



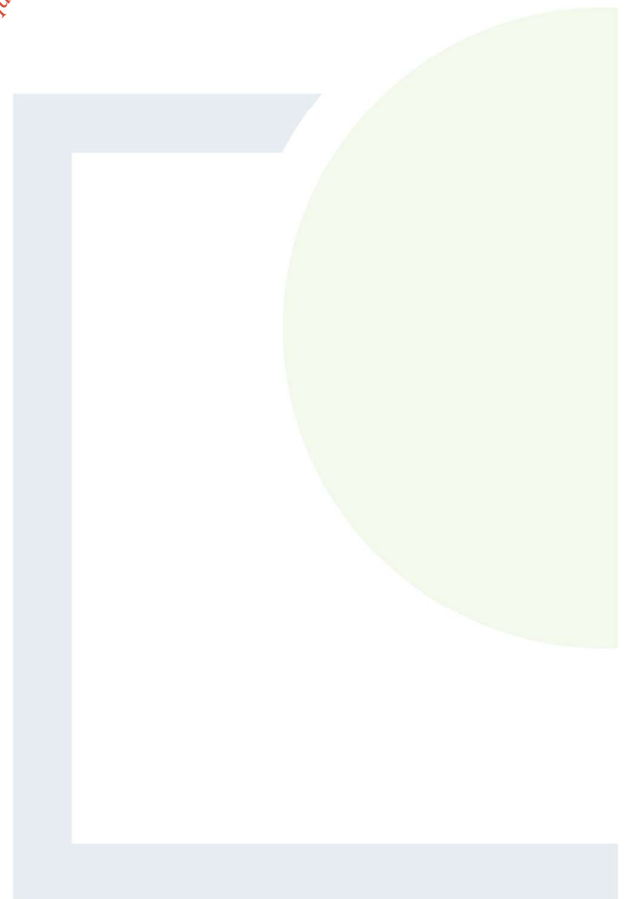
**FEHILY
TIMONEY**

**CONSULTANTS IN ENGINEERING,
ENVIRONMENTAL SCIENCE & PLANNING**

APPENDIX 4

European Site Synopses

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Site Name: Akeragh, Banna and Barrow Harbour SAC

Site Code: 000332

Akeragh, Banna and Barrow Harbour SAC is a large coastal site covering a 10 km section of coastline in Co. Kerry, and including a wide diversity of habitats. The underlying rock is limestone, which outcrops only in the southern part of the site, in the impressive columns and hillsides north of Fenit. Elsewhere shell sand is predominant with occasional development of peat.

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

[1210] Annual Vegetation of Drift Lines
[1310] Salicornia Mud
[1330] Atlantic Salt Meadows
[1410] Mediterranean Salt Meadows
[2110] Embryonic Shifting Dunes
[2120] Marram Dunes (White Dunes)
[2130] Fixed Dunes (Grey Dunes)*
[2190] Humid Dune Slacks
[4030] Dry Heath

Sand dunes run southwards from Ballyheigue and they become especially interesting south of the Akeragh outflow where they show great variety in both physiography and vegetation. The largest proportion of the sand dune system is fixed dune grassland. The vegetation is made up of a mosaic of Marram (*Ammophila arenaria*) tussocks interspersed with low-lying patches of a Red Fescue-Lady's Bedstraw (*Festuca rubra-Galium verum*) community. Other species occurring include Smooth Meadow-grass (*Poa pratensis*), Daisy (*Bellis perennis*), Ribwort Plantain (*Plantago lanceolata*) and Bulbous Buttercup (*Ranunculus bulbosus*). There is a sparse occurrence of moss species, including *Brachythecium rutabulum*, *Tortula ruralis* ssp. *ruraliformis* and *Homalothecium lutescens*. These tend to be restricted to areas close to rabbit burrows, where they are associated with species such as Germander Speedwell (*Veronica chamaedrys*), Squinancywort (*Asperula cynanchica*) and Dog Lichen (*Peltigera* spp.). A number of other species typical of Mesobromion grasslands are found in this habitat type, reflecting the calcareous nature of the site. These include Pyramidal Orchid (*Anacamptis pyramidalis*), Thyme-leaved Sandwort (*Arenaria serpyllifolia*) and Hairy Rock-cress (*Arabis hirsuta*). Dodder (*Cuscuta epithimum*), a parasitic plant, grows in abundance on the fixed dune slopes at Carrahane.

Mobile Marram dunes occur as a narrow band running along the seaward side of the entire coastal strip. There is a slight increase in dune mobility towards the growing tip at Carrahane. The main ridges are dominated by Marram and reach heights in excess of 20 m in places. Companion species include Sea Spurge (*Euphorbia paralias*), Colt's-foot (*Tussilago farfara*), Sea-holly (*Eryngium maritimum*) and Sand Sedge (*Carex arenaria*). Also occurring are embryonic dunes, with such species as Sand Couch (*Elymus farctus*) and Sea Rocket (*Cakile maritima*). The latter species, along with Spear-leaved Orache (*Atriplex prostrata*), has also been recorded from the 'annual vegetation of drift lines' habitat at this site.

The site contains a number of dune slack areas, these being best developed on the landward side of Carrahane dunes. Species present in these dune slacks include Common Bent (*Agrostis stolonifera*), Red Clover (*Trifolium pratense*), Glaucous Sedge (*Carex flacca*), Water Mint (*Mentha aquatica*), Creeping Willow (*Salix repens*) and the scarce Marsh Helleborine (*Epipactis palustris*).

