

APPENDIX D
Site Locations and Conