew) in 1987 was one of three major concentrations in Ireland and Britain. The population of breeding Redshank in the site was estimated to be 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 E.U. 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 damaging activities can yet be said to be having a serious impact. 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 E.U. Habitats Directive occur within the site – *Molinia* meadows and lowland hay meadows with good examples of a further three Annex habitats (two 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.

SITE SYNOPSIS

SITE NAME: RIVER SUCK CALLOWS SPA

SITE CODE: 004097

The River Suck Callows SPA is a linear, sinuous site comprising a section of the River Suck from Castlecoote, Co. Roscommon to its confluence with the River Shannon close to Shannonbridge, a distance of approximately 70 km along the course of the river. The river forms part of the boundary between Counties Galway and Roscommon. The site includes the River Suck itself and the adjacent areas of seasonally-flooded semi-natural lowland wet callow grassland. The River Suck is the largest tributary of the River Shannon.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Whooper Swan, Greenland White-fronted Goose, Wigeon, Golden Plover and Lapwing. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

The River Suck Callows SPA is an important site for wintering waterfowl. Of particular note is the nationally important Greenland White-fronted Goose flock (293 – five year mean peak for the period 1994/95 to 1998/99) which congregates mainly in the middle reaches of the river. Four other species occur in populations of national importance, i.e. Whooper Swan (164), Wigeon (3,232), Golden Plover (2,241) and Lapwing (3,906) – all figures are five year mean peaks from aerial surveys between 2001/02 and 2005/06. Other species present include Mute Swan (122), Teal (402), Mallard (70), Black-tailed Godwit (24), Curlew (22) and Black-headed Gull (86).

The River Suck Callows SPA is of considerable ornithological importance, in particular for the presence of nationally important populations of five species. Of note is that three of the species that occur regularly, i.e. Whooper Swan, Greenland White-fronted Goose and Golden Plover, are listed on Annex I of the E.U. Birds Directive. Part of the River Suck Callows SPA is a Wildfowl Sanctuary.

SITE SYNOPSIS

SITE NAME: ANNAGHBEG BOG NHA

SITE CODE: 002344

Annaghbeg Bog NHA is located 5 km south-east of Ahascragh, mostly in the townlands of Addergoole West, Addergoole North, Gortbrackmoor and Annaghbeg in Co. Galway. The site comprises a raised bog that includes both areas of high bog and cutover bog.

This raised bog was originally part of an extensive system of bogs that, with the exception for Annaghbeg, have now been cutover. Annaghbeg Bog is in close proximity to Crit Island NHA (254) and Killure Bog NHA (1283). Although this bog has no pools it is wet and quaking in places with hummocks throughout the high bog. Cutover is found all around the high bog.

Much of the high bog has vegetation typical of a Midland Raised Bog, consisting of Ling Heather (*Calluna vulgaris*), Deergrass (*Scirpus cespitosus*), Cranberry (*Vaccinium oxycoccos*) and Bog-rosemary (*Andromeda polifolia*). The vegetation on the bog is uniform and dominated by Carnation Sedge (*Carex panicea*), Deergrass, Bog Asphodel (*Narthecium ossifragum*) and White Beak-sedge (*Rhynchospora alba*). Close to the centre of the bog the surface is wet and quaking, bog moss cover is at its highest and Bogbean (*Menyanthes trifoliata*) is present. Hummocks of the bog mosses *Sphagnum capillifolium* and *S. papillosum* are common and *S. magellanicum* is also frequent, the hummock forming bog moss *S. imbricatum* was less common. Away from the centre of the bog *Sphagnum* cover is low. Bog Asphodel dominates to the south of the site, in areas that have been recently burnt, and towards the south-east Ling Heather becomes more dominant on dryer hummocks. In the east of the site there is an old townland boundary drain that is in-filled with the aquatic bog moss *S. cuspidatum*, Bog Asphodel and White Beak-sedge. In the adjacent drain Sundew (*Drosera* sp.) was also recorded. The high bog is surrounded by cutover, much of which has been reclaimed as agricultural grassland, however small areas in the east and north-west have patches of Gorse (*Ulex* sp.) scrub.

Common frog, a species listed in the Red Data Book, has been recorded on the site.