Of particular ecological interest is the gradation from fixed dune and dune slack to saltmarsh at Carrahane. Saltmarsh here is particularly well-developed but also occurs at Barrow Harbour. Common saltmarsh species include Thrift (*Armeria maritima*), Red Fescue, Sea Plantain (*Plantago maritima*), Saltmarsh Rush (*Juncus gerardi*) and Sea Rush (*Juncus maritima*). A number of scarce species are associated with the saltmarsh, notably Hard-grass (*Parapholis strigosa*), Saltmarsh Flat-sedge (*Blysmus rufus*), Strawberry Clover (*Trifolium fragiferum*) and a species of sea-lavender (*Limonium recurvum*). Glassworts (*Salicornia* spp.) occur on the edges of the saltmarsh and in sheltered areas extends onto the intertidal muds.

The harbour is surrounded by low hills of limestone which support an interesting grassland community where they remain unfertilised. This is best seen at the entrance to Carrahane Bay but recurs sporadically elsewhere. Coastal heath occurs scattered on limestone rocky areas in the southern part of the site. It generally occurs in association with dry grassland. Species which occur include Gorse (*Ulex europaeus*), Western Gorse (*U. gallii*), Burnet Rose (*Rosa pimpinellifolia*), Blackthorn (*Prunus spinosa*), Biting Stonecrop (*Sedum acre*), Black Medick (*Medicago lupulina*), Common Whitlowgrass (*Erophila verna*), Kidney Vetch (*Anthyllis vulneraria*) and Wild Madder (*Rubia peregrina*), among others.

Akeragh Lough now supports extensive areas of brackish vegetation. It was formerly richer in birdlife, but the lake level has been controlled by a sluice on the outflow, the total water area has declined. Also, the peaty land to the east has been afforested. The site supports important wintering waterfowl populations. Brent Goose occur in internationally important numbers (360 in winter 1996/97), while in winter 1996/97 nationally important populations of Ringed Plover (130), Grey Plover (62), Lapwing (approx. 2000), Sanderling (280) and Bar-tailed Godwit (345) occurred. Notable populations of Golden Plover, Oystercatcher, Dunlin, Curlew and Redshank also occur. The regular occurrence of Golden Plover and Bar-tailed Godwit is of note as these species are listed on Annex I of the E.U. Birds Directive.

This large site is of major ecological interest due both to its range of floristically-rich coastal habitats, nine of which are listed on Annex I of the E.U. Habitats Directive, including one priority habitat, and as a wintering site for significant numbers of waterfowl (including two Annex I species).

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SITE SYNOPSIS

SITE NAME: TRALEE BAY COMPLEX SPA

SITE CODE: 004188

The Tralee Bay Complex SPA is located along the coast of north Co. Kerry between Ballyheige in the north, Tralee in the east and Stradbally in the west. The site includes the inner part of Tralee Bay, including Derrymore Island, the inlets of Barrow Harbour and Carrahane Strand, Akeragh Lough, Lough Gill, and much of the intertidal habitat from Scraggane Point at the northern end of the Magharees Peninsula around the coast to c. 2 km south of Ballyheige. Inner Tralee Bay is well sheltered by the Derrymore Island peninsula. The intertidal sediments vary from muddy sands on the upper shore to firm rippled sands on the lower, more exposed shore. The sediments have a diverse macro-invertebrate fauna, with such species as Cockle (*Cerastoderma edule*), Lugworm (*Arenicola marina*), Ragworm (*Hediste diversicolor*), Baltic Tellin (*Macorna balthica*) and Shrimp (*Crangon crangon*) occurring. The intertidal flats have extensive beds of Eelgrass (*Zostera* spp.).

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

Tralee Bay Complex SPA is an internationally important wetland for wintering waders and wildfowl. It supports an internationally important population of Light-bellied Brent Goose (1,412) and nationally important populations of a further 21 species, i.e. Whooper Swan (101), Shelduck (220), Wigeon (1,634), Teal (623), Mallard (571), Pintail (54), Scaup (892), Oystercatcher (1,011), Ringed Plover (344), Golden Plover (6,393), Grey Plover (195), Lapwing (6,106), Sanderling (228), Dunlin (2,444), Black-tailed Godwit (139), Bar-tailed Godwit (608), Curlew (1,170), Redshank (635), Turnstone (229), Black-headed Gull (1,320) and Common Gull (599) – all figures are five year mean peak counts for the period 1995/96 to 1999/2000, except the gulls which are four year mean peak counts for the period 1996/97 to 1999/2000.

Tralee Bay Complex SPA is of high ornithological importance as it annually supports over 20,000 wintering waterbirds, including an international important population of Light-bellied Brent Goose and nationally important populations of 21 other species. It is of note that three of the species that regularly occur, Whooper Swan, Golden Plover and Bar-tailed Godwit, are listed on Annex I of the E.U. Birds Directive. Tralee Bay is a Ramsar Convention site and parts of the Tralee Bay Complex SPA are designated as Nature Reserves. Lough Gill is a Wildfowl Sanctuary.

20.1.2015

Site Name: Tralee Bay and Magharees Peninsula, West to Cloghane SAC

Site Code: 002070

This large site in Co. Kerry stretches from Tralee town westwards to Fenit Harbour and Cloghane, encompassing Tralee Bay, Brandon Bay and the Magharees Peninsula. It includes extensive mudflats at the eastern end, the beaches of Derrymore Island, the sand dunes and lagoons of the Magharees Peninsula, as well as the rocky headlands at its end. The site includes two Statutory Nature Reserves, Tralee Bay and Derrymore Island, and much of the estuarine part of the site has been designated a Special Protection Area (SPA) for birds and their habitats.

The site is mostly underlain by limestone, but significant parts of this are covered with glacial drift or windblown sand. The main exposures occur at Fenit port, Oyster Hall, Blennerville and at Rough Point and Fahamore, but there are some other low outcrops on the beaches west to Castlegregory. Elsewhere the sandstones and slates of the Dingle Beds appear.

