

APPENDIX FOUR — EUROPEAN DESIGNATED SITES

4

APPENDIX FOUR — EUROPEAN DESIGNATED SITES

PAGE NO.

164-197



Appendix Four: European Designated Sites

Special Areas of Conservation

River Shannon Callows (000216)

SITE NAME: River Shannon Callows

SITE CODE: 000216

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

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

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

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

At Clorhane, an area of limestone pavement represents the only known example in Co Offaly. It is predominantly colonised by mature hazel woodland, with areas of open limestone and calcareous grassland interspersed. The open limestone pavement comprises bare or moss covered rock or rock with a very thin calcareous soil cover supporting a short grassy turf. The most notable plant in the grassy area is a substantial population of Green-winged Orchids (*Orchis morio*), which occurs with such species as Sweet Vernal Grass (*Anthoxanthum odoratum*), Quaking Grass (*Briza media*), sedges (*Carex caryophyllea*, *C. flacca*), Bird's-foot Trefoil (*Lotus corniculatus*), Knapweed (*Centaurea nigra*), and Narrow-leaved Plantain (*Plantago lanceolata*). Ferns associated with the cracks in the paving include *Asplenium trichomanes*, *A. ruta-muraria*, *A. adiantum-nigrum*, *Polypodium australe*. Bryophytes include *Grimmia apocarpa* and *Orthotrichum* cf. *anomalum*. Anthills are common within the open grassland. The hazel wood is well developed and has herbaceous species such as Primrose (*Primula vulgaris*), Violet (*Viola riviniana*), Wood Sorrel (*Oxalis acetosella*) and Herb Robert (*Geranium robertianum*). The wood is noted for its luxuriant growth of epiphytic mosses and liverworts, with such species as *Neckera crispa* and *Hylocomium brevirostre*. Yew (*Taxus baccata*) occurs at one area.

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

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

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

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

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

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

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

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

Lough Ree (000440)

SITE NAME: Lough Ree

SITE CODE: 000440

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

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

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

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

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

Dry, broad-leaved, semi-natural woodland occurs in several places around the lake, most notably at St John's Wood and on Hare Island. St John's Wood is recognised as the largest and most natural

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

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

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

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

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

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

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

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

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

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

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

Garriskil Bog (000679)

SITE NAME: Garriskil Bog

SITE CODE: 000679

This raised bog site lies 3 km west of Lough Derravaragh and 3 km east of Rathowen. It is bounded to the southeast and southwest by the rivers Inny and Riffey.

The site has a well developed system of pools and hummocks occupying 25% of the dome. Here, the Bog mosses *Sphagnum imbricatum*, *S. fuscum* and the moss *Leucobryum glaucum* are important components of the hummocks, frequently crowned by the moss *Racomitrium lanuginosum* and sometimes colonised by Bilberry (*Vaccinium myrtillus*). In the pools *Sphagnum* mosses (*S. auriculatum* var. *auriculatum*, *S. cuspidatum*), Great Sundew (*Drosera anglica*), White Beak-sedge (*Rhynchospora alba*) and the liverwort *Cladopodiella fluitans* occur. In between the pools and hummocks "quaking" *Sphagnum* moss carpets support Bog Asphodel (*Narthecium ossifragum*). The area of bog away from this system is drier and more uniformly sedge-rich. In the northwest corner of the site, there is a small wet and quaking area dominated by the moss *Sphagnum cuspidatum* and Common Cottongrass (*Eriophorum angustifolium*) with Soft Rush (*Juncus effusus*), Bog Asphodel and Bottle Sedge (*Carex rostrata*) also present. Along the northeast margin a narrow band of fen-grassland occurs.

Old cutaway bog provides an additional habitat where Purple Moor-grass (*Molinia caerulea*) and Heather (*Calluna vulgaris*) dominate, along with Cottongrasses (*Eriophorum angustifolium* and *E. vaginatum*) while in some parts Downy Birch (*Betula pubescens*) woodland is developing.

On and around the hummocks a rich lichen flora, featuring an abundance of the scarce *Cladonia rangiferina*, has developed. Garriskil Bog is, on occasion, used as a refuge by the Greenland White-fronted Goose flock which winters on the large Co. Westmeath lakes. The site is within a breeding territory of a pair of Merlin. Both of these species are of high conservation importance and are listed on Annex I of the EU Birds Directive. Other birds breeding on the site include Snipe, Curlew and Redshank.

In general, human landuse within the site is low, with much of the previous cutaway areas reverting to semi-natural wilderness. Burning in the past has caused damage, with some bare peat exposure evident in places. This is always a very real threat to a bogland habitat. Past drainage of the bog has unfavourably impacted on the site, although many of these drains have now been infilled and blocked. However, a more serious threat is the arterial drainage of the R. Inny. This could result in major and irreversible damage to the hydrological integrity of this raised bog habitat.

Garriskil bog is a very good example of a relatively intact true Midland raised bog characterised by its typical flora. This habitat is increasingly under threat in Ireland. A remarkable and impressive feature of this site is an extensive and well-developed system of pools and hummocks. Garriskil Bog has one of the best developed pool systems of any remaining raised bog in the country and the site is of unique conservation value.

Lough Ennell (000685)

SITE NAME: Lough Ennell

SITE CODE: 000685

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

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

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

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

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

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

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

This site shares an internationally important Greenland White-fronted Goose flock with Loughs Iron, Glen and Owel. The numbers of Geese which visit Lough Ennell are lower than for the other lakes: 91

birds (3 year average peak). Nationally important bird populations which have been recorded on Lough Ennell are: Cormorant (average peak 149; absolute maximum 448); Mute Swan (average peak 424); Pochard (average peak 889; maximum 2,600 on 8/11/85); Tufted Duck (average peak 720) and Coot (average peak 639). All of these data were compiled from counts made over 3 seasons, 1984/85 - 1986/87. A single count of 522 Golden Plover was obtained in that period, i.e. a regionally important population.

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

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

Lough Owel (000688)

SITE NAME: Lough Owel

SITE CODE: 000688

Lough Owel is a large hard water lake, a habitat listed on Annex I of the EU Habitats Directive. The lake is located approximately 4km north-west of Mullingar. It is a relatively shallow lake with a rocky, marl-covered bottom. Submerged vegetation includes a number of Stoneworts, notably *C. rudis* and *C. tomentosa*. The rocky nature of the shoreline has given rise to marginal vegetation which is patchy and sparse. Apart from some reedswamp formed by Common Reed (*Phragmites australis*) and Common Clubrush (*Scirpus lacustris*), shoreline vegetation is dominated by occasional patches of Alder (*Alnus glutinosa*).

There are, however, areas of marsh and fen in the northern and south-western corners of the lake. These areas (Bunbrosna marsh and Tullaghan fen) were formerly separate Areas of Scientific Interest but have now been included within the Lough Owel site. Bunbrosna is an area of marsh and fen which is partially invaded by Downy Birch (*Betula pubescens*) and Willows (*Salix* spp.). The area contains some rare plant species, namely Marsh Pea (*Lathyrus palustris*), Marsh Fern (*Thelypteris palustris*) and the protected Round-leaved Wintergreen (*Pyrola rotundifolia*). In addition, four other rare plant species are found along the lake margins namely, White Sedge (*Carex curta*), Fibrous Tussock-sedge (*Carex appropinquata*), Marsh Stitchwort (*Stellaria palustris*) and Frogbit (*Hydrocharis morsus-ranae*). Tullaghan fen is an area of flooded cut-over bog which has developed a varied fen and marsh vegetation quite similar to Bunbrosna marsh. Bog-sedge (*Carex limosa*), Tussock-sedge and Marsh Fern are to be found here.

Although Lough Owel is not noted for its wildfowl, there are small populations of Mallard, Shoveler, Pochard and Tufted Duck present. Farmland adjacent to the lake provides feeding grounds for internationally important numbers of Greenland White-fronted Goose. Lough Owel is one of the most important fishing lakes in the midlands and is especially good for Trout. Scharff's Char (*Salvelinus scharffi*), a distinct race of char which was once found only in Lough Owel and Lough Ennell, is now thought to be extinct. Notable invertebrates recorded from the lake include three caddis fly species: *Tinodes maculicornis*, *Metatype fragilis* and *Limnephilus nigriceps* (Trichoptera).

With the exception of Lough Carra in County Mayo, Lough Owel is the best example of a large, spring-fed calcareous lake in the country. The site is of major conservation significance, containing, as it does, three habitats that are listed on Annex I of the EU Habitats Directive, i.e. alkaline fens, transition mires

and hard water lakes. Additionally, the site supports bird populations of conservation significance. Potential threats to the conservation interest of the lake include the increasing level of water supply to Mullingar, overfishing, eutrophication caused by local farming practices and pressure from amenity uses such as boating and fishing.

Scragh Bog (000692)

SITE NAME: Scragh Bog

SITE CODE: 000692

Scragh Bog lies approximately 10 km northwest of Mullingar, Co. Westmeath. This site comprises a wet transition fen with a floating root mat which has developed in a small oval-shaped depression. The fen is fed by weak surface springs and drains by an artificially defined outlet.

The main habitat on the site corresponds to calcareous fen, a habitat listed on Annex I of the EU Habitats Directive, while transition mire, another Annex I habitat is also present. The fen becomes open carr in the central area and in places grades into ombrotrophic bog.

Most of the fen vegetation belongs to two broad types. The first is dominated by Black Bog-rush (*Schoenus nigricans*), with Long-stalked Yellow-sedge (*Carex lepidocarpa*), Narrow-leaved Marsh-orchid (*Dactylorhiza traunsteineri*), Marsh Arrowgrass (*Triglochin palustris*), Grass-of-parnassus (*Parnassia palustris*) and the following mosses: *Campylium stellatum*, *Scorpidium scorpioides* and *Drepanocladus revolvens*. The second type is quaking fen in which Slender Sedge (*Carex lasiocarpa*) is dominant and is associated with Bogbean (*Menyanthes trifoliata*), Water Horsetail (*Equisetum fluviatile*), Long-stalked Yellow-sedge and the moss species *Drepanocladus revolvens*, *Bryum pseudotriquetrum* and *Cinclidium stygium*. Slender Cottongrass (*Eriophorum gracile*), a protected species which is also rare in Europe, occurs in this vegetation type. A third category of fen vegetation is dominated by large sedges, such as Fibrous Tussock-sedge (*Carex appropinquata*).

The fen carr is dominated by Willows (*Salix* spp.), including the rare Grey Willow (*Salix cinerea* subsp. *cinerea*) and by Downy Birch (*Betula pubescens*). Round-leaved Wintergreen (*Pyrola rotundifolia*), another Red Data Book species, is found in this vegetation type. Other rare plants found at the site include *Drepanocladus vernicosus*, a moss listed on Annex II of the EU Habitats Directive, and the arctic-alpine moss *Homalothecium nitens*.

The embryonic raised bog communities contain such species as Bog-sedge (*Carex limosa*), Slender Sedge, Cross-leaved Heath (*Erica tetralix*), Round-leaved Sundew (*Drosera rotundifolia*), Cranberry (*Vaccinium oxycoccos*), and a number of mosses, such as *Aulacomnium palustre*, *Sphagnum plumulosum* and *Sphagnum contortum*.

The remaining terrestrial vegetation types (apart from some planted coniferous forestry at the southern end) are two grassland communities: the first is a tall meadow community in which Meadowsweet (*Filipendula ulmaria*) is dominant; the second is characterised by Purple Moor-grass (*Molinia caerulea*) and Devil's-bit Scabious (*Succisa pratensis*).

Two aquatic communities are also found: one is free-floating, in which Common Duckweed (*Lemna minor*) is prominent; and the other is a submerged community of Stoneworts (*Chara* spp.).

The site also supports a uniquely complete fauna of transition mire invertebrates, including a number of species which are extremely rare in Northern Europe. Among the aquatic/subaquatic insects, *Chrysops sepulchralis* (Diptera), *Tetanocera freyi* (Diptera) and *Coenagrion lunulatum* (Odonata) provide examples of rare Northern European species. Two other flies *Acrometopia wahlbergi* and *Platycheirus perpallidus* (Diptera) are rare species more closely associated with mire vegetation. The fen carr also has its own complement of associated invertebrates of scientific interest. Three flightless beetles (Coleoptera), which are indicative of very old wetlands, have also been identified from Scragh Bog - *Hydroporus glabriusculus*, *H. scalesianus* and *Laccornis oblongus*.

Scragh Bog supports a population of Marsh Fritillary butterfly (*Euphydryas aurinia*). This scarce species is of high conservation value and is listed on Annex II of the EU Habitats Directive.

Most of the site is managed as a Nature Reserve. The outflow stream is included in the site, since interference with this outflow could damage the site hydrology. A small section at the bottom of a field to the south is also included - this area supports a species-rich marsh/wet grassland vegetation. As well as being vulnerable to interference with its hydrology, Scragh Bog is also susceptible to eutrophication as a result of agricultural run-off from the surrounding land.

Scragh Bog contains excellent examples of two habitats listed on Annex I of the EU Habitats Directive - alkaline fen and transition mire. These habitats support a number of rare plants, notably *Drepanocladus vernicosus*, and also play host to a well developed invertebrate fauna.

White Lough, Ben Loughs & Lough Doo (001810)

SITE NAME: White Lough, Ben Loughs & Lough Doo

SITE CODE: 001810

This site is comprised of four hard water lakes, a habitat listed on Annex I of the EU Habitats Directive, in a small, poorly-drained valley, 4 km east of Castlepollard, Co. Westmeath.

A curious feature of the site is the contrast between Lough Doo and the other loughs. Although they are in close proximity and are connected by a ditch, Lough Doo has a very limited aquatic and marginal flora while all the rest are colonised by a wide, dense fringe of Great Fen-sedge (*Cladium mariscus*) swamp.

The bottom of Doo Lough is covered by an unusually extensive mat of stonewort species (*Chara* spp.) with a few sparse stands of Common Reed (*Phragmites australis*). The calcium-rich water has deposited marl on the lake bed and over the stoneworts themselves. The presence of stoneworts in such abundance is significant as many of these species are threatened by loss of habitat or by pollution.

Areas of wet woodland dominated by willows (*Salix* spp.) fringe some of the lakes, and elsewhere wet grassland and freshwater marsh occur. In places peat formation and acidification is indicated by the presence of heath species. Some of the steeper slopes around the lakes are covered with scrub or small areas of broadleaf woodland.

The White-clawed Crayfish (*Austropotamobius pallipes*), a species listed on Annex II of the EU Habitats Directive and protected under the 1976 Wildlife Act, has been recorded from these lakes.

This site is of considerable conservation significance for its hard water lakes and for the occurrence of White-clawed Crayfish. The variety of habitats within this valley and the contrasting vegetation types add further to its interest.

Split Hills & Long Hills Esker (001831)

SITE NAME: Split Hills & Long Hills Esker

SITE CODE: 001831

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

The main habitat is of semi-natural woodland dominated by Hazel (*Corylus avellana*), Ash (*Fraxinus excelsior*), and Hawthorn (*Crataegus monogyna*). Oak (*Quercus robur*), Wych Elm (*Ulmus glabra*) and Irish Whitebeam (*Sorbus hibernica*) are important constituents. There are very fine examples of these trees throughout the site: some Hazel trees, in particular, are impressive. The ground flora is species-rich and includes Primrose (*Primula vulgaris*), Enchanter's Nightshade (*Circaea lutetiana*), Golden Saxifrage (*Chrysosplenium oppositifolium*), Bluebell (*Hyacinthoides non-scripta*), Ground Ivy (*Glechoma*

hederacea), Sanicle (*Sanicula europaea*) and other typical woodland plants. The scarce woodland grass, Wood Fescue (*Festuca altissima*), is present, and the scarce Bird's-nest Orchid (*Neottia nidus-avis*) has also been recorded here. The presence of Wych Elm is interesting in view of its decline due to Dutch Elm Disease.

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

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

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

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

Lough Bane & Lough Glass (002120)

SITE NAME: Lough Bane & Lough Glass

SITE CODE: 002120

This site is located on the Meath/Westmeath border, about 10 km south of Oldcastle. It comprises three lakes situated in a shallow valley. Lough Bane is by far the largest of the group, with the much smaller Lough Glass occurring immediately to the east and Lough Glass North to the north-west. The lakes occur at the headwaters of the River Deel, with the main outflow at the south-east end of Lough Bane. The outflow is not very substantial and partly overgrown with vegetation. The connection between Lough Glass and Lough Bane has now been severed and the flow from Glass is diverted to the south-west. The water level has dropped over the years and has exposed soft marl along parts of the shore.

Lough Bane is a good example of a hard water marl lake with well developed stonewort (*Chara* spp.) communities. This is an important habitat listed on Annex I of the E.U. Habitats Directive. Sampling of the aquatic flora has shown the presence in Lough Bane of at least four species of Charophyte, i.e. *Chara rudis* (dominant in deep water), *C. curta* (shallow water at north shore), *C. globularis* and *C. contraria* (both mid-south shore).

Much of the shoreline of the lakes has a fringe of wetland vegetation, mostly Common Reed (*Phragmites australis*) and Common Club-rush (*Scirpus lacustris*), but also some Water Horsetail (*Equisetum fluviatile*) and Bottle Sedge (*Carex rostrata*). At the east and west ends of Lough Bane the

swamp vegetation is particularly well developed and there is also fen vegetation. Species include Jointed Rush (*Juncus articulatus*), Water-cress (*Nasturtium officinale*), Meadowsweet (*Filipendula ulmaria*), Devils'-bit Scabious (*Succisa pratensis*), Meadow Thistle (*Cirsium dissectum*), Marsh Bedstraw (*Galium palustre*) and Grass-of-parnassus (*Parnassia palustris*).

Mixed woodland occurs along parts of the south and north shores. Species present include Beech (*Fagus sylvatica*), Oak (*Quercus* sp.), Holly (*Ilex aquifolium*), Scots Pine (*Pinus sylvestris*) and European Larch (*Larix decidua*). In some areas Hazel (*Corylus avellana*) becomes dominant, along with other shrubby species such as Hawthorn (*Crataegus monogyna*).

Dry calcareous grassland (mostly unimproved) is found in a few areas, notably at Noggin Hill. Species present here include Primrose (*Primula vulgaris*), Fairy Flax (*Linum catharticum*), Lady's Bedstraw (*Galium verum*), Ribwort Plantain (*Plantago lanceolata*) and the grasses *Briza media* and *Cynosurus cristatus*.

The lake has Brown Trout and is an important angling lake. An important population of White-clawed Crayfish (*Austropotamobius pallipes*), a species listed on Annex II of the E.U. Habitats Directive, was known from these lakes, but it was wiped out by a fungal plague (*Aphanomyces astaci*) in the 1980s. Crayfish have successfully been re-introduced to other lakes in the area and National Parks and Wildlife intend to re-introduce them to Lough Bane. The lakes and fringing wetlands also support a varied avifauna including Little Grebe, Cormorant, Lapwing, Curlew and Snipe.

Despite being surrounded by mostly improved pasture, the quality of the water appears good and Lough Bane has been classified as a very oligotrophic system. However, as it is a small waterbody and situated in a valley, it is vulnerable to water pollution. A further threat comes from afforestation within the catchment - should there be an increase in the areas under commercial forestry, the quality of the water could be affected.

Overall, this is a fine example of a hard water marl lake system with good *Chara* communities. Such systems are becoming scarce in Europe.

Lough Lene (002121)

SITE NAME: Lough Lene

SITE CODE: 002121

This lake is situated 4km north east of Castlepollard in Co. Westmeath. It is a deep (20m max.), clear hard-water lake with marl deposition (especially noticeable on the margins).

The lake supports a range of pondweeds (including *Potamogeton perfoliatus* and *P. lucens*), Canadian Pondweed (*Elodea canadensis*) and a variety of stoneworts (*Chara* spp.), such as *C. pedunculata* and *C. curta* which are marl or hard water lake indicators. A stony shore fringes much of the lake - here species such as spike-rush (*Eleocharis* sp.), Jointed Rush (*Juncus articulatus*), Shoreweed (*Littorella uniflora*), Redshank (*Polygonum persicaria*), Marsh Pennywort (*Hydrocotyle vulgaris*) and sedges (*Carex* spp.) are found. A narrow fringe of emergent plant species dominated by Common Reed (*Phragmites australis*) and Common club-rush (*Schoenoplectus lacustris*) occurs along some areas of the lakeshore.

Patches of wet woodland colonise former areas of cut-away and other low-lying areas close to the lake and are dominated by willows (*Salix* spp.), birch (*Betula* sp.) and Alder (*Alnus glutinosa*) with patches of Common Reed also occurring. These areas support a rich ground flora. The ground flora of the wood at the north-western end of the site supports a range of Sphagnum mosses, Bilberry (*Vaccinium myrtillus*) and Heather (*Calluna vulgaris*). Alder carr occurs on the spur of land jutting into the lake at its north-western end.

Freshwater marsh/fen vegetation, with such species as Purple Moor-grass (*Molinia caerulea*), Bottle Sedge (*Carex rostrata*), Black Bog-rush (*Schoenus nigricans*), and Marsh Cinquefoil (*Potentilla palustris*), occurs in some areas by the lake.

Bird species using the site include Mute Swan, Teal, Pochard, Great-crested Grebe, Little Grebe, Tufted Duck, Grey Heron, Water Rail, Mallard, Golden Eye, Cormorant and Wigeon. The surrounding lands are used by Snipe, Lapwing and Curlew. Of particular significance is the Pochard population which, in the winters 1995/96 and 1996/97, was of national importance (average max. 515 individuals).

Much of the lakeshore is accessible to grazing cattle and the surrounding fields have been heavily improved. The stoneworts may become gradually displaced as the principal primary producers by phytoplankton or vascular plants if this and other such hard-water lakes become artificially enriched with nutrients. Unpolluted hard-water lakes such as Lough Lene are becoming increasingly rare in Ireland and in Europe and are of a type that is listed on Annex I of the E.U. Habitats Directive.

Lough Lene had a notable population of Freshwater Crayfish, a species that is listed on Annex II of the E.U. Habitats Directive, but this species disappeared from the site in 1987 following an outbreak of crayfish fungus plague. A re-introduction programme for this species at the site began shortly after this date - this has been most successful, with breeding being recorded during a survey in 1995.

River Boyne & River Blackwater (002299)

SITE NAME: River Boyne & River Blackwater

SITE CODE: 002299

This site comprises the freshwater element of the River Boyne as far as the Boyne Aqueduct, the Blackwater as far as Lough Ramor and the Boyne tributaries including the Deel, Stoneyford and Tremblestown Rivers. These riverine stretches drain a considerable area of Meath and Westmeath and smaller areas of Cavan and Louth. The underlying geology is Carboniferous Limestone for the most part with areas of Upper, Lower and Middle well represented. In the vicinity of Kells Silurian Quartzite is present while close to Trim are Carboniferous Shales and Sandstones. There are many large towns adjacent to but not within the site. Towns both small and large, include Slane, Navan, Kells, Trim, Athboy and Ballivor.

The site is a candidate SAC selected for alkaline fen and alluvial woodlands, both habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for the following species listed on Annex II of the same directive - Atlantic Salmon, Otter and River Lamprey.

The main areas of alkaline fen are concentrated in the vicinity of Lough Shesk, Freehan Lough and Newtown Lough. The hummocky nature of the local terrain produces frequent springs and seepages which are rich in lime. A series of base-rich marshes have developed in the poorly-drained hollows, generally linked with these three lakes. Open water is usually fringed by Bulrush (*Typha latifolia*), Common Club-rush (*Scirpus lacustris*) or Common Reed (*Phragmites australis*) and this last species also extends shorewards where a dense stand of Great Fen Sedge or Saw Sedge (*Cladium mariscus*) frequently occurs. This in turn grades into a sedge and grass community (*Carex* spp., *Molinia caerulea*) or one dominated by the Black Bog-rush (*Schoenus nigricans*). An alternative direction for the aquatic/terrestrial transition to take is through a floating layer of vegetation. This is normally based on Bogbean (*Menyanthes trifoliata*) and Marsh cinquefoil (*Potentilla palustris*). Other species gradually become established on this cover, especially plants tolerant of low nutrient status e.g. bog mosses (*Sphagnum* spp.). Diversity of plant and animal life is high in the fen and the flora, includes many rarities. The plants of interest include Narrow-leaved Marsh Orchid (*Dactylorhiza traunsteineri*), Fen Bedstraw (*Galium uliginosum*), Cowbane (*Cicuta virosa*), Frogbit (*Hydrocharis morsus-ranae*) and Least Bur-reed (*Sparganium minimum*). These species tend to be restricted in their distribution in Ireland. Also notable is the abundance of aquatic Stoneworts (*Chara* spp.) which are characteristic of calcareous wetlands.

The rare plant, Round-leaved Wintergreen (*Pyrola rotundifolia*) occurs around Newtown Lough. This species is listed in the Red Data Book and is protected under the Flora Protection Order, 1999, and this site is its only occurrence in Co. Meath.

Wet woodland fringes many stretches of the Boyne. The Boyne River Islands are a small chain of three islands situated 2.5 km west of Drogheda. The islands were formed by the build up of alluvial sediment in this part of the river where water movement is sluggish. All of the islands are covered by dense thickets of wet, Willow (*Salix* spp.) woodland, with the following species occurring: Osier (*S. viminalis*), Crack Willow (*S. fragilis*), White Willow (*S. alba*), Purple Willow (*Salix purpurea*) and Grey Willow (*S. cinerea*). A small area of Alder (*Alnus glutinosa*) woodland is found on soft ground at the edge of the canal in the north-western section of the islands. Along other stretches of the rivers of the site Grey Willow scrub and pockets of wet woodland dominated by Alder have become established, particularly at the river edge of mature deciduous woodland. Ash (*Fraxinus excelsior*) and Birch (*Betula pubescens*) are common in the latter and the ground flora is typical of wet woodland with Meadowsweet (*Filipendula ulmaria*), Angelica (*Angelica sylvestris*), Yellow Iris, Horsetail (*Equisetum* spp.) and occasional tussocks of Greater Tussock-sedge (*Carex paniculata*).

The dominant habitat along the edges of the river is freshwater marsh - the following plant species occur commonly here: Yellow Flag (*Iris pseudacorus*), Creeping Bent (*Agrostis stolonifera*), Canary Reed-grass (*Phalaris arundinacea*), Marsh Bedstraw (*Galium palustre*), Water Mint (*Mentha aquatica*) and Water Forget-me-not (*Myosotis scorpioides*). In the wetter areas of the marsh Common Meadow-rue (*Thalictrum flavum*) is found. In the vicinity of Dowth, Fen Bedstraw (*Galium uliginosum*), a scarce species mainly confined to marshy areas in the midlands, is common in this vegetation. Swamp Meadow-grass (*Poa palustris*) is an introduced plant which has spread into the wild (naturalised) along the Boyne approximately 5 km south-west of Slane. It is a rare species which is listed in the Red Data Book and has been recorded among freshwater marsh vegetation on the banks of the Boyne in this site. The only other record for this species in the Republic is from a site in Co. Monaghan.

The secondary habitat associated with the marsh is wet grassland and species such as Tall Fescue (*Festuca arundinacea*), Silverweed (*Potentilla anserina*), Creeping Buttercup (*Ranunculus repens*), Meadowsweet (*Filipendula ulmaria*) and Meadow Vetchling (*Lathyrus pratensis*) are well represented. Strawberry Clover (*Trifolium fragiferum*), a plant generally restricted to coastal locations in Ireland, has been recorded from wet grassland vegetation at Trim. At Rossnaree river bank on the River Boyne, is Round-Fruited Rush (*Juncus compressus*) found in alluvial pasture, which is generally periodically flooded during the winter months. This rare plant is only found in three counties in Ireland.

Along much of the Boyne and along tributary stretches are areas of mature deciduous woodland on the steeper slopes above the floodplain marsh or wet woodland vegetation. Many of these are planted in origin. However the steeper areas of King Williams Glen and Townley Hall wood have been left unmanaged and now have a more natural character. East of Curley Hole the woodland has a natural appearance with few conifers. Broad-leaved species include Oak (*Quercus* spp.), Ash (*Fraxinus excelsior*), Willows, Hazel (*Corylus avellana*), Sycamore (*Acer pseudoplatanus*), Holly (*Ilex aquifolium*), Horse chestnut (*Aesculus* sp.) and the shrubs Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*) and Elder (*Sambucus nigra*). South-west of Slane and in Dowth, the addition of some more exotic tree species such as Wych Elm (*Ulmus glabra*), Beech (*Fagus sylvatica*), and occasionally Lime (*Tilia cordata*), are seen. Coniferous trees, Larch (*Larix* sp.) and Scots Pine (*Pinus sylvestris*) also occur. The woodland ground flora includes Barren Strawberry (*Potentilla sterilis*), Enchanter's Nightshade (*Circaea lutetiana*) and Ground-ivy (*Glechoma hederacea*), along with a range of ferns. Variation occurs in the composition of the canopy, for example, in wet patches alongside the river, White Willow and Alder form the canopy.

Other habitats present along the Boyne and Blackwater include lowland dry grassland, improved grassland, reedswamp, weedy wasteground areas, scrub, hedge, drainage ditches and canal. In the vicinity of Lough Shesk, the dry slopes of the morainic hummocks support grassland vegetation which, in some places, is partially colonised by Gorse (*Ulex europaeus*) scrub. Those grasslands which remain unimproved for pasture are species-rich with Common Knapweed (*Centaurea nigra*), Creeping Thistle (*Cirsium arvense*) and Ribwort Plantain (*Plantago lanceolata*) commonly present. Fringing the canal alongside the Boyne south-west of Slane, are Reed Sweet-grass (*Glyceria maxima*), Great Willowherb (*Epilobium hirsutum*) and Meadowsweet.

The Boyne and its tributaries is one of Ireland's premier game fisheries and it offers a wide range of

angling from fishing for spring salmon and grilse to seatrout fishing and extensive brown trout fishing. Atlantic Salmon (*Salmo salar*) use the tributaries and headwaters as spawning grounds. 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 Habitats Directive. Atlantic Salmon run the Boyne almost every month of the year. The Boyne is most important as it represents an eastern river which holds large three-sea-winter fish from 20 -30 lb. These fish generally arrive in February with smaller spring fish (10 lb) arriving in April/May. The grilse come in July, water permitting. The river gets a further run of fish in late August and this run would appear to last well after the fishing season. The salmon fishing season lasts from 1st March to 30th September.

The Blackwater is a medium sized limestone river which is still recovering from the effects of the arterial drainage scheme of the 70's. Salmon stocks have not recovered to the numbers pre drainage. The Deel, Riverstown, Stoneyford and Tremblestown Rivers are all spring fed with a continuous high volume of water. They are difficult to fish in that some are overgrown while others have been affected by drainage with the resulting high banks.

The site is also important for the populations of two other species listed on Annex II of the E.U. Habitats Directive, namely River Lamprey (*Lampetra fluviatilis*) which is present in the lower reaches of the Boyne River while the Otter (*Lutra lutra*) can be found throughout the site. In addition, the site also supports many more of the mammal species occurring in Ireland. Those which are listed in the Irish Red Data Book include Pine Marten, Badger and Irish Hare. Common Frog, another Red Data Book species, also occurs within the site. All of these animals with the addition of the Stoat and Red Squirrel, which also occur within the site, are protected under the Wildlife Act.

Whooper Swans winter regularly at several locations along the Boyne and Blackwater Rivers. Parts of these areas are within the cSAC site. Known sites are at Newgrange (c. 20 in recent winters), near Slane (20+ in recent winters), Wilkinstown (several records of 100+) and River Blackwater from Kells to Navan (104 at Kells in winter 1996/97, 182 at Headfort in winter 1997/98, 200-300 in winter 1999/00). The available information indicates that there is a regular wintering population of Whooper Swans based along the Boyne and Blackwater River valleys. The birds use a range of feeding sites but roosting sites are not well known. The population is substantial, certainly of national, and at times international, importance. Numbers are probably in the low hundreds.

Intensive agriculture is the main landuse along the site. Much of the grassland is in very large fields and is improved. Silage harvesting is carried out. The spreading of slurry and fertiliser poses a threat to the water quality of this salmonid river and to the lakes. In the more extensive agricultural areas sheep grazing is carried out.

Fishing is a main tourist attraction on the Boyne and Blackwater and there are a number of Angler Associations, some with a number of beats. Fishing stands and styles have been erected in places. The Eastern Regional Fishery Board have erected fencing along selected stretches of the river as part of their salmonid enhancement programme. Parts of the river system have been arterially dredged. In 1969 an arterial dredging scheme commenced and disrupted angling for 18 years. The dredging altered the character of the river completely and resulted in many cases in leaving very high banks. The main channel from Drogheda upstream to Navan was left untouched, as were a few stretches on the Blackwater. Ongoing maintenance dredging is carried out along stretches of the river system where the gradient is low. This is extremely destructive to salmonid habitat in the area. Drainage of the adjacent river systems also impacts on the many small wetland areas throughout the site. The River Boyne is a designated Salmonid Water under the EU Freshwater Fish Directive.

The site supports populations of several species listed on Annex II of the EU Habitats Directive, and habitats listed on Annex I of this directive, as well as examples of other important habitats. Although the wet woodland areas appear small there are few similar examples of this type of alluvial wet woodland remaining in the country, particularly in the north-east. The semi-natural habitats, particularly the strips of woodland which extend along the river banks and the marsh and wet grasslands, increase the overall habitat diversity and add to the ecological value of the site as does the presence of a range of Red Data

Book plant and animal species and the presence of nationally rare plant species.

Ballymore Fen (002313)

SITE NAME: Ballymore Fen

SITE CODE: 002313

Ballymore Fen lies approximately 17 km west of Mullingar adjacent to the Mullingar to Ballymore road (R390) in Co. Westmeath. The geology of the area is Carboniferous Limestone. The site occupies a relatively wide and deep depression in the surrounding drift which is fed on both the east and west by springs. The area may at one stage have been a lake of some size but at present is occupied by a transition mire complex with the characteristic lagg fen at the edges.

The site is a candidate SAC selected for transition mires, a habitat listed on Annex I of the E.U. Habitats Directive.

In the wetter areas towards the centre and south of the site the vegetation is characterised by a scraw typified by patches with an abundance of Bogbean (*Menyanthes trifoliata*) and Water Horsetail (*Equisetum fluviatile*). Other associated plants include Marsh Helleborine (*Epipactis palustris*), Water Mint (*Mentha aquatica*), Marsh Cinquefoil (*Potentilla palustris*), Marsh Bedstraw (*Galium palustre*), Angelica (*Angelica sylvestris*), Lesser Spearwort (*Ranunculus flammula*) and sedges (*Carex* spp.). In slightly drier areas and on old banks are Willow (*Salix*) saplings, with occasional Ash (*Fraxinus excelsior*) and ferns such as Regal Fern (*Osmunda regalis*) and Broad Buckler-fern (*Dryopteris dilatata*). Where there is flowing water Lesser Water-parsnip (*Berula erecta*) is present.

At the edge of the wetter area, particularly at the east of the site, is a gradation to Black Bog-rush (*Schoenus nigricans*) dominated fen area. Throughout are Willow saplings with some Purple Moor-grass (*Molinia caerulea*) and bog moss hummocks (*Sphagnum* spp.). Between the hummocks, abundant Round-leaved Wintergreen (*Pyrola rotundifolia*) - a Red Data Book Species, occurs with species typically found in such conditions. The bryophyte communities are of considerable interest.

On the slopes surrounding the fen area is a mosaic of improved, semi-improved and species-rich calcareous grasslands lightly grazed by cattle. Plant species present on the slopes at the east include Common Spotted-orchid (*Dactylorhiza fuchsii*), Quaking Grass (*Briza media*), Knapweed (*Centaurea nigra*), Oxeye Daisy (*Leucanthemum vulgare*), Crested Hair-grass (*Koeleria macrantha*), Common Bird's-foot-trefoil (*Lotus corniculatus*), Ribwort Plantain (*Plantago lanceolata*) and Cat's-ear (*Hypochoeris radicata*).

Associated with drains and flowing streams throughout the site are the 10-spined stickleback along with the common frog and smooth newt. Five species of dragonfly and damselfly were recorded on the wing: Brown Hawker (*Aeshna grandis*), Common Hawker (*Aeshna juncea*), Keeled Skimmer (*Orthethrum coerulescens*), Azure damselfly (*Coenagrion puella*) and Variable damselfly (*Coenagrion pulchellum*).

Parts of the site have been cut for turf in the past, as evidenced by parallel heather covered ridges and banks. Peat cutting has not occurred for a long time - confirmed by a local landowner. Regeneration of vegetation is occurring in these areas and the ground underfoot is very wet and soft.

Ballymore Fen is interesting due to the overall variety of habitats and species in a relatively small area and to the richness of the transition mire/scraw which is enhanced by the presence of the Red Data Book Species Round-leaved Wintergreen.

Carn Park Bog (002336)

SITE NAME: Carn Park Bog

SITE CODE: 002336

Carn Park Bog is situated 8 km east of Athlone, in the townlands of Tullywood, Carn Park,

Cappaghbrack, Warren High and Moydrum, Co. Westmeath. The site comprises a raised bog that includes both areas of high bog and cutover bog. The margins of the site are bounded by roads on the north, west and southern margins and forestry on the east.

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

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

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

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

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

Crosswood Bog (002337)

SITE NAME: Crosswood Bog

SITE CODE: 002337

Crosswood Bog is situated approximately 5 km east of Athlone, Co. Westmeath, mainly in the townlands

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

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

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

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

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

Moneybeg & Clare Island Bogs (002340)

SITE NAME: Moneybeg & Clare Island Bogs

SITE CODE: 002340

This site is located on the border of Counties Meath and Westmeath 9 km east of the town of Granard.

It is situated mainly in the townlands of Clareisland or Derrymacegan, Williamstown and Moneybeg in County Westmeath and Ross in County Meath.

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

The site consists of two lowland raised bogs at Moneybeg and Clareisland, situated on the south and south-west shores of Lough Sheelin. An important feature of these bogs is that in some areas the transition from high bog to open water is intact and not separated by cutover.

The raised bog habitat includes both areas of high bog and cutover. The high bog at Moneybeg consists of a single small dome with extensive cutover to the east and west. Overall the high bog is flat with slopes associated with the southern margin. There is a wet area with a characteristic microtopography of pools, hummocks and hollows. The local road from Mount Nugent to Finnea runs through the bog and an isolated northern section adjoins the lake shore. There is also a large mound located to the west of the high bog. The raised bog is surrounded by agricultural land, which in the east, slopes steeply down to the cutover. There is forestry to the south and south-west. The raised bog at Clareisland consists of a small linear high bog extending along the shore of Lough Sheelin with only limited cutover to the east and west. There is an extensive wet area with frequent pools on the high bog and there is a slight slope towards the semi-natural lake margin. The local road described above runs by the southern margin of the high bog and there is forestry on cutover south of the road.

These high bogs have vegetation typical of Midland Raised Bog type consisting of Ling Heather (*Calluna vulgaris*), Hare's-tail Cottongrass (*Eriophorum vaginatum*), White Beak-sedge and bog mosses (*Sphagnum* spp.) with Cranberry (*Vaccinium oxycoccos*) and Bog-rosemary (*Andromeda polifolia*) also present. On Moneybeg Bog, the bog mosses *Sphagnum capillifolium*, *S. papillosum*, *S. tenellum* and *S. imbricatum* are plentiful in the extensive wet area, with many large pools lined by bog mosses including the rare *S. fuscum*. Great Sundew (*Drosera anglica*) is present in some pools along with the bog moss *S. cuspidatum*. A few of the pools are completely in-filled with bog mosses and Common Cottongrass (*E. angustifolium*).

Clareisland Bog has a semi-natural margin with Lough Sheelin and an extensive wet area with a high cover of bog mosses and pools. Most of the pools are in-filling with Bog Asphodel, White Beak-sedge and bog mosses. Great Sundew and the bog moss *S. cuspidatum* occur in the pools and other bog moss species occur at the pool edges, especially *S. capillifolium*, *S. papillosum*, *S. magellanicum* and the rare *S. fuscum*. The lichen *Cladonia portentosa* is common, along with Bog-rosemary and Cranberry growing through the bog mosses. The semi-natural margin is dominated by tall Ling Heather with lush carpets of the moss *Hypnum jutlandicum* and large hummocks of the bog moss *S. capillifolium*. There are many deep cracks in the peat due to subsidence at the lake margin. A thin margin of Gorse (*Ulex europaeus*) and Downy Birch (*Betula pubescens*) scrub occurs at the lake edge.

At Moneybeg Bog there is extensive areas of cutover to the east and west, which have some active peat-cutting. Sections of old cutover are dominated by Ling Heather, Purple Moor-grass (*Molinia caerulea*) and Gorse scrub. These areas are bordered by Birch scrub and woodland. Across the road on the slope to the lake there is old cutover dominated by Purple Moor-grass grading into Birch scrub at the shoreline. The presence of a large wooded mound, which may be man-made in origin adds to the interest of this raised bog. At Clareisland Bog there are abandoned peat-cuttings in the north-west

dominated by Ling Heather and to the east there is cutover dominated by Purple Moor-grass with encroaching Gorse scrub.

Landuse at Moneybeg Bog includes active peat-cutting to the east and west and forestry along the western margin. Current landuse at Clareisland Bog includes peat cutting to the west and north-west of the high bog and forestry along the southern margin. Damaging activities associated with these landuses include drainage and burning. Drainage has occurred on these high bogs in the past and at Moneybeg Bog there is evidence of recent and frequent burning of the high bog. These activities have resulted in habitat loss and damage to the hydrological status, and pose a continuing threat to the viability of these high bogs.

The Moneybeg and Clareisland Bogs site is of considerable conservation significance, comprising as it does two raised bogs with semi-natural lake margins at the north-eastern extreme of the range of raised bogs in Ireland. This is a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland. The site supports a diversity of raised bog habitats including, hummock/hollows and pools. 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 type (over 60%) and so has a special responsibility for its conservation at an international level.

Mont Hevey Bog (002342)

SITE NAME: Mont Hevey Bog

SITE CODE: 002342

Mount Hevey Bog is situated approximately 4 km north-east of Kinnegad, in the townlands of Cloncrave, White Island, Aghamore, Kilwarden and Kilnagalliagh. The Meath-Westmeath county boundary runs through the centre of the bog. The site comprises a raised bog that includes both areas of high bog and cutover bog. The Dublin-Sligo railway runs through the northern part of the bog isolating two northern lobes. The northern lobes are adjacent to the Royal Canal.

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

The site consists of a long narrow bog separated into four sub-sections; the larger eastern section supports a wet quaking area with hummock/hollows and pool complex. Hummock/hollow complex also occurs in the south-west lobe and the north-west lobe of the site. An infilled lake is now a soak system. Forestry occurs on the most easterly section of the site. There is abandoned cutover all around this bog and particularly on the western section. There is some wet and actively regenerating areas of the cutover along the southern margins of the western lobe and along the railway.

Much of the high bog has vegetation typical of the Midlands Raised Bog type. The vegetation consists of Ling Heather (*Calluna vulgaris*), Cottongrass (*Eriophorum angustifolium* and *E. vaginatum*), Bog Asphodel, White Beak-sedge and midland indicator species Bog-rosemary (*Andromeda polifolia*) and the bog moss *Sphagnum magellanicum*. The wet quaking area in the eastern section of the bog has pools that support the bog moss *Sphagnum cuspidatum* with White Beak-sedge, Cottongrass and Ling Heather at the edges. The hummock/hollow complex supports a range of hummock-forming bog mosses, including *Sphagnum imbricatum* and *S. fuscum*, as well as other species such as *S. capillifolium*,

S. magellanicum and *S. papillosum*. Other plants found in the hummock/hollow complexes are Bog-rosemary, Cross-leaved Heath (*Erica tetralix*), Bog Asphodel and Deergrass.

The infilled lake is wet and quaking and the vegetation is dominated by Purple Moor-grass (*Molinia caerulea*), Bog-myrtle (*Myrica gale*) and Downy Birch (*Betula pubescens*) with bog mosses *Sphagnum palustre* and *S. papillosum*. The birch trees appear to be between 20 and 30 years old and the Bog Myrtle is over 150 cm high. The edge of the former lake is clearly marked by robust plants of Ling Heather. Some areas of old abandoned cutover bog on the site are very wet and regenerating well, with a good cover of bog mosses, including such species as *Sphagnum cuspidatum*, *S. papillosum*, *S. capillifolium*, *S. auriculatum* and *S. subnitens*.

Current landuse on the site consists of limited mechanised peat-cutting, mostly on the eastern end of the high bog. There are areas of old peat cuttings all around the site with some very old abandoned regenerating cutover along the edge of the railway. The area to the east of the site has been afforested. Areas of cutover have been reclaimed for agricultural purposes. Damaging activities associated with these landuses include drainage throughout the site (both old and recent) and burning of the high 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.

Mount Hevey Bog is a site of considerable conservation significance comprising as it does a raised bog, a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland. The site supports a good diversity of raised bog microhabitats, including hummock/hollow complexes, pools, flushes and regenerating cutover, as well as a number of scarce plant species. 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.

Special Protection Areas

Lough Derravaragh SPA (004043)

SITE NAME: Lough Derravaragh SPA

SITE CODE: 004043

Lough Derravaragh is located approximately 12 km north of Mullingar town. It is a medium- to large-sized lake of relatively shallow water (maximum depth 23 m). The lake extends along a south-east/north-west axis for approximately 8 km. The Inny River, a tributary of the River Shannon, is the main inflowing and outflowing river. It is a typical limestone lake with water of high hardness and alkaline pH, and is classified as a mesotrophic system.

A notable feature is the range of charophytes that occur in the lake (eight species have been recorded, including the rare, Red Data Book species *Chara denudata* and *C. tomentosa*). It has a good diversity of marginal habitats. At the western end of the lake are extensive areas of swamp dominated by Common Reed (*Phragmites australis*). Elsewhere along the shore there is freshwater marsh vegetation dominated by sedges (*Carex* spp.) and tussock-forming grasses such as Tufted Hair-grass (*Deschampsia cespitosa*) and fescues (*Festuca* spp.), with a range of flowering herbs including Nodding Bur-Marigold (*Bidens cernua*) and Trifid Bur-Marigold (*Bidens tripartita*). The lakeshore is a mineral-rich substrate and several plant species of poor fen habitats occur in abundance, such as Black Bog-rush (*Schoenus nigricans*) and Long-stalked Yellow-sedge (*Carex lepidocarpa*). Deciduous woodland fringes the lake in some areas.

Lough Derravaragh is one of the most important midland lakes for wintering waterfowl. It supports nationally important populations of Little Grebe (42), Mute Swan (159), Pochard (3,129), Tufted Duck (1,073) and Coot (1,358) - all counts are average maxima over the five winters 1995/96 to 1999/00. The Pochard population is of particular note as it represents over 6% of the national total, and at times has exceeded the threshold for International Importance (i.e. 3,500). The lake is a traditional haunt for the internationally important Midland lakes Greenland White-fronted Goose flock (which also uses

Loughs Iron, Owel and Ennell). This flock, whose numbers usually range between 300 and 400 birds, use the lake mainly for roosting purposes. A regionally important population of Whooper Swan (102) occurs, along with a range of other species including Great Crested Grebe (34), Cormorant (34), Wigeon (207), Teal (52), Mallard (195), Pintail (6), Shoveler (12), Goldeneye (46), Golden Plover (158) and Lapwing (1,079).

Enrichment of the lake, mainly by agricultural run-off, is a threat and could affect the bird populations and especially the diving ducks. An increase in recreational and wildfowling activities could cause disturbance to the birds though this is not considered to be a major threat.

Lough Derravaragh is of major ornithological importance as it regularly supports nationally important populations of five species, and at times is used by the internationally important population of Greenland White-fronted Goose which is based in the region. Also of note is that three of the species which occur at the site (Greenland White-fronted Goose, Whooper Swan, Golden Plover) are listed on Annex I of the E.U. Birds Directive.

Lough Ennell SPA (004044)

SITE NAME: Lough Ennell SPA

SITE CODE: 004044

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

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

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

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

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

Glen Lough SPA (004045)

SITE NAME: Glen Lough SPA

SITE CODE: 004045

Glen Lough is situated about 5 km north-west of Lough Iron, to which it is connected by the Black River. Extensive drainage in the 1960s has resulted in a dramatic drop in the watertable here, with the result that there is now little open water, except during flooding in the winter months. Sedge-dominated freshwater marsh now occupies the majority of what was once open water. Plant species present include Bottle Sedge (*Carex rostrata*), Water Horsetail (*Equisetium fluviatile*) and Canary Reed-grass (*Phalaris arundinacea*). Other habitats present include reedswamp, wet and dry grassland, cutaway bog colonised by heath vegetation, scrub and wet willow (*Salix* spp.) woodland.

An internationally important Whooper Swan population uses the site at times. This flock (average peak of 272 individuals for the 5 seasons 1995/96-1999/00) also uses Lough Iron and a range of grassland feeding areas in the vicinity. At times, the site is visited by part of the internationally important Midland lakes Greenland White-fronted Goose population, although numbers are low (17). Dabbling ducks are well represented, but in relatively low numbers, and include such species as Wigeon (85), Teal (75), Mallard (46), Pintail (7) and Shoveler (23). Lapwing (189) are also found in the area.

Glen Lough is surrounded by intensively farmed agricultural land and undoubtedly receives nutrient run-off. The effect of this on the vegetation and indirectly the birds is not known. Planting of forestry around part of the margin of the site has occurred. Any further planting would be of concern as this could destroy feeding areas used by the swans, geese and herbivorous wildfowl.

Whilst this site attracts a range of wintering waterfowl, the principal interest is the internationally important Whooper Swan population that is based in the area. Whooper Swan is of particular note as it is listed on Annex I of the E.U. Birds Directive. Greenland White-fronted Goose, nowadays an occasional visitor to the site, is also listed on Annex I of this Directive. The site provides useful habitat for Shoveler, which in Ireland is a fairly localised species.

Lough Iron SPA (004046)**SITE NAME: Lough Iron SPA****SITE CODE: 004046**

Lough Iron is a small- to moderately-sized midland lake, located some 12 km north-west of Mullingar. It is situated on the Inny River, which flows from Lough Derravaragh approximately 5 km to the north-east. Lough Owel occurs a few kilometres to the south-east and is connected to Lough Iron by a small stream. The underlying geology is limestone and the lake is mesotrophic in character.

Drainage of the River Inny in the 1960s has led to a dramatic drop in the level of the lake and this in turn has led to the development of freshwater marsh and wet grassland on what was previously lake bed. The lake is partially surrounded by agricultural land, much of which is managed intensively. Conifers are also present along stretches of the lake edge. The grassland fields which are used by geese and swans for feeding purposes are included in the site. Some conifer plantations along the south-western shore of the lake are also included in the site to provide screening for feeding birds.

The dominant wetland plant species along the margins of the lake are Canary Reed-grass (*Phalaris arundinacea*) and Purple Moor-grass (*Molinia caerulea*), the latter species forming large expanses of wet grassland. There are also patches of calcareous fen, wet woodland dominated by Downy Birch (*Betula pubescens*) and tall sedge swamp dominated by Tufted Sedge (*Carex elata*) and Bottle Sedge (*Carex rostrata*). Quite a wide band of Common Reed (*Phragmites australis*) fringes the lake. The marsh areas contain several scarce plant species, including Fen Bedstraw (*Galium uliginosum*), Frogbit (*Hydrocharis morsus-ranae*), and Marsh Pea (*Lathyrus palustris*).

Lough Iron is of International Importance as a site for wintering waterfowl. It is a traditional haunt for the internationally important Midland lakes Greenland White-fronted Goose flock (which also use Loughs Owel, Ennell and Derravaragh), and is also frequented by a nationally important population of Whooper

Swan. Counts for principal waterfowl species over the five winters 1995/96 to 1999/00 are as follows (figures are average maxima): Mute Swan (52), Whooper Swan (154), Greenland White-fronted Goose (409), Wigeon (1,229), Teal (736), Mallard (257), Pintail (19), Shoveler (164), Pochard (239), Tufted Duck (208), Coot (293), Golden Plover (2,200), Lapwing (1,670), Snipe (30) and Curlew (136). The populations of Whooper Swan, Wigeon, Teal, Shoveler and Golden Plover are of National Importance. At times the Whooper Swan population exceeds the qualifying threshold (160) for International Importance.

Lough Iron SPA is of high ornithological importance primarily as it supports an Internationally Important population of Greenland White-fronted Geese, with both feeding and roosting areas available to the birds. Nowadays it is the main site used by this flock. An Internationally Important population of Whooper Swans sometimes occurs. The site also supports a notable diversity of other waterfowl, including dabbling duck, diving duck and waders. Of particular importance is that three of the species which occur are listed on Annex I of the E.U. Birds Directive (Greenland White-fronted Goose, Whooper Swan and Golden Plover).

Lough Owel SPA (004047)

SITE NAME: Lough Owel SPA

SITE CODE: 004047

Lough Owel is a medium- to large-sized lake, with a length of c. 6 km along its long axis and a maximum width of 3 km. It is fed by a number of small streams and the main outflow is to the Royal Canal. Water is relatively shallow, with a maximum depth of 22 m. Overlying Carboniferous limestone, Lough Owel is one of the most important examples of a limestone lake in the Midlands. The water is moderately hard, alkaline and virtually colourless. The lake appears to be relatively unproductive with low levels of orthophosphate and moderate chlorophyll concentrations. The lake is classified as a mesotrophic system and its status has been stable in recent years.

Aquatic vegetation includes a number of stoneworts (*Chara* spp., notably *C. denudata* and *C. tomentosa* which are Red Data Book species). The rocky nature of the shoreline has given rise to marginal vegetation which is patchy and sparse. Apart from some reedswamp formed by Common Reed (*Phragmites australis*) and Common Clubrush (*Scirpus lacustris*), shoreline vegetation is dominated by occasional patches of Alder (*Alnus glutinosa*). Areas of marsh and fen occur above the shoreline in the northern and south-western corners of the lake though these are largely outside of the site. Several small islands occur in the southern sector.