Current landuses on the site include peat-cutting and agriculture. Active peat-cutting is taking place in the west and south of the site. The cutting in the south seems to be more intensive and commercial. Areas of cutover all around the bog have been reclaimed for agriculture and much of the grassland seems to have been improved. Damaging activities associated with these landuses include drainage throughout the site and burning of the high bog. All these activities have resulted in the loss of habitat, damage to the hydrological status of the site, and pose a continuing threat to its viability.

Annaghbeg Bog NHA 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 hummocks. Ireland has a high proportion of the total E.U. resource of raised bog (over 50%) and so has a special responsibility for its conservation at an international level.

20.11.2002

SITE SYNOPSIS

SITE NAME: CARRICKYNAGHTAN BOG NHA

SITE CODE: 001623

Carrickynaghtan Bog NHA is situated approximately 4 km south of Athlone on the west of the River Shannon, mainly in the townlands of Cloonown and Carrickynaghtan in Co. Roscommon. The site comprises a raised bog that includes both areas of high bog and cutover bog. The site is mostly bounded by reclaimed grassland and tracks.

The raised bog consists of a large, but very dissected area, with numerous tracks crossing the site. There are large areas of cutover separating two intact portions of high bog at the north and south of the site. The northern portion contains pools, although many are algae-filled.

Much of the high bog vegetation is typical of raised bogs in Ireland, containing species such as Ling Heather (*Calluna vulgaris*), Cross-leaved Heath (*Erica tetralix*) and bog mosses (*Sphagnum* spp.). At the northern part of the site there is a large relatively intact area of high bog. This has a number of pools, of which many are algae-filled, but some have the bog moss *Sphagnum cuspidatum*. The surface is not quaking and is dominated by Ling Heather, with Deergrass (*Scirpus cespitosus*) and Cottongrass species, mainly *Eriophorum vaginatum*. The White Beak-sedge (*Rhynchospora alba*) is common, especially in wet hollows. There is an absence of well-developed hummocks, but instead there are low undulating carpets of bog mosses.

Current landuse consists of peat-cutting throughout much of the site. There is much drainage associated with this, and with old areas of peat-cutting. Large portions of the bog have been burnt repeatedly in the past. Some areas of old cutover have been reclaimed for agriculture and numerous trackways have been built through the site. These activities have resulted in loss of habitat and damage to the hydrological status of the site, and pose a continuing threat to its viability.

Carrickynaghtan Bog NHA 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. It is one of the few remaining raised bogs which developed on the former floodplain of the River Shannon. Ireland has a high proportion of the total E.U. resource of raised bog (over 50%) and so has a special responsibility for its conservation at an international level.

14.11.2002

SITE SYNOPSIS

SITE NAME: CASTLE FFRENCH EAST BOG NHA

SITE CODE: 001244

Castle Ffrench East Bog is located 5km west of Ballyforan, mainly in the townlands of Castle Ffrench East and Gowla, Co. Galway. The site consists of a small, intact raised bog, situated in a region of intensive peat development. It can be accessed from local roads to the north and west. There are extensive areas of cutover peat to the south and east and along with Castle Ffrench West Bog to the south-west, this site represents the only intact raised bog habitat remaining in this region.

The site is a raised bog consisting of areas of both high bog and cutover. The high bog has active bog moss (*Sphagnum* spp.) growth and small pool systems to the north, west and east, some of which have dried out, indicating a lowering water-table. Two series of swallow-holes and two flushed areas are also present. There are also a number of overgrown drains to the north of the high bog. Flooded cutover, wet grassland and dry grassland occur around the margins of the high bog. There is also a small wet woodland and a small dry semi-natural woodland present on the site.

The high bog has vegetation typical of a Midland Raised Bog, dominated by Common Cottongrasses (*Eriophorum angustifolium*) and Deergrass (*Scirpus cespitosus*) with Ling Heather (*Calluna vulgaris*) and lichens (*Cladonia* spp.). The drier areas of the high bog to the west and south are dominated by Ling Heather and Bog-rosemary (*Andromeda polifolia*) is quite abundant especially in wetter areas towards the centre of the high bog along with the moss (*Campylopus atrovirens*). There is good regeneration of bog mosses here with *Sphagnum papillosum* and *S. capillifolium* (but no *S. imbricatum*) and the surface is quaking. The northern pool system is the remnant of a much larger system with most of the pools drying out and containing algae. The small pool system to the west has pools filled with the bog moss *S. cuspidatum* and between the pools Carnation Sedge (*Carex panicea*) dominates with Deergrass and Cottongrasses. There is little bog moss, but some unburnt Ling Heather hummocks are present.