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

- [1130] Estuaries
- [1140] Tidal Mudflats and Sandflats
- [1150] Coastal Lagoons*
- [1160] Large Shallow Inlets and Bays
- [1170] Reefs
- [1210] Annual Vegetation of Drift Lines
- [1220] Perennial Vegetation of Stony Banks
- [1310] *Salicornia* Mud
- [1330] Atlantic Salt Meadows
- [1410] Mediterranean Salt Meadows
- [2120] Marram Dunes (White Dunes)
- [2130] Fixed Dunes (Grey Dunes)*
- [2170] Dunes with Creeping Willow
- [2190] Humid Dune Slacks
- [6410] *Molinia* Meadows
- [91E0] Alluvial Forests*
- [1355] Otter (*Lutra lutra*)
- [1395] Petalwort (*Petalophyllum ralfsii*)

Both the Tralee and Brandon (Owenmore) estuaries feature wide expanses of sheltered intertidal flats, often fringed with saltmarsh vegetation. Plant species are typically scarce on the flats, although there are some eelgrass (*Zostera* spp.) beds and patches of green algae (e.g. *Ulva* spp. and *Enteromorpha* spp.). The eelgrass beds at Derrymore Island include *Zostera noltii*, a species which has a limited distribution in Ireland. A variety of polychaetes (worms) and bivalve molluscs are also present in the intertidal sections.

The majority of Tralee Bay is shallow and composed of sublittoral sediments. In the more sheltered areas of the bay, there is a variety of important sublittoral sediment communities in which a number of rare species occur. Seagrass beds in sandy substrates are characterized by oysters and the rare anemone *Calliactis parasitica* which lives on shells inhabited by the hermit crab *Pagurus bernhardus*. The little known hydroid, *Laomedea angulata*, is also found on the fronds of the seagrass. The native oyster, *Ostrea edulis*, occurs in sediment communities throughout the bay. Maerl beds, composed of the free-living coralline algae *Lithothamnion corallioides* and *Phymatolithon calcareum*, and characterized by anemones (*Anthopleura balli*) and oysters, occur in the middle of the bay. The rare anemone *Halcampa chrysanthellum* has been recorded here.

The intertidal reefs of Tralee Bay and the Magharees peninsula range from being exposed to sheltered from wave action, and the communities present are good examples of the communities typically found on these types of shores. The barnacle/limpet community with the lichen *Lichina pygmaea* is an uncommon community and is found in the upper-mid shore at Rough Point. The low shore at Rough Point, which is moderately exposed to wave action, and the shore at Coosanea, which is sheltered from wave action, are both very species-rich. Rocky outcrops on the shore half way round the bay near Camp are known to support a community of the uncommon honeycomb worm *Sabellaria alveolata*. The sublittoral reefs support communities characterised by a variety of red foliose algae, as well as the brown algae *Dictyota dichotoma*, and are typical of communities that are subjected to sand scour as indicated by the presence of the red algae *Furcellaria lumbricalis* and *Polyides rotundus*.

In the transition zone between the intertidal flats and saltmarsh, specialised colonisers of mud predominate - swards of Common Cord-grass (*Spartina anglica*) are extensive on the leeward side of Derrymore Island, while swards of Glasswort (*Salicornia europaea* agg.) also occur in parts of the site.

Saltmarsh vegetation frequently fringes the mudflats, with the most extensive areas being found at Blennerville, Derrymore Island and Formoyle in Brandon Bay. The dominant type of saltmarsh present is Atlantic salt meadow. Characteristic species occurring include Common Saltmarsh-grass (*Puccinellia maritima*), Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Sea-milkwort (*Glaux maritima*), Sea Plantain (*Plantago maritima*), Red Fescue (*Festuca rubra*), Creeping Bent (*Agrostis stolonifera*), Saltmarsh Rush (*Juncus gerardi*), Long-bracted Sedge (*Carex extensa*), Lesser Sea-spurrey (*Spergularia marina*) and Sea Arrowgrass (*Triglochin maritima*). Areas of

Mediterranean salt meadows, characterised by clumps of Sea Rush (*Juncus maritimus*), occur occasionally.

Sandy beaches backed by strips of 'white' dunes are common along the southern shore of the site. The vegetation of these 'white' dunes is dominated by Marram (*Ammophila arenaria*). However, the main dune area on this southern shore occurs on the Magherees Peninsula - a tombolo which joins a number of the Magherees Islands with the mainland. Here there are extensive areas of fixed 'grey' dunes, which feature a number of damp hollows or dune slacks. The fixed dunes are species-rich, with characteristic species such as White Clover (*Trifolium repens*), Lesser Hawkbit (*Leontodon taraxacoides*), Common Centaury (*Centaureum erythraea*), Lady's Bedstraw (*Galium verum*) and grasses (e.g. *Festuca rubra*, *Poa trivialis* and *Avenula pubescens*).

Relatively scarce plants found on the dunes include the following: Fringed Rock-cress (*Arabis brownii*), Fragrant Orchid (*Gymnadenia conopsea*), Squinancywort (*Asperula cynanchica*), Autumn Lady's-tresses (*Spiranthes spiralis*) and Dodder (*Cuscuta epithymum*). Dune slack species include Strawberry Clover (*Trifolium fragiferum*), Chaffweed (*Anagallis minima*) and the fungus *Inocybe halophila*.

Lough Gill, a natural sedimentary lagoon, is located at the base of the Magherees Peninsula. The lagoon is only slightly brackish and therefore contains freshwater species along with lagoon specialists. Submerged flora present includes Beaked Tasselweed (*Ruppia maritima*) and Horned Pondweed (*Zannichellia palustris*), while species fringing the lagoon include Common Reed (*Phragmites australis*), Sea Club-rush (*Scirpus maritimus*) and Grey Club-rush (*S. lacustris* subsp. *tabernaemontani*).