Lough Owel is one of the most important Midland lakes for wintering waterfowl, with nationally important populations of Shoveler (142) and Coot (1,825) - figures given are average peaks for the five seasons 1995/96-1999/00. The populations for both of these species represent a significant proportion (c. 5%) of the respective national totals. The lake is also of importance for diving duck, including Pochard (291), Tufted Duck (227) and Goldeneye (75). At times, the lake is utilised as a roost by the internationally important Midland lakes Greenland White-fronted Goose population (c. 400 strong). The lake also supports populations of Little Grebe (16), Great Crested Grebe (18) and Cormorant (32). Lough Owel is one of the most important fishing lakes in the Midlands and is especially good for Trout.

Whilst the water quality has been satisfactory in recent years, Lough Owel is vulnerable to pollution from agricultural and domestic sources. A deterioration in water quality could affect bird populations. Some of the areas above the shoreline, which are not within the site, have been afforested - further afforestation could be damaging to the system. An increase in recreational and wildfowling activities could cause disturbance to the birds though this is not considered to be a major threat.

Lough Owel has very significant populations of two species, Shoveler and Coot. It is also a notable site as it is used on occasions by the Midlands Greenland White-fronted Goose flock, which is of international importance.

Lough Kinale & Derragh Lough SPA (004061)
SITE NAME: Lough Kinale & Derragh Lough SPA

SITE CODE: 004061

Lough Kinale is a relatively small lake that is situated immediately downstream of Lough Sheelin, both lakes being near the top of the catchment of the Inny River, a main tributary of the River Shannon. Derragh Lough, a much smaller system, is connected to Lough Kinale and the Inny River. This is a typical limestone system and is very shallow (maximum depth of Lough Kinale is c. 4 m). As with Lough Sheelin, the trophic status of the lake has varied greatly since the 1970s due to pollution. It was recently (1998-2000) classified as a highly eutrophic system. The lake was formerly an important Trout fishery.

Lough Kinale has two main basins, almost separated by swamp formations. Reed swamp is frequent around the lakes, with Common Reed (*Phragmites australis*) and Tufted-sedge (*Carex elata*) occurring commonly. A calcium-rich small sedge marsh occurs along parts of the shoreline. This is characterised by species such as Long-stalked Yellow-sedge (*Carex lepidocarpa*), Marsh Pimpernel (*Anagallis tenella*), Knotted Pearlwort (*Sagina nodosa*), Marsh Pennywort (*Hydrocotyle vulgaris*) and Water Mint (*Mentha aquatica*). Areas of bog occur around the margins of the lakes in places but some of these have been planted with conifers.

Despite the very variable water quality in recent decades, Lough Kinale and Derragh Lough remain an important site for wintering waterfowl, especially diving duck. The site supports nationally important populations of two species, i.e. Pochard (951) and Tufted Duck (449) - figures are average peaks for the 5 seasons 1995/96-1999/00. A large population of Mute Swan (120), close to the threshold for national importance, also uses the site. Coot (199), whilst still occurring in substantial numbers, formerly had a population of national importance. A number of other species are found, in relatively low numbers, including Great Crested Grebe (25), Mallard (130) and Goldeneye (22). Marginal grassland areas outside of the site attract feeding wildfowl and waders such as Lapwing and Golden Plover.

The variable water quality over the years, with periods of highly eutrophic conditions, undoubtedly has had adverse impacts on the wintering waterfowl, and especially the diving duck. This would appear to be borne out by very variable numbers of birds recorded over the years. The lake is still vulnerable to pollution and it is considered that there is urgent need to reduce the phosphorus inputs to the system. Afforestation has taken place close to parts of the shoreline and further planting would be undesirable. Angling and wildfowling activities currently cause some disturbance to the birds and any increase in such activities would be of concern.

Whilst relatively small in area and subject to a number of damaging activities, this site retains national importance for two duck species. With an improvement in the environmental conditions pertaining at the site, higher numbers of some species would undoubtedly occur.

Lough Ree SPA (004064)
SITE NAME: Lough Ree SPA

SITE CODE: 004064

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

assessment of water quality a reduced planktonic growth was noted, which may be due to the spread of the Zebra Mussel (*Dreissena polymorpha*), which feeds on phytoplankton.

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

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

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

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

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

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

Lough Sheelin SPA (004065)**SITE NAME: Lough Sheelin SPA****SITE CODE: 004065**

Lough Sheelin is a medium- to large-sized lake, with a maximum length of 7 km. The lake lies near the top of the catchment of the Inny River, a main tributary of the River Shannon. It is a typical limestone lake and is fairly shallow (maximum depth 14 m). The trophic status of the lake has varied greatly since the 1970s due to pollution from mainly agricultural sources. It was recently (1998-2000) classified as a highly eutrophic system.

The shoreline is varied and no one plant species predominates over large areas. Species present include Jointed Rush (*Juncus articulatus*) and Common Spike-rush (*Eleocharis palustris*) growing on stony beaches, with Yellow Sedges (*Carex cf. demissa*), Lesser Spearwort (*Ranunculus flammula*), Water Mint (*Mentha aquatica*) and Black Bog-rush (*Schoenus nigricans*) also represented. The shore of the lake is also wooded in places and there are some very small offshore islands that are wooded with willows (*Salix aurita* and *S. cinerea*). The islands are fringed by swamp communities of Common Reed (*Phragmites australis*), Common Clubrush (*Scirpus lacustris*) and Bottle Sedge (*Carex rostrata*). A good range of Charophytes has been recorded from the lake, including *Chare denudata*, a Red Data Book species.

Despite very variable water quality in recent decades, Lough Sheelin remains a very important site for wintering waterfowl, especially diving duck. It supports nationally important populations of four species, i.e. Great Crested Grebe (140), Pochard (546), Tufted Duck (762) and Goldeneye (224) all figures are average peaks for the 5 seasons 1995/96-1999/00. A number of other species occur in relatively low numbers, including Mute Swan (28), Mallard (76), Coot (24), Little Grebe (19), Cormorant (42) and Black-headed Gull (202).

The variable water quality over the years, with periods of highly eutrophic conditions, undoubtedly has had some adverse impacts on the wintering waterfowl, especially the diving duck. This would appear to be borne out by the very variable numbers of birds recorded over the years. It is considered that there is urgent need to reduce the phosphorus inputs to the feeder streams entering the lake.

Lough Sheelin is a nationally important site for four species of wintering wildfowl and is one of the main Midlands lakes sites for wintering birds. An improvement in water quality would probably result in higher numbers of birds frequenting the site.

Middle Shannon Callows SPA (004096)**SITE NAME: Middle Shannon Callows SPA****SITE CODE: 004096**

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

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

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

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

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

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

The Middle Shannon Callows qualifies as a site of International Importance for wintering waterfowl both on the total numbers regularly exceeding 20,000 birds (for example 27,581 in winter 1998/99) and for the Whooper Swan population (287 ? average peak count 1995/96-1999/00). Whooper Swan is listed on Annex I of the EU Birds Directive. Five further species occur in numbers of national importance (all figures are average peaks for winters 1995/96-1999/00) - Mute Swan 349, Wigeon 2,972, Golden Plover (listed on Annex I of the EU Birds Directive) 4,254, Lapwing 11,578 and Black-tailed Godwit 388. For some of these species, peak counts in the period have been considerably higher than the averages, such as 1,096 Black-tailed Godwits and 23,839 Lapwings. The importance of the site for species like Black-tailed Godwit and Whimbrel may have been underestimated if count coverage missed the brief spring peaks for these species. A wide range of other species occur in numbers of regional or local importance, including Bewick's Swan (listed on Annex I of the EU Birds Directive) 7, Teal 77, Tufted Duck 33, Dunlin 369, Curlew 129, Redshank 31 and Black-headed Gull 1,061. Small numbers of Greenland White-fronted Goose (listed on Annex I of the EU Birds Directive) use the Shannon Callows (average 21, peak 55) and these are generally associated with larger flocks which occur on the adjacent Little Brosna Callows and River Suck Callows. The callow grasslands provide optimum feeding grounds for these various species of waterfowl, while many of the birds also roost or rest within the site.

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

The Shannon Callows continues to hold approximately 40% of the Irish population of Corncrake, a species of global conservation concern that is also listed on Annex I of the EU Birds Directive. Between 1997 and 2001, the average number of calling birds was 60, with a peak of 69. BirdWatch Ireland, in association with Dúchas and the RSPB, operate a grant scheme to encourage farming practices that favour the Corncrake and this has probably been responsible for the stabilisation of numbers in recent years. A related scarce species, the Quail, is also known to breed within the callow grasslands.

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

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

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

Garriskil Bog SPA (004102)

SITE NAME: Garriskil Bog SPA

SITE CODE: 004102

Garriskil Bog SPA, a raised bog, lies 3 km west of Lough Derravaragh and 3 km east of Rathowen. It is bounded to the south-east and south-west by the rivers Inny and Riffey. The bog is underlain by calcareous shales with a low permeability. A substantial area of uncut high bog remains though much of this is classified as degraded raised bog. Old cutaway bog surrounds the high bog and parts of this are dominated by Downy Birch (*Betula pubescens*) scrub. The site contains good examples of active raised bog, degraded raised bog and depressions on peat substrates (*Rhynchosporion*), habitats which are listed on Annex I of the E.U. Habitats Directive.

The site has a well-developed system of pools and hummocks, and a large proportion of the uncut high bog is notably wet. Common vascular plant species on the bog include Ling (*Calluna vulgaris*), the cottongrasses *Eriophorum angustifolium* and *E. vaginatum*, Bog Asphodel (*Narthecium ossifragum*) and White Beak-sedge (*Rhynchospora alba*). Bog mosses (*Sphagnum* spp.) are important components of the vegetation. The cutaway bog has species such as Ling and Purple Moor-grass (*Molinia caerulea*), while in some parts Downy Birch woodland is developing.

The site is within the range of the midland lakes flock of Greenland White-fronted Geese, which is centred on four major lakes (Derravaragh, Iron, Owel and Ennell). There are 16 known feeding sites, mostly on intensively managed grassland. In the past the bog has been utilised by the geese (up to 60) but nowadays usage of raised bogs by geese is a rare event.

The site is within the breeding territory of a pair of Merlin. Nesting probably occurs outside of the site boundary, with the bog being used primarily as a foraging area.

Several wader species breed within the site, with an estimated 5 pairs of Snipe, 2-3 pairs of Curlew and 2 pairs of Redshank. Barn Owl has been recorded hunting along the margins of the bog, while Red Grouse is considered to occur occasionally.

While the site appears to have been abandoned by wintering Greenland White-fronted Geese, it is still of some ornithological importance as it supports a typical range of bird species of midland raised bogs, including Merlin. Merlin is of high conservation importance as it is listed on Annex I of the E.U. Birds Directive.