In the east a tear pool system with a north-south alignment occurs close to the high bog margin. It is wet and quaking with the bog mosses (*S. cuspidatum* and *S. auriculatum*) and Sundew (*Drosera* spp.). A flush with Purple moor-grass (*Molina caerulea*) and Bog Myrtle (*Myrica gale*) occurs to the north-east of the site with some small Birch (*Betula* spp.) also present. The flushed area to the south-west has a carpet of bog mosses (*Sphagnum* spp.) with Purple moor-grass, Bog Myrtle and abundant Cranberry (*Vaccinium oxycoccos*). This flush appears to be drying out due to drainage. A small natural drainage channel with swallow-holes occurs to the north of the site. Bilberry (*Vaccinium myrtillus*), Bog moss (*Sphagnum auriculatum*), Carnation Sedge and Hare's-tail Cottongrass (*Eriophorum vaginatum*) are present. Stunted Birch line this channel and Ling Heather with Lichen dominate the surrounding vegetation. A larger swallow-hole system occurs to the south-east of the

high bog with tall Birch, Scots Pine (*Pinus sylvestris*), Holly (*Ilex aquifolium*) and Bilberry.

A dry semi-natural woodland with Oak (*Quercus* spp.), Hazel (*Corylus avellana*) and Holly occurs on a small mineral ridge to the south of the site and a small flooded Birch wood is present on cutover to the north-west. Dry grassland also occurs along the southern ridge and flooded cutover and wet grassland occur around the margins of the site. Some of the old cutover is wet with Purple moor-grass, Bog Myrtle and regenerating bog mosses.

Current landuse on the site consists of agriculture and mechanical peat-cutting to the north and north-west. Damaging activities associated with these landuses include drainage and burning. There is very little new drainage on the high bog, but large portions of the bog are being burnt at regular intervals with dead hummocks and burnt Ling Heather evident. These activities have resulted in loss of habitat and damage to the hydrological status of the site, and pose a continuing threat to its viability. However the site is quite wet and some bog moss (*Sphagnum* spp.) regeneration is occurring and this will probably improve if burning stops. Some dumping also occurs by the roadside.

Castle Ffrench East Bog NHA is a site of considerable conservation significance comprising as it does a relatively intact 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 range of raised bog habitats including pool systems, flushes, swallow holes and is showing signs of active regeneration. The presence of woodland and dry grassland adds to the diversity of the site. Ireland has a high proportion of the total E.U. resource of raised bog (over 50%) and so has a special responsibility for its conservation at an international level.

SITE SYNOPSIS

SITE NAME: FORTHILL BOG NHA

SITE CODE: 001448

Forthill Bog NHA is located 2 km from the north-eastern shore of Lough Ree and 2 km south-east of Newtown Cashel. It is mainly situated in the townlands of Forthill, Claras, Ballyrevagh and Newtownflanagan, Co. Longford. It is one of only two raised bogs in this region that have not been developed for commercial peat extraction. This bog is 4 km south-west of the Ballymahon to Lanesbourogh road (R392) and can be accessed from local roads to the south-east and bog tracks to the west and north-west of the site. It is bounded by mineral soil to the east, improved grassland and cutover to the west and Birch scrub on cutover to the north.

The site consists of a small raised bog with a single dome of high bog and associated cutover. The main features of interest are the pools, flushes and wetter areas of the high bog. Towards the north-east of the high bog, there is a good though somewhat limited pool system and a small flush is present to the south-east.