Other coastal habitats that occur within the site include shingle beaches, rocky shores and vegetated sea-cliffs. The site also contains fragments of terrestrial habitats such as deciduous woodland, scrub, heath, dry limestone grassland, wet grassland and freshwater marshes.

There is some good limestone flora on the hill at Oyster Hall, with Burnet Rose (*Rosa pimpinellifolia*), Southern Polypody (*Polypodium australe*) and Hairy Rock-cress (*Arabis hirsuta*) occurring. There is an old record for the Red Data Book species, Sea-kale (*Crambe maritima*). At Fahamore and Rough Point it is the intertidal communities that are particularly rich, benefiting from a multitude of microhabitats in the eroded limestone. Red algae are frequent, including the agar seaweeds *Gelidium* and *Pterocladia*.

A small area of *Molinia* meadow is found in the site, with species such as Purple Moor-grass (*Molinia caerulea*), Devil's-bit Scabious (*Succisa pratensis*), Sharp-flowered Rush (*Juncus acutiflorus*) being common, and species such as Greater Tussock-sedge (*Carex paniculata*), Tormentil (*Potentilla erecta*), Marsh Cinquefoil (*Potentilla palustris*), Wild Angelica (*Angelica sylvestris*) and Common Valerian (*Valeriana officinalis*) also frequent.

Beach features dominate the northern coast of the Dingle Peninsula with an excellent series of shingle ridges forming Derrymore Island and the tombolo which links

former Magheree Islands (Rough Point, etc.) to the mainland. Here there is a large area of well developed sand dunes with an exceptionally rich flora and great topographic variation. The flora includes Fringed Rock-cress, Squinancywort, Dodder, Autumn Lady's-tresses and Chaffweed - all plants with a restricted distribution in the west of Ireland. These occur in a vegetation with abundant Red Fescue, scattered Marram, and herbs such as Lady's Bedstraw, Wild Thyme (*Thymus praecox*), Common Bird's-foot-trefoil (*Lotus corniculatus*) and Kidney Vetch (*Anthyllis vulneraria*). Yellow-rattle (*Rhinanthus minor*), eyebrights (*Euphrasia* spp.), Pyramidal Orchid (*Anacamptis pyramidalis*) and Heath Spotted-orchid (*Dactylorhiza maculata*) are four sensitive species which also occur here.

At the seaward edge drift line vegetation is often present. The more stable areas of shingle support Sea Beet (*Beta vulgaris* subsp. *maritima*), Sea Mayweed (*Matricaria maritima*), Sea Campion (*Silene vulgaris* subsp. *maritima*), Curled Dock (*Rumex crispus*), oraches (*Atriplex* spp.), Sea Sandwort (*Honkenya peploides*) and Silverweed (*Potentilla anserina*).

Between the dunes where erosion has removed the sand down to the water table there are temporary ponds or dune slacks with many additional species. Marsh Pennywort (*Hydrocotyle vulgaris*), Silverweed, various sedges (*Carex panicea* and *C. nigra*) and, in places, Strawberry Clover, Adder's-tongue (*Ophioglossum vulgatum*), Knotted Pearlwort (*Sagina nodosa*) and the orchids *Dactylorhiza majalis* and *D. incarnata* all occur. Some parts of the dune slacks feature a vegetation community characterised by the presence of Creeping Willow (*Salix repens*).

Woodland is rare on the Dingle Peninsula so the three stands included in this site are locally important. A deserted river valley at Killelton, the steep valley of the Finglas River at Camp and the west-facing slopes of Drom Hill opposite Cloghane all have features of significant interest. The last site has many species of lower plant (liverworts and lichens) that form distinctive elements of the westernmost natural woods in Ireland. At Garrahies Wood, adjacent to the Finglas River, there is an example of wet woodland on base-rich soils subject to flooding. The woodland type falls into the ash-alder alluvial forest category. The most common tree species are Alder (*Alnus glutinosa*), Downy Birch (*Betula pubescens*) and willows (*Salix* spp.). Bluebell (*Hyacinthoides non-scripta*), grasses and Bramble (*Rubus fruticosus* agg.) are the most common species in the ground layer.

The dune complex on the Magherees Peninsula supports the largest Irish breeding population of Natterjack Toads. Indeed, the population may be the largest breeding population in Britain and Ireland. The Natterjack Toad is listed as vulnerable in the Red Data Book and is protected under both European and national legislation. The toads require shallow warm water to spawn in and sandy habitats for over-wintering. Their tadpoles are vulnerable to predation in permanent lakes but despite this they have some success in Lough Gill which is a shallow lake with flat shores of sand, wet grassland or marsh. Natterjack Toads also breed within the site at Fermoy, to the west. Also recorded from Fermoy is the rare whorl snail *Vertigo angustior*, a species listed on Annex II of the E.U. Habitats Directive. Two species of

hover fly - *Platycheris perpilladus* and *Sphaerophoria loewi* - have their only Irish records from the Magharees Peninsula dune system and a water beetle, *Cercyon sternalis*, was first recorded in Ireland in 1997 in Lough Gill.