Natural Heritage Areas

Clonydonnin Bog NHA (000565)

SITE NAME: Clonydonnin Bog NHA

SITE CODE: 000565

Clonydonnin Bog NHA is located on the border of Co. Offaly and Co. Westmeath, approximately 13 km south-east of Athlone. It is situated mainly in the townlands of Esker, Laughil and Castletown. The site comprises an area of raised bog that includes both areas of high bog and cutover bog.

The site consists of one dome of high bog, fringed with areas of cutover bog, scrub and low-lying agricultural land. Although the bog surface is relatively dry, the cover of bog mosses is good. However, the typical hummock/hollow topography of a raised bog is poorly-developed. The area of cutover associated with this bog is quite limited, and much of it has been reclaimed for agriculture or overgrown with scrub.

This high bog is an example of a Midlands Raised Bog, with species such as Ling Heather (*Calluna vulgaris*), Cross-leaved Heath (*Erica tetralix*), Bog Asphodel (*Narthecium ossifragum*), Carnation Sedge (*Carex panicea*) and Cottongrass species (*Eriophorum* spp.). Other species found here include Cranberry (*Vaccinium oxycoccos*), Bog-rosemary (*Andromeda polifolia*) and Deergrass (*Scirpus cespitosus*). Bog mosses found on the site include *Sphagnum papillosum*, *S. capillifolium* and *S. imbricatum*; a number of lichens (*Cladonia* spp.) are also found. The cutover areas of the site are mainly dominated by Downy Birch (*Betula pubescens*) and/or Gorse (*Ulex europaeus*) scrub, or by areas of Purple Moor-grass (*Molinia caerulea*) and Soft Rush (*Juncus effusus*). There are also areas of Bracken (*Pteridium aquilinum*) and Blackberry (*Rubus fruticosus* agg.).

Current landuse on the site consists of some peat-cutting around the edge of the high bog. In the past this occurred in localised areas at the south-east, west and north-east of the bog. However, peat-cutting has decreased, and is now restricted to two areas at the north-east and south. The older areas of cutover bog have been reclaimed for agriculture (at the north-east and south-west), and scrub or rough grassland have developed on other sections. Damaging activities associated with this landuse include drainage and burning. The site appears to be subject to regular episodes of burning, with most of the surface having been subjected to burning within the past decade. A recent fire has damaged two areas of the bog at the northern side. Recurrent burning at the site is having a drying effect on 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. There has also been recent drainage on the high bog, involving the excavation of numerous shallow drains across the surface of the site. However, these are already infilling with vegetation and rewetting is occurring in the centre of the bog.

Clonydonnin 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. 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.

Lough Derravaragh NHA (000684)
SITE NAME: Lough Derravaragh NHA

SITE CODE: 000684

Lough Derravaragh is located approximately 12 km north of Mullingar town mainly in the townlands Clonava, Derrya, Kiltoom, Donore, Ballynakill, Streamstown and Knockbody in Co. Westmeath. The majority of the site comprises the lake, but it also includes a variety of wetland, grassland and woodland habitats. The site includes a small area of raised bog. The site is bounded in the north-west by the River Inny.

The River Inny, which is a major tributary of the River Shannon, flows into and out of Lough Derravaragh at its north-west end. At this end, the lake is wide and shallow and the raised bog and cutover is found in this area. Lough Derravaragh is shallow and its water is hard with an alkaline pH. There is only a small area of raised bog in the site, but formerly it comprised a very large bog complex which extended to the north-west of the lake. Most of this has now been cutover and large areas have been reclaimed for agriculture. The remaining area of bog has hummock/hollow complexes but no pools. Coniferous forestry has been planted on the high bog and a section of cutover. Cutover is found all around the high bog and there is also a separate small area of old cutover 2.5 km south of the raised bog.

Much of the high bog has vegetation typical of a Midland Raised Bog, with such species as Ling Heather (*Calluna vulgaris*) and Hare's-tail Cottongrass (*Eriophorum vaginatum*). The hummock-forming bog moss *Sphagnum papillosum* has been recorded on the high bog as has the more scarce *S. imbricatum*. Overall, *Sphagnum* covers around one third of the high bog area and the centre of the bog is wet with standing water in places. The aquatic bog moss *S. cuspidatum* has been recorded in the hollows on the bog. Ling Heather and Hare's-tail Cottongrass are common on the hummocks as are lichens (*Cladonia* sp.). There are dried out channels on the bog which are colonised by algae, Deergrass (*Scirpus cespitosus*) and lichens. Coniferous forestry has been planted on the western side of the high bog and on adjoining areas of cutover. On the cutover in the south-east, south and north of the site of the site there are areas of Downy Birch (*Betula pubescens*) woodland, with patches of Gorse (*Ulex europaeus*) scrub in between.

A notable feature of Lough Derravaragh is the range of Charophytes (Stoneworts) that occur in the lake; to date eight species have been recorded here, several of which have a restricted range in Ireland. Around the lake margin, a range of habitats have been created as a result of drainage of the River Inny. At the western end are extensive reed beds and swamps dominated by Common Reed (*Phragmites australis*) with scattered stands of Downy Birch and willows (*Salix* spp.). Elsewhere, there is freshwater marsh vegetation dominated by sedges (*Carex* spp.) and often tussock-forming grasses such as Tufted Hair-grass (*Deschampsia cespitosa*) and fescues (*Festuca* spp.), with a range of flowering herbs including Nodding Bur-Marigold (*Bidens cernua*) and Trifid Bur-Marigold (*Bidens tripartita*). The lakeshore is a mineral-rich substrate and several plant species of poor fen habitats occur in abundance, such as Black Bog-rush (*Schoenus nigricans*) and Long-stalked Yellow-sedge (*Carex lepidocarpa*). Knockeyon and the other hills around the south-eastern end of the lake support deciduous woodland which is comprised mostly of native species. Hazel (*Corylus avellana*), Rowan (*Sorbus aucuparia*), Ash (*Fraxinus excelsior*) and Sessile Oak (*Quercus petraea*) are abundant. Exotic species occur occasionally, including Beech (*Fagus sylvatica*).

Lough Derravaragh is an important site for wintering waterfowl, and is of particular note as a site for geese, swans and diving duck. It is a traditional haunt for the internationally important midland flock of Greenland White-fronted Geese (which also use Loughs Iron, Owel and Ennel). This flock, whose numbers usually range between 300 and 400 birds, use the lake mainly for roosting purposes. Counts for principal waterfowl species over the five winters 1995/96 to 1999/00 are as follows (figures are average maxima): Little Grebe 42, Great Crested Grebe 34, Cormorant 34, Mute Swan 159, Whooper Swan 102, Greenland White-fronted Goose 409, Wigeon 207, Teal 52, Mallard 195, Pintail 6, Shoveler 12, Pochard 3129, Tufted Duck 1,073, Goldeneye 46, Coot 1,358, Golden Plover 158 and Lapwing 1,079. The populations of Little Grebe, Mute Swan, Whooper Swan, Pochard, Tufted Duck and Coot are

of National Importance. At times, the Pochard population, which is one of the largest in the country, has exceeded the threshold for International Importance (i.e. 3,500).

This site regularly supports nationally important populations of six species, and at times is used by the internationally important population of Greenland White-fronted Geese which is based in the region. Three of the species which occur at the site (Greenland White-fronted Geese, Whooper Swan, Golden Plover) are listed on Annex I of the E.U. Birds Directive. The rare Charophyte *Chara denudata*, has been recorded in Lough Derravaragh and the Red Data Book species Otter and Irish Hare have also been noted from the site.

Current landuses on the site include active peat-cutting, agriculture, forestry, fishing, hunting and leisure activities. On the southern margins of the high bog there is a small area of active peat-cutting. There are only a small number of agricultural fields within the site, with a few on reclaimed cutover. There is coniferous forestry on a small section of high bog and cutover. Damaging activities associated with these landuses include drainage throughout the site and burning of the high bog. The lake is an important amenity for anglers, as it holds a population of Brown Trout. Knockbody Wood is used for shooting Pheasant. Local groups use the lake for canoeing and watersports. Parts of the site have also been used for dumping and as an encampment. These activities have resulted in the loss of habitat and damage to the hydrological status of the site, and pose a threat to its viability.

Lough Derravaragh NHA is a site of considerable conservation significance, including 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. The site supports a good diversity of raised bog microhabitats, including hummocks and hollows. Ireland has a high proportion of the total E.U. resource of the raised bog (over 50%) and so has a special responsibility for its conservation at an international level. Lough Derravaragh itself is of importance for its aquatic flora and fauna and for its marginal wetland habitats. It is also of major ornithological importance and is designated a Special Protection Area under the E.U. Birds Directive.

Wooddown Bog NHA (000694)

SITE NAME: Wooddown Bog NHA

SITE CODE: 000694

Wooddown Bog NHA is situated approximately 4km east of Mullingar in the townlands of Curraghmore, Macetown and Wooddown in Co. Westmeath. The site comprises a raised bog that includes both areas of high bog and cutover bog.

The site consists of a Midlands Raised Bog type, which has developed in a basin. The bog has good hummock/hollow microtopography but few pools. There is a small soak area situated close to the northern edge of the high bog. This area also supports a low canopy of Downy Birch (*Betula pubescens*) woodland. A small fen is located to the south-west of the bog. The cutover supports humid grassland, Birch and Gorse (*Ulex europaeus*) scrub and woodland. There appears to be a flush on the cutover off the northern margin of the high bog.

Much of the high bog has vegetation typical of a Midland Raised Bog. Ling Heather (*Calluna vulgaris*), Deergrass (*Scirpus cespitosus*) and the bog moss *Sphagnum capillifolium* are the dominant species on the bog. Other common species include Bog Asphodel (*Narthecium ossifragum*), Cross-leaved Heath (*Erica tetralix*) and Common Cottongrass (*Eriophorum angustifolium*). Midland Raised Bog indicators include Bog-rosemary (*Andromeda polifolia*), Cranberry (*Vaccinium oxycoccos*) and bog moss *Sphagnum magellanicum*.

There are only a few pools on the bog, which is very dry. These pools support the bog moss *Sphagnum cuspidatum*, Common Cottongrass and White Beaked-sedge (*Rhynchospora alba*). There is good hummock/hollow microtopography where burning has not occurred. The hummocks comprise bog mosses, including *Sphagnum capillifolium*, Crowberry (*Empetrum nigrum*), Ling Heather and *Cladonia* Lichens

There is a flush and soak system on the northern margin of the highbog, which supports Downy Birch woodland with an understorey of Purple Moor-grass (*Molinia caerulea*). Bog Myrtle (*Myrica gale*), Meadowsweet (*Filipendula ulmaria*), the bog mosses *Sphagnum palustre*, *S. recurvum* var *tenue* and the rare *S. fimbriatum* are also found in the flush.