The high bog has vegetation typical of a Midland Raised Bog, dominated by Ling Heather (*Calluna vulgaris*), Cottongrass (*Eriophorum* spp.), Bog Asphodel (*Narthecium ossifragum*) and Deergass (*Scirpus caespitosus*) with Cranberry (*Vaccinium oxycoccos*). Overall the high bog surface is quite wet and although bog mosses (*Sphagnum* spp.) are not very abundant, there is regeneration over most of the high bog. The dried out marginal areas to the south and south-west have little moss cover and are dominated by Ling Heather, Bog Asphodel and Carnation Sedge (*Carex panicea*) with some Bog-rosemary (*Andromeda polifolia*). There is some cracking and subsidence here with associated tear pools. Towards the north-eastern section of the high bog, there is a small pool system with some pools containing bog moss (*Sphagnum cuspidatum*) and Sundew (*Drosera* spp.). Between the pools, bog mosses (*Sphagnum imbricatum*, *S. magellanicum*, *S. capillifolium* and *S. papillosum*) are more dominant and the rare bog moss *S. fuscum* is also present. A small flush occurs in the south-east around an in-filling lake, which has wet habitat of bog moss (*Sphagnum cuspidatum*), Purple Moor-grass (*Molinia caerulea*), Cranberry and Soft Rush (*Juncus effusus*). The bog surface is slightly quaking around this lake.

There is extensive cutover present on this site, especially to the south and west. This is dominated by Purple Moor-grass, Ling Heather and Soft Rush. The cutover to the north-west is dominated by Gorse (*Ulex europaeus*) and Downy Birch (*Betula pubescens*) scrub. Along the eastern margin, there is a flushed area on a transition between the high bog and mineral soil. Purple Moor-grass dominates with Creeping Bent-grass (*Agrostis stolonifera*) and large clumps of Bog Myrtle (*Myrica gale*). This area has dried out due to drainage and Common Reed (*Phragmites australis*) is sparse. This may be the remnant of a lagg zone between the bog and the surrounding mineral soil. The ditches on the eastern and north-western boundaries are on mineral soil and contain Bulrush (*Typha latifolia*), Pondweeds (*Potamogeton* spp.) and other

aquatic plants, which reveal the groundwater influence in these locations. There is also Birch (*Betula* spp.) scrub on cutover to the north, with Bracken (*Pteridium aquilinum*) and Bramble (*Rubus fruticosus* agg.) dominating the ground layer.

Current landuse on the site consists of agricultural reclamation of old cutover and mechanical peat-cutting. Damaging activities associated with these include poaching, drainage and burning with large portions of the bog being burnt at regular intervals. These activities have resulted in loss of habitat and damage to the hydrological status of the site, and pose a continuing threat to its viability. Dumping of household rubbish and agricultural waste has also been noted on this site.

Forthill Bog NHA 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 range of raised bog micro-habitats including pools and flushes and the rare bog moss *Sphagnum fuscum*. This bog, although small and damaged by extensive cutaway, developed on the shores of Lough Ree and is the largest remaining intact bog in the region. Ireland has a high proportion of the total E.U. resource of raised bog (over 50%) and so has a special responsibility for its conservation at an international level.

SITE SYNOPSIS

SITE NAME: LOUGH SLAWN

SITE CODE: 001443

Lough Slawn is a small lough about 1km from Elfeet Bay, on the shores of Lough Ree, and some 12km south of Lanesborough. The lough, the area around the lough and an extension to the south, have been combined in a rationalisation of two former Areas of Scientific Interest (ASIs) to form a site now designated a Natural Heritage Area (NHA). Much of the western boundary of the NHA is formed by Culnagore Wood, itself a part of the large Lough Ree NHA, and the southern boundary of the site again runs down to the Lough Ree NHA.

The lough is fringed by Common Reed (*Phragmites australis*) which merges into a grassland for the main part dominated by Purple Moor-grass (*Molinia caerulea*). Downy Birch (*Betula pubescens*) and willow (*Salix* spp.) are scattered throughout. Old peat cuttings surround the basin, with a few pools and with some peatland vegetation. The underlying geology is of Carboniferous limestone, and the influence of calcium enrichment is quite clear throughout the site with species such as Grass-of-parnassus (*Parnassia palustris*) and Great Fen-sedge (*Cladium mariscus*) in the marsh and swamp areas, and Black Bog-rush (*Schoenus nigricans*) in the peatier areas.

The same base enrichment is evident in the fields to the south where Purple Moor-grass is again frequent along with other grasses such as Tall Fescue (*Festuca arundinacea*).