The site supports populations of several rare plant species which have not been mentioned already. The bryophyte Petalwort (*Petalophyllum ralfsii*), which is listed on Annex II of the E.U. Habitats Directive, is known from the dune slacks on the Magharees Peninsula and Smooth Brome (*Bromus racemosus*), a Red Data Book grass, has been recorded from two wet meadows within the site. Several aquatic plants of interest grow in Lough Gill, the rarest being the Red Data Book stonewort *Chara canescens*. The Slender-leaved Pondweed (*Potamogeton filiformis*) occurs far to the south of its distribution elsewhere in Ireland and Britain, while there are also old records for Spiral Tasselweed (*Ruppia spiralis*). The marshes along the southern shore in the past support a rich variety of vegetation including several species rare in Kerry such as Water Dock (*Rumex hydrolapathum*) and Greater Spearwort (*Ranunculus lingua*), as well as sedges (*Carex dioica*, *C. limosa* and *C. diandra*) on patches of peat. Despite local reclamation it is likely that most of these still survive.

Otters regularly feed within this extensive site though it is not known if they breed. Otter is listed on Annex II of the E.U. Habitats Directive.

Tralee Bay, including Lough Gill, is an internationally important wetland for wintering waders and wildfowl. Species present which are listed on Annex I of the E.U. Birds Directive include Whooper Swans (24, mid-1980s), Golden Plover (3,053, 1994-95) and Bar-tailed Godwit (903, 1995-96). The dunes also provide an important feeding ground for Chough, a resident Annex I species.

Other wintering waders and wildfowl present include: Pale-bellied Brent Goose (944, mid-1980s), Shelduck (218, 1995-96), Gadwall (14, 1994-95), Teal (860, 1994-95), Pintail (56, 1995-96), Shoveler (144, mid-1980s), Scaup (1560, 1994-95), Scoter (620, 1994-95), Red-breasted Merganser (46, 1994-95), Ringed Plover (332, 1994-95), Grey Plover (674, 1995-96), Lapwing (5700, 1994-95), Knot (320, 1994-95), Sanderling (270, 1994-95), Purple Sandpiper (103, mid-1980s), Dunlin (4122, 1995-96), Black-tailed Godwit (508, 1994-95), Curlew (826, 1994-95), Redshank (352, 1995-96), Greenshank (21, 1994-95) and Turnstone (477, mid-1980s). Most of these species are present in nationally important numbers.

The dunes at this site face pressures from intensive farming practises and recreational use by visitors. The most threatening activities include fertilisation of the species-rich dune grasslands, over-grazing, and trampling of areas of dunes adjacent to tourist facilities (e.g. caravan parks). These activities may lead to severe erosion and eutrophication of the dune grasslands and dune slacks. Parts of the dune system are also vulnerable to invasion by Sea Buckthorn (*Hippophae rhamnoides*).

Agricultural run-off from areas of fertilised dune grasslands in the vicinity of Lough Gill pose a continued threat to the nutrient status of the lagoon; algal blooms and fish

kills have occurred in the past. Removal of sand has also occurred and poses a threat to the integrity of the system.

Generally, the intertidal areas are relatively robust, although certain communities are vulnerable. For example, *Spartina* has spread widely, and may oust less vigorous colonisers of mud and may also reduce the area of mudflat available to feeding birds. Other activities, such as land reclamation and aquaculture, pose potential threats in terms of damage to habitats and potential disturbance to wintering birds.

Domestic and industrial wastes are discharged into inner Tralee Bay, but water quality is generally satisfactory - except in the inner bay, reflecting the sewage load from Tralee Town. Further industrial development along the bay in the vicinity of Tralee Town and Fenit and water polluting operations are potential threats.

This site is of considerable ecological and conservation significance for the excellent diversity of habitats it contains, many of which are listed on Annex I of the E.U. Habitats Directive. The occurrence of a species listed on Annex II of the E.U. Habitats Directive adds further importance to the site. The presence of a number of Red Data Book species, including the largest population of Natterjack Toads in Ireland, is also notable, as is the occurrence of several species listed on Annex I of the E.U. Birds Directive.

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Site Name: Magharee Islands SAC

Site Code: 002261

This marine site is centred around the Magharee Islands, which lie about 2 km north of the Magharee Peninsula in Co. Kerry. The site includes two of the smaller islands, Illaunnabarnagh and Mucklaghmore, which lie about 5 km to the north-east of the main group. The islands are exposed on their west coasts and more sheltered on their east coasts with moderately strong currents between them. The islands are composed of Carboniferous limestone.

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

[1170] Reefs

The shallow water reefs around and between the Magharee Islands consist of areas that are exposed to wave action on the west coasts of the islands, more sheltered on the east coasts and subject to weak or moderate tidal streams. For the most part, the reefs are a mixture of boulders, cobbles, pebbles and sand, but in some areas are solid bedrock. In shallow water areas that are sheltered from wave action, mixed kelp forests of *Laminaria hyperborea*, *Saccorhiza polyschides* and *L. saccharina* colonize larger boulders and bedrock. On some reefs only *L. hyperborea* and *L. saccharina* are present with a sparse understory of red algae - this is an uncommon community. The sea squirts *Polycarpa scuba* and *Distomus variolosus* occur in the kelp communities and both of these species have a limited distribution in Ireland and Britain. *P. scuba* (=rustica) has only previously been recorded from the Irish Sea, English Channel and Brittany, but was common on the south-east coast. *D. variolosus* in Ireland is only known from between Galway and Tralee Bay on the west coast, and the east and south-east coasts.

In areas exposed to wave action the reefs at depths of 19-28 m are generally characterised by a community of foliose red algae, in particular *Callophyllis laciniata*, *Schottera nicaeensis*, *Plocamium cartilagineum* and *Delesseria sanguinea* and the hydroid *Sertularia argentia*, indicating the tide-swept nature of the habitats. Branching and cushion sponge may also be common in this community. The sea squirt *Diazona violacea* and the sponge *Thymosia guernei* were recorded twice and both occur at the reef north-west of Gurrig Island. *D. violacea* is more characteristic of the deeper water Axinellid sponge community. The small crevice dwelling brittlestar *Ophiothrix balli* is frequent at several sites. Red algal species such as *Plocamium cartilagineum* and *Acrosorium venulosum* colonise small boulders and cobbles, and the red alga *Radicilingua thysanorhizans* is also present at the Mucklaghmore reefs.