To the south is an area of fen, which supports Long-stalked Yellow Sedge (*Carex lepidocarpa*), Common Sedge (*C. nigra*), Bottle Sedge (*C. rostrata*), Water Mint (*Mentha aquatica*) and Marsh Cinquefoil (*Potentilla palustris*).

Birch and mixed woodland occur on the north and north-east margin of the high bog on the cutover. The Birch woodland to the north of the site has Ling Heather, Bilberry (*Vaccinium myrtillus*) and the bog mosses *Sphagnum palustre* and *S. capillifolium*. The woodland to the north-east also supports Sycamore (*Acer pseudoplatanus*), Elder (*Sambucus nigra*) and Bracken (*Pteridium aquilinum*).

The cutover, which contains areas of old peat cutting and active peat cutting, also supports Birch and Gorse scrub, flush vegetation, humid grasslands and forestry. Grassland is present on mineral soil to the west of the site.

Current landuse on the site includes active peat-cutting in the north-east and south-east of the site. Afforestation occurs on high bog and cutover to the east and on cutover to the south-east. Areas of cutover have been reclaimed for agricultural purposes around the site. The grassland is used for grazing. Damaging activities associated with these landuses include drainage and burning of the high 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.

Wooddown Bog NHA is a site of conservation significance comprising as it does a raised bog, a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland. This site supports a good diversity of raised bog microhabitats, including hummock/hollow complexes, a soak system and flushes, as well as a number of scarce plant species. 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.

Lough Garr Bog NHA (001812)

SITE NAME: Lough Garr Bog NHA

SITE CODE: 001812

Lough Garr Bog NHA is located approximately 16 km north-west of Mullingar on the main Longford road, in the townlands of Corydonnellan, Cappagh and Joanstown, Co. Westmeath. The site comprises of a mosaic of habitats which include a small raised bog, marsh, wet woodland, humid grassland and dry grassland. The site is bounded by a main road to the west and local roads to the south and east.

The raised bog on the site consists of two areas of high bog, which have been divided by a bog road. The bog surface is relatively dry. There is a flush located in the south-west section of the high bog and a marsh occurs to the east of the site in what was once Lough Garr lake. Cutover is found all around the north, west and south of the site and along the bog road. Cutover supports wet woodland, scrub and humid grassland.

Much of the high bog has vegetation typical of a Midland Raised Bog, mainly dominated by Ling Heather (*Calluna vulgaris*). There is frequent Crossed-leaved Heath (*Erica tetralix*), Deergrass (*Scirpus cespitosus*), Bog Asphodel (*Narthecium ossifragum*) and White-beaked sedge (*Rhynchospora alba*). The bog mosses *Sphagnum capillifolium*, *S. tenellum* and *S. magellanicum* are also present. The midland indicator species Bog-rosemary (*Andromeda polifolia*) and the bog moss *Sphagnum magellanicum* are also found on the bog. There are no pools on the bog but there is a sizeable (5.5 ha) flush to the south-west of the site. The south-eastern lobe of the high bog and adjoining cutover has been afforested.

Cutover areas of the bog support wet grassland, dominated by Purple Moor-grass (*Molinia caerulea*), with Tormentil (*Potentilla erecta*), Sheep's-fescue (*Festuca ovina*), Common Sorrel (*Rumex acetosa*), Sweet Vernal-grass (*Anthoxanthum odoratum*), Soft Rush (*Juncus effusus*) and Broad Buckler-fern

(*Dryopteris dilatata*). Along the south-west margin of the site there are patches of wet woodland on cutover with Downy Birch (*Betula pubescens*), Goat Willow (*Salix caprea* agg) and Eared Willow (*Salix aurita*). The understorey is dominated by Bramble (*Rubus fruticosus* agg.), Bracken (*Pteridium aquilinum*) and Purple Moor-grass. Heathy scrub areas are dominated by Gorse (*Ulex europaeus*), Downy Birch and Ling Heather.

An area of species-rich wet marsh occurs in a very wet lagg area in the cutover located on the south-west of margin of the site. Creeping Bent (*Agrostis stolonifera*) and Brown Sedge (*Carex disticha*) are the dominant species with Marsh Cinquefoil (*Potentilla palustris*), Meadowsweet (*Filipendula ulmaria*), Common Valerian (*Valeriana officinalis*), Jointed Rush (*Juncus articulatus*), Water Mint (*Mentha aquatica*), Common Marsh-bedstraw (*Galium palustre*), Soft Rush and Devil's-bit Scabious (*Succisa pratensis*).

The wet marsh with floating scraw which occupies the area that was once Lough Garr, supports homogeneous vegetation which is dominated mainly by Creeping Bent, Cowbane (*Cicuta virosa*) and Bottle Sedge (*Carex rostrata*). Other common species include Marsh Willowherb (*Epilobium palustre*), Water Horsetail (*Equisetum fluviatile*), Bulrush (*Typha latifolia*), Cuckooflower (*Cardamine pratensis*), Common Marsh-bedstraw, Marsh-marigold (*Caltha palustris*) and Branched Bur-reed (*Sparaganium erectum*). Common Reed (*Phragmites australis*) and Yellow Iris (*Iris pseudocarus*) occasionally form small dominant patches. Other species present include Nodding Bur-marigold (*Bidens cernua*) and Greater Spearwort (*Ranunculus lingua*). There is luxuriant moss cover, which include Calliergon giganteum and Calliergonella cuspidata. To the west of the marsh there is a slightly drier area with Devil's-bit Scabious, Wild Angelica (*Angelica sylvestris*), Yorkshire-fog (*Holcus lanatus*), Common Valerian, Bottle Sedge, Bogbean (*Menyanthes trifoliata*), Water Horsetail and Common Sorrel. This vegetation grades into the Downy Birch wet woodland by the high bog .

The transitional zone between the marsh and the high bog has an interesting vegetation composition. Downy Birch and Eared Willow form a patchy canopy over Bilberry (*Vaccinium oxycoccos*), Crowberry (*Empetrum nigrum*) and the bog moss *Sphagnum capillifolium*. Jointed Rush can be locally abundant. Ling Heather, Devils-bit Scabious, Bogbean and Water Horsetail are also found here. Mosses found in this habitat include *Rhytidiadelphus squarrosus* and *Pleurozium schreberi*.

Current landuse on the site includes forestry, peat-cutting, dumping and grazing. There is limited peat-cutting along the bog road and most of the cutover has been abandoned. The south-east of the site, including high bog and cutover, has been afforested. Damaging activities associated with these landuses include drainage and burning of the high bog. Dumping takes place on the site, particularly by the road which runs through the centre of the bog. 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.

Lough Garr 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. There is an interesting transition zone between marsh and high bog on this site which supports a good range of plant species. Ireland has a high proportion of the total E.U. resource of raised bog (over 50%) and so has a special responsibility for the conservation of this habitat at an international level.

Milltownpass Bog NHA (002323)

SITE NAME: Milltownpass Bog NHA

SITE CODE: 002323

Milltownpass Bog NHA is located 1 km north-east of Milltownpass, in the townlands of Pass of Kilbride and Claremount or Cummingstown in Co. Westmeath. The site comprises a raised bog that includes both areas of high bog and cutover bog and can be accessed from the local road off the N6 to the east of the site.

This bog has pools present and is wet and quaking in places. The wet areas are formed by re-wetting of depressions on the high bog surface caused by subsidence. There is very little drainage on the high bog

and no forestry. Cutover is found all around the high bog margins with encroaching scrub and a forestry plantation. Broad-leaved woodland occurs to the west of the site.

Much of the high bog has vegetation typical of a Midland Raised Bog, consisting of Ling Heather (*Calluna vulgaris*), Hare's-tail Cottongrass (*Eriophorum vaginatum*), White Beak-sedge (*Rhynchospora alba*), Cross-leaved Heath (*Erica tetralix*), Bog Asphodel (*Narthecium ossifragum*), Cranberry (*Vaccinium oxycoccos*) and Bog-rosemary (*Andromeda polifolia*). There is some encroachment by Birch (*Betula pubescens*) at the northern high bog margin with some scattered Scots Pine (*Pinus sylvestris*). In general the high bog is wet with the bog mosses *Sphagnum capillifolium*, *S. subnitens* and *S. papillosum* present. Other species present include Deergrass (*Scirpus cespitosus*) and the lichens *Cladonia portentosa*, *C. uncialis*, *C. fimbriata*, *C. crispata* and *C. fleurciana*. The abundance of lichens is indicative of the absence of recent burning. The vegetation is quite hummocky, due to drying out and there are old dry hummocks of Ling Heather with Cranberry and the mosses *Dicranum majus* and *Hypnum jutlandicum*. The liverwort *Odontoschisma sphagni* occurs among *Sphagnum* hummocks.

Towards the centre of the high bog there is a dry ridge dominated by Ling Heather, Bog Asphodel and Deergrass with some Cottongrass. North of this ridge there is a wet depression dominated by Ling Heather, Cottongrasses, Cross-leaved Heath and lichens. There are small pools and wet hollows with the bog moss *Sphagnum cuspidatum* and small hummocks of the bog mosses *S. papillosum*, *S. capillifolium* and *S. magellanicum*. Some hollows are dominated by Bog Asphodel and the hummocks are overgrown by the liverwort *Odontoschisma sphagni*. The small pools are drying out and in-filling with Cottongrass. Round-leaved Sundew (*Drosera rotundifolia*) is present along with the bog moss *Sphagnum tenellum* and large lawns of *S. magellanicum*. These occur in wet quaking areas caused by re-flooding from subsidence.

South of the ridge, the high bog slopes away towards the road and grades into a very wet and quaking area that has numerous pools and extensive lawns of bog moss (*S. magellanicum*). This area is dominated by Cottongrasses and Ling Heather over abundant *Sphagnum*, with Bog Asphodel and White Beak-sedge dominated hollows. Large pools occur here with the bog moss *S. cuspidatum*. There are also flushed areas with the mosses *Aulacomnium palustre*, *Polytricum commune*, *P. alpestre*, the liverwort *Pleurozium schreberi* and Cranberry locally abundant.

The high bog is surrounded by cutover, much of which has been colonised by Birch (*Betula* spp.) scrub. There is old cutover to the north, with a thin margin of Birch wood. This cutover is dominated by bog species, especially Ling Heather and lichens. There is some active peat-cutting at the north-east margin, backed by Birch scrub on cutover, and to the west some of the cutover has been reclaimed for agricultural grassland. A small forestry plantation is present on cutover to the north-east and broadleaved woodland to the west adds to the habitat diversity of the site.

Current landuses on the site include peat-cutting, agriculture and forestry. To the east, outside the site, there is intensive commercial peat-cutting, but few damaging operations apart from reclamation of cutover to the west and small scale domestic peat-cutting to the east occur within the site. The heavily improved area of cutover at the western margin has been cleared of scrub, levelled and re-seeded. This reclamation directly adjoins the cutface. A new road has been built and further developments are planned. Damaging activities associated with these landuses include scrub clearance and drainage at the margins of the high bog. 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.

Milltownpass 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 and pools and due to its easterly location, is of biogeographical importance. 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.