The base enrichment and the continuity of responsible management have combined to make this an important site. Even in a comparatively small area the diversity of habitats of interest is remarkable, and its position in relation to Culnagore Wood and the Lough Ree shoreline make this an exceptional area in a botanical sense.

SITE SYNOPSIS

SITE NAME: CRANBERRY LOUGH

SITE CODE: 001630

Cranberry Lough is a unique and botanically rich lake occupying a low-lying area within a raised bog near Ballydangan, County Roscommon. The eastern side of the lake is formed by the dry margins of the bog which is colonised mainly by Heather (*Calluna vulgaris*). The western side of the site is bounded by a mature conifer plantation. In between the lake and forestry, an extensive area of reed-beds has developed adjacent to the raised bog which on the western side is colonised by tall willow (*Salix* spp.) scrub.

The dense swards of emergent vegetation in the reed-beds are comprised of Bulrush (*Typha latifolia*), Great Fen-sedge (*Cladium mariscus*), Bottle Sedge (*Carex rostrata*) and Lesser Tussock-sedge (*Carex diandra*). The open water is colonised by floating plants such as the Yellow Water-lily (*Nuphar lutea*) and Common Duckweed (*Lemna minor*).

A 'scraw' or floating mat of vegetation separates the lake in two parts. It is based on Bogbean (*Menyanthes trifoliata*) and the colourful Marsh Cinquefoil (*Potentilla palustris*) and supports an abundance of *Spaghnum* and other mosses. Where more acidic conditions prevail, Bog-myrtle (*Myrica gale*), Round-leaved Sundew (*Drosera rotundifolia*) and Cranberry (*Vaccinium oxycoccus*) occur with sedges such Bog-sedge (*Carex limosa*) and Dioecious Sedge (*Carex dioica*). In other areas of the scraw, more herb rich communities occur. These areas are comprised of an unusual abundance of Ragged-Robin (*Lychnis flos-cuculi*) and other flowering herbs such as Wild Angelica (*Angelica sylvestris*), Marsh-marigold (*Caltha palustris*), Marsh Lousewort (*Pedicularis palustris*) and Hoary Willowherb (*Epilobium parviflorum*).

Cranberry Lough is in a very natural, undisturbed location and is quite attractive to wildlife in the area. Nesting bird species recorded include Sedge Warbler, Reed Bunting, Snipe, Curlew, Little Grebe and Moorhen. Whooper Swans have also been observed here in the winter.

24.11.2009

SITE SYNOPSIS

SITE NAME: FEACLE TURLOUGH

SITE CODE: 001634

Feacle Turlough lies approximately 12km west of Athlone in an uneven terrain of glacial deposits. The basin, which runs roughly east - west, but whose edges are sinuous because of encroaching mounds, has an uneven floor with a number of discrete hollows. Outcrop is visible at the western end - elsewhere there is some loose rock. A permanent pond occurs at the north-western end, but there is no apparent inflow.

Patterns of vegetation at this site are extremely simple; all the lower hollows have Amphibious Bistort (*Persicaria amphibia*), along with Marsh Foxtail (*Alopecurus geniculatus*) and Reed Canary-grass (*Phalaris arundinacea*). Above this, Common Sedge (*Carex nigra*) and Creeping Cinquefoil (*Potentilla reptans*) occupy the western section and areas of drier grassland on the eastern side. This spreads onto the esker in the southern section, where there is compact zonation.

The hedges at the western end have a high proportion of Buckthorn (*Rhamnus catharticus*).

A pond by the roadside is covered in a dense mat of Willow Feather-moss (*Amblystegium varium*), and by Common Duckweed (*Lemna minor*), Fat Duckweed (*L. gibba*) and Spiked Water-milfoil (*Myriophyllum spicatum*), with Common Cudweed (*Filago vulgaris*) around the edges.

The Red Data Book species, Northern Yellow-cress (*Rorippa islandica*) is found around the edges of the pond and is occasional throughout the site.

The turlough is largely grazed by sheep and some cattle.