Illaunbarnagh is of national importance for breeding terns. In 1995 there were 46 pairs of Common Tern and 68 pairs of Arctic Tern. All tern species are listed on Annex I of the E.U. Birds Directive. Illaunabarnagh and Mucklaghbeg also have a nationally important population of Black Guillemots (113+ individuals in 1999).

This site is of conservation significance in particular for the reefs and associated communities which it hosts. The fact that the site supports important bird colonies adds further to its value.

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SITE SYNOPSIS

SITE NAME: MAGHAREE ISLANDS SPA

SITE CODE: 004125

The Magharee Islands lie about 2 km north of the Magharees Peninsula on the north side of the Dingle Peninsula, Co. Kerry. The site includes the main Magharee Islands (“Seven Hogs”), the islands of Mucklaghmore and Illaunnabarnagh to the east, Illaunnaon and Doonagaun Island to the south and several smaller rocky islets. Illaunimmill and Illauntannig are the largest of the islands included in the site. The islands are most exposed on their west coasts, and there are moderately strong sea currents between them. The bedrock of the islands is Carboniferous limestone; the larger ones have a covering of glacial boulder clay. The islands are low-lying, being mostly less than 15 m above sea level. Illaunimmill and Illauntannig were at one time inhabited and both are still grazed by cattle and sheep. The remains of an early Christian church can be seen on Illauntannig. Areas of the surrounding seas are included around all of the islands.

This site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Barnacle Goose, Storm Petrel, Shag, Common Gull, Common Tern, Arctic Tern and Little Tern.

The Magharee Islands are of national importance for breeding seabirds and also for wintering geese. In winter, the islands are utilised by a Barnacle Goose flock of national importance (85 – four survey mean between 1993 and 2003). The Magharee Islands are also an important site for breeding terns, which have been known from here since the 1850s. In 1995 the following were recorded: Common Tern (58 pairs), Arctic Tern (232 pairs) and Little Tern (36 pairs). The Little Tern population comprised over 20% of the national total. Sandwich Tern has bred in the past, for example in 1978, and a pair of Roseate Tern was also recorded breeding on Illaunnabarnagh in 2006. The site also supports nationally important populations of Storm Petrel (1,272 in 2007), Shag (61 pairs in 2001) and Common Gull (43 pairs in 2001). Other breeding seabirds recorded during a survey in 2001 were as follows: Fulmar (85 pairs), Cormorant (20 pairs), Lesser Black-backed Gull (20 pairs), Herring Gull (7 pairs) and Great Black-backed Gull (21 pairs). A recent survey in 2007 recorded the following breeding seabirds: Fulmar (137 pairs), Cormorant (91 pairs), Shag (223 pairs), Common Gull (178 pairs), Lesser Black-backed Gull (146 pairs), Herring Gull (82 pairs), Great Black-backed Gull (74 pairs), Common Tern (128 pairs), Arctic Tern (163) and Little Tern (18 pairs).

A possible breeding pair of Chough was recorded on the islands in 1992 and birds breeding on the mainland are known to forage on some of the islands.

Magharee Islands SPA is of high ornithological importance for breeding seabirds, especially terns, as well as for wintering Barnacle Geese, which are at the most southerly point of their range in Europe. It is of note that six of the species that occur,

i.e. Storm Petrel, Barnacle Goose, Chough, Common Tern, Arctic Tern and Little Tern are listed on Annex I of the E.U. Birds Directive.

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31.10.2014

SITE SYNOPSIS

SITE NAME: KERRY HEAD SPA

SITE CODE: 004189

Kerry Head SPA is situated on the south side of the mouth of the River Shannon in north Co. Kerry. It encompasses the sea cliffs from just west of Ballyheigue, around the end of Kerry Head to the west and north-eastwards as far as Kilmore. The site includes the sea cliffs and land adjacent to the cliff edge. The high water mark forms the seaward boundary. Most of the site is underlain by Devonian siltstones, sandstones and mudstones; a small section of the site has rocks of Carboniferous age.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Chough and Fulmar.

The site supports an internationally important population of breeding Chough, a Red Data Book species that is listed on Annex I of the E.U. Birds Directive; 32 breeding pairs were recorded from the site in the 1992 survey and 30 in the 2002/03 survey. In addition, a flock of 20 birds was noted on the northern coast of the site during the latter survey. The site is of particular note for the density of breeding pairs found.

The site also supports a nationally important population of Fulmar (421 pairs), as well as a small population of Shag (8 pairs) all seabird data from 2000. The site is also used by Peregrine (2 pairs in 2002).

Kerry Head SPA is one of the most important sites in the country for Chough. It also supports a population of Fulmar of national importance. The presence of Chough and Peregrine, both species that are listed on Annex I of the E.U. Birds Directive, is of particular significance

20.1.2015

SITE SYNOPSIS

SITE NAME: STACK'S TO MULLAGHAREIRK MOUNTAINS, WEST LIMERICK HILLS AND MOUNT EAGLE SPA

SITE CODE: 004161

The Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA is a very large site centred on the borders between the counties of Cork, Kerry and Limerick. The site is skirted by the towns of Newcastle West, Ballydesmond, Castleisland, Tralee and Abbeyfeale. The mountain peaks included in the site are not notably high or indeed pronounced, the highest being at Knockfeha (451 m). Other mountains included are Mount Eagle, Knockanefune, Garraunbaun, Taur, Rock Hill, Knockacummer, Mullaghmuish, Knight's Mt, Ballincollig Hill, Beennageeha Mt, Sugar Hill, Knockanimpuba and Knockathea, amongst others. Many rivers rise within the site, notably the Blackwater, Owentaraglin, Owenkeal, Glenlara, Feale, Clydagh, Allaghaun, Allow, Oolagh, Galey and Smerlagh.

The site consists of a variety of upland habitats, though almost half is afforested. The coniferous forests include first and second rotation plantations, with both pre-thicket and post-thicket stands present. Substantial areas of clear-fell are also present at any one time. The principal tree species present are Sitka Spruce (*Picea sitchensis*) and Lodgepole Pine (*Pinus contorta*). A substantial part (28%) of the site is unplanted blanket bog and heath, with both wet and dry heath present. The vegetation of these habitats is characterised by such species as Ling Heather (*Calluna vulgaris*), Bilberry (*Vaccinium myrtillus*), Common Cottongrass (*Eriophorum angustifolium*), Hare's-tail Cottongrass (*Eriophorum vaginatum*), Deergass (*Scirpus cespitosus*) and Purple Moor-grass (*Molinia caerulea*). The remainder of the site is mostly rough grassland that is used for hill farming. This varies in composition and includes some wet areas with rushes (*Juncus* spp.) and some areas subject to scrub encroachment.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for Hen Harrier.

This SPA is a stronghold for Hen Harrier and supports the largest concentration of the species in the country. A survey in 2005 recorded 45 pairs, which represents over 20% of the all-Ireland total. A similar number of pairs had been recorded in the 1998-2000 period. The mix of forestry and open areas provides optimum habitat conditions for this rare bird, which is listed on Annex I of the E.U. Birds Directive. The early stages of new and second-rotation conifer plantations are the most frequently used nesting sites, though some pairs may still nest in tall heather of unplanted bogs and heath. Hen Harriers will forage up to c. 5 km from the nest site, utilising open bog and moorland, young conifer plantations and hill farmland that is not too rank. Birds will often forage in openings and gaps within forests. In Ireland, small birds and small mammals appear to be the most frequently taken prey.

Short-eared Owl, a very rare species in Ireland, has been known to breed within the site. Nesting certainly occurred in the late 1970s and birds have been recorded intermittently since. The owls are considered to favour this site due to the presence of Bank Voles, a favoured prey item. Merlin also breed within the site but the size of the population is not known. Red Grouse is found on some of the unplanted areas of bog and heath – this is a species that has declined in Ireland and is now Red-listed.

The Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA is of ornithological importance because it provides excellent nesting and foraging habitat for breeding Hen Harrier and is one the top sites in the country for the species. The presence of three species, Hen Harrier, Merlin and Short-eared Owl, which are listed on Annex I of the E.U. Birds Directive is of note.

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20.1.2015

Site Name: Slieve Mish Mountains SAC

Site Code: 002185

The Slieve Mish Mountains form the backbone of the eastern half of the Dingle Peninsula in Co. Kerry. The highest peak is Baurtregaum (851 m). The range is composed predominantly of Old Red Sandstone.

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

[4010] Wet Heath
[4030] Dry Heath
[4060] Alpine and Subalpine Heaths
[8110] Siliceous Scree
[8210] Calcareous Rocky Slopes
[8220] Siliceous Rocky Slopes
[1421] Killarney Fern (*Trichomanes speciosum*)

The dominant habitat within Slieve Mish Mountains SAC is heath. Wet heath, dry heath and acid grassland occur in mosaics on the lower slopes of the mountains, while dry heath tends to dominate the upper, steeper slopes. Typical species of the wet heath include Purple Moor-grass (*Molinia caerulea*), Cross-leaved Heath (*Erica tetralix*), Common Cottongrass (*Eriophorum angustifolium*) and Deergrass (*Scirpus cespitosus*). The dry heath is dominated by Heather (*Calluna vulgaris*), with grasses (e.g. *Agrostis capillaris*, *A. canina* and *Festuca ovina*) and mosses. Some alpine heath occurs on the highest ridges; this supports a number of locally scarce species, including Dwarf Willow (*Salix herbacea*), Stiff Sedge (*Carex bigelowii*), Thrift (*Armeria maritima*) and Crowberry (*Empetrum nigrum*).

The site is intersected, particularly on its northern flank, by several steep-sided glaciated river valleys or glens. The head of Derrymore Glen features a classic oligotrophic corrie lake which is surrounded by steep cliffs. Steep cliffs, scree and rocky ridges are features of the site above 650 m. Cliffs within the site support a number of rare bryophytes, i.e. *Bazzania pearsonii*, *Daltonia splachnoides*, *Dumortiera hirsute*, *Mastigophora woodsii*, *Moerckia hibernica*, *Paraleptodontium recurvifolium*, *Radula carringtonii* and *Scapania ornithopodioides*, along with several relatively scarce vascular plant taxa typical of high-altitude inland cliffs, i.e. Starry Saxifrage (*Saxifraga stellaris*), Roseroot (*Rhodiola rosea*), Alpine Scurvygrass (*Cochlearia officinalis* subsp. *alpina*), Alpine Hair-grass (*Deschampsia cespitosa* subsp. *alpina*), Mountain Everlasting (*Antennaria dioica*), Mountain Sorrel (*Oxyria digyna*), Brittle Bladder-fern (*Cystopteris*

fragilis) and Irish Saxifrage (*Saxifraga rosacea*). The cliffs also support Kidney Saxifrage (*Saxifraga hirsuta*), St Patrick's-cabbage (*Saxifraga spathularis*) and the hybrid between these two species.