The value of this turlough is that it is at the dry end of the wetness gradient, but seems to be unaffected by any artificial drainage. It is also unusual, it being surrounded by gravelly deposits which may affect its hydrology. Its vegetation is limited in type, but the zonation on the surrounding glacial hills is of interest. The occurrence of Fat Duckweed and Northern Yellow-cress adds to the importance of the site.

SITE SYNOPSIS

SITE NAME: WATERSTOWN LAKE

SITE CODE: 001732

About 6km north-west of Athlone, Waterstown Lake lies between Carraun Hill to the north, and a peat bog to the south. There is active peat formation along a half or two thirds of the lake margin. This peaty shore is in sharp contrast to the calcium-rich water that enters the lake from the surrounding limestone gravel drift. The lake is in a state of flux.

There are extensive fen and species-rich reed-bed areas which now divide the open water into pools. These have an interesting species composition with the main plants being Common Reed (*Phragmites australis*), Great Fen-sedge (*Cladium mariscus*) and a few species of true sedges including Greater Tussock-sedge (*Carex paniculata*). Also found is the rare Lesser Bulrush (*Typha angustifolia*).

Areas of dry former lake bed to the north and north-east are now calcareous marshes with the characteristic Black Bog-rush (*Schoenus nigricans*), Long-stalked Yellow-sedge (*Carex lepidocarpa*) and Grass-of-parnassus (*Parnassia palustris*).

The woods around the lough include interesting, wet woodlands of birch (*Betula* spp.), willow (*Salix* spp.) and Alder (*Alnus glutinosa*) that are extending into the marginal lake areas and established woods which are diverse, with oak (*Quercus* spp.), Ash (*Fraxinus excelsior*), Rowan (*Sorbus aucuparia*) and Whitebeam (*Sorbus aria*). Unfortunately the woods have become very unnatural in composition due to the introduction and spread of non-native species such as dogwood (*Cornus* spp.), Rhododendron (*Rhododendron ponticum*), spruce (*Picea* spp.) and Sycamore (*Acer pseudoplatanus*).

As may be expected with this mixture of different habitats, birds and invertebrates are well represented on the site.

Drainage of adjacent peatlands is now directing acidic water into the lake and modifications to the lake outlet have lowered the lake water level. Nevertheless this is still a fine example of a calcium-rich fen with an interesting and rare interface between alkaline calcium-rich water and acidic peatland.

25.11.2009

SITE SYNOPSIS

SITE NAME: SUCK RIVER CALLOWS NHA

SITE CODE: 000222

The Suck River Callows is a long sinuous area of semi-natural lowland wet grassland, which floods extensively each winter along the River Suck between Castlecoote in the north and Shannonbridge in the south, passing through Ballinasloe. The Suck River forms the Roscommon - Galway county boundary and joins the River Shannon at Shannonbridge. Along most of its borders, former raised bogs (now in the process of large-scale harvesting by Bord na Móna) are present. Just south of Ballyforan, there is a small intact raised bog on the eastern bank of the river, which contains both high bog and cutover. This is situated in the townlands of Ballina, Ballyforan, Coolatober and Cloonagh, Co. Roscommon and can be accessed from a road to the east.

The main habitat of the Suck River Callows is flood meadows of wet grassland and the associated aquatic and semi-aquatic habitats of drainage ditches. Secondary habitats of importance, which directly border the callows within the site are species-rich dry and wet calcareous grassland, flooded fen, wet woodland and a small raised bog with a tear pool system. There is a semi-natural margin between this raised bog and the river. Improved grasslands are also included within the site at the upper margin of wet grasslands.

The wet grassland vegetation consists of Common Sedge (*Carex nigra*), Creeping Bent (*Agrostis stolonifera*), Brown Sedge (*Carex disticha*), Marsh Foxtail (*Alopecurus geniculatus*), Reed Canary-grass (*Phalaris arundinacea*), Creeping Buttercup (*Ranunculus repens*), Jointed Rush (*Juncus articulatus*), Common Spike-rush (*Eleocharis palustris*) and Floating Sweet-grass (*Glyceria fluitans*). Many of these species are important food plants for the wintering wildfowl which also forage on the improved grasslands within the site. A large area of flooded fen with Black Bog-rush (*Schoenus nigricans*) and Common Reed (*Phragmites australis*) occurs to the north of Derrycabill Bridge. Small patches of Common Club-rush (*Scirpus lacustris*) occur in shallows along the river margin.