The site includes a small area of dry deciduous woodland, supporting species such as Sessile Oak (*Quercus petraea*), Ash (*Fraxinus excelsior*) and Holly (*Ilex aquifolium*).

The site contains a good population of Killaney Fern (*Trichomanes speciosum*), a species that is listed on Annex II of the E.U. Habitats Directive. Two other plants that are also listed in the Irish Red Data Book occur, namely Betony (*Stachys officinalis*) and Cornish Moneywort (*Sibthorpia europaea*). In Ireland, the latter species is confined to the Dingle Peninsula - its most easterly known station lies within the site. Other notable plant species recorded from the site include Whorled Caraway (*Carum verticillatum*), Lemon-scented Fern (*Oreopteris limbosperma*) and Ivy-leaved Bellflower (*Wahlenbergia hederacea*). Killarney Fern (*Trichomanes speciosum*) and Betony are protected under the Flora (Protection) Order, 2015.

Peregrine Falcons breed on cliffs within the site, and Chough are known to feed in the area. Both of these species are listed on Annex I of the E.U. Birds Directive.

Most of the site is grazed by sheep, with a smaller area being grazed by cattle. Over-grazing on parts of the site has led to some habitat degradation, particularly of the wet heath covering the lower slopes. Most of the blanket bog within the site has been extensively cut for turf and some of the turbarry is still active. The lack of forestry within the Slieve Mish range is notable.

Overall, the site is of considerable conservation significance, particularly for the presence of several habitats and species that are listed on Annexes I and II of the E.U. Habitats Directive. The presence of two bird species that are listed on Annex I of the E.U. Birds Directive and the populations of several rare or scarce plant species adds to the importance of the site.

Site Name: Ballyseedy Wood SAC

Site Code: 002112

Ballyseedy Wood lies south of the River Lee, some 2 km south-east of Tralee, Co. Kerry. Most of the wood is situated in the floodplain of the River Lee on sticky, gleyed clay.

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

[91E0] Alluvial Forests*

The woodland at the site is dominated by native tree species: Ash (*Fraxinus excelsior*), Alder (*Alnus glutinosa*), Rusty Willow (*Salix cinerea* subsp. *oleifolia*) and Hazel (*Corylus avellana*), with oak (*Quercus* spp.), Yew (*Taxus baccata*), elm (*Ulmus* sp.) and Spindle (*Euonymus europaeus*) also occurring. Non-native tree species found include Sycamore (*Acer pseudoplatanus*), Horse-chestnut (*Aesculus hippocastanum*), poplar (*Populus* sp.), Beech (*Fagus sylvatica*) and Hornbeam (*Carpinus betulus*). Three semi-natural woodland types are represented - areas dominated by Alder and Ash (following and adjacent to the River Lee); areas dominated by Ash and Hazel (on sloping, better-drained soil, mostly in the western half of the site); and areas dominated by Alder and Rusty Willow (on level sections further removed from the river).

The Alder/Ash-dominated woodland is a high canopy wood. The very large Alder trees present were probably planted, but much of the secondary regeneration is also very mature, being up to 100 years old. Sycamore, Horse-chestnut, poplar and Beech can also be found here. In the understorey species such as Hawthorn (*Crataegus monogyna*), Holly (*Ilex aquifolium*), elm, Spindle and Guelder-rose (*Viburnum opulus*) are found. The Alder/Ash-dominated woodland conforms well with the woodland type 'Alluvial Forest', listed with priority status on Annex I of the E.U. Habitats Directive.

The Ash/Hazel-dominated woodland is also mature, with Sycamore, Hornbeam and Beech also present. Hazel is frequent in the sub-canopy, with Hawthorn and the occasional elm also occurring.

The Alder/willow woodland stands are, for the most part, dominated by Alder, with Rusty Willow occurring as scattered trees.

The ground flora is represented by Wild Angelica (*Angelica sylvestris*), Meadowsweet (*Filipendula ulmaria*), Golden-saxifrage (*Chrysosplenium oppositifolium*), Enchanter's-nightshade (*Circaea lutetiana*), Soft Shield-fern (*Polystichum setiferum*), Broad Buckler-fern (*Dryopteris dilatata*), Scaly Male-fern (*Dryopteris affinis*), Thin-spiked Wood-sedge (*Carex strigosa*), Remote Sedge (*C. remota*) and Pendulous Sedge (*C. pendula*).

Several plant species which are nationally or locally scarce are found on the site, including Rough Horsetail (*Equisetum hyemale*), Thin-spiked Wood-sedge, Dark-leaved Willow (*S. myrsinifolia*) and Wood Horsetail (*E. sylvaticum*). The rare moss *Pylaisia polyantha*, a species known in Ireland only from Counties Donegal, Kerry and Mayo, has also been recorded from the site.

Ballyseedy Wood is a nesting site for Long-eared Owl, and the river is frequented by Otters, a species listed on Annex II of the E.U. Habitats Directive.

The site is undisturbed and apparently infrequently visited by man. Non-native tree species are present within the site but account for less than 30% of the woodland. Exotic and potentially invasive species present include Rhododendron (*Rhododendron ponticum*), Snowberry (*Symphoricarpos albus*), Cherry Laurel (*Prunus laurocerasus*), Japanese Knotweed (*Reynovtria japonica*) and Bamboo. These are, however, localised within the site and are not found throughout the woodland. In fact, some stands of woodland are remarkable for the complete absence of exotic species.

Ballyseedy Wood is of prime importance for its Alder/Ash-dominated woodland stands, a habitat type that is rare and threatened in Europe. The site is also of significance for several rare or scarce plant species that occur there. The scarcity of woodlands in north Kerry adds to the importance of the site.

Site Name: Lower River Shannon SAC

Site Code: 002165

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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