At Ballyforan the small intact raised bog has been classified as a True Midland Raised Bog. The vegetation of the high bog has been affected by burning and is dominated by Carnation Sedge (*Carex panicea*), Bog Asphodel (*Narthecium ossifragum*), Deergrass (*Scirpus cespitosus*) and Ling Heather (*Calluna vulgaris*), however, there is active Bog Moss (*Sphagnum* spp.) regeneration occurring. Species occurring on the site include *Sphagnum fuscum*, *S. imbricatum* and *S. capillifolium*, *S. cuspidatum* (in elongated tear pools), Great Sundew (*Drosera anglica*), Brown Beak-sedge (*Rhynchospora fusca*) and Lesser Bladderwort (*Utricularia minor*). Cross-leaved Heath (*Erica tetralix*), Bog-rosemary (*Andromeda polifolia*), cottongrasses (*Eriophorum* spp.) and lichens (*Cladonia* spp.) occur in the unburnt areas. The bog appears to be drying out and the western margin has been invaded by Downy Birch (*Betula pubescens*).

At Ballyforan Bog, the cutover to the south of the high bog is primarily reclaimed grassland. There is an uninterrupted transition from this high bog to low-lying callow grassland to the west. Active peat-cutting occurs to the north-west and east with some scrub encroachment on old cutover.

There are also small areas of cutover at the margins of the developed (cut-away) raised bogs on the banks of the River Suck. Some of this cutover is very wet, bordering on to floodmeadows and contains permanent pools with Lesser Bladderwort. Royal Fern (*Osmunda regalis*), cottongrasses and orchids (*Dactylorhiza* spp.) have been recorded on these cutover areas. Regenerating birch and Alder (*Alnus glutinosa*) woods occurs on old cutover margins throughout the site. These wet woodlands have an understory of Ling Heather and Bog-myrtle (*Myrica gale*).

The Suck River Callows is an important site for wintering waterfowl. Of particular note is the internationally important flock of Greenland White-fronted Geese based along the Suck. The birds congregate mainly in the middle reaches of the river. A separate sub-flock is centred at Glenamaddy turlough. The average maximum winter count for the period 1988/89 to 1993/94 was 386. In recent years, the only complete count of waterfowl for the site was in January 2002. Three species had populations of national importance: Whooper Swan 124, Wigeon 1,203 and Lapwing 3,640. Other species which were present included Mute Swan 90, Teal 325, Pintail 5 and Curlew 67. Of the species which occur regularly at this site, Greenland White-fronted Geese and Whooper Swan are listed on Annex I of the E.U. Birds Directive. A further Annex I species, Golden Plover, occurs at times. The good quality riverine and grassland habitats are also home to populations of Otter and Irish Hare, and Brown Trout occur in the river.

Current landuses on the site include, agriculture, active peat-cutting, forestry and conservation. The wet grasslands of the callows are used for agriculture. At Ballyforan Bog, active peat-cutting is most prevalent to the north-west and along the eastern margin of the high bog. The cutover to the south has been reclaimed for agriculture. There are extensive areas of peat-cutting by Bord na Móna along the boundaries of the site and a large area of callow and esker has been recently planted with forestry. Damaging activities associated with these landuses include habitat loss and drainage throughout the site and burning of the high bog. These activities have all resulted in the loss of habitat and damage to the hydrological status of the raised bog, and pose a continuing threat to its viability. There is a no-shooting area at Muckanagh, north of Ballyforan.

The Suck River Callows NHA, along with the River Shannon Callows cSAC (216) and River Little Brosna Callows NHA (564), form by far the largest area of lowland wet grassland in Ireland and Britain. These callows are each designated as a Special Protection Area under the E.U. Birds Directive for the presence of Internationally and Nationally Important numbers of wintering waterfowl.

The presence of raised bog is of considerable conservation significance as it is a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in

Ireland. The site supports a good diversity of raised bog microhabitats, including hummocks and pools. Ireland has a high proportion of the total E.U. resource of raised bog (over 50%) and so has a special responsibility for its conservation at an international level. The site is of major ornithological importance.

14.11.2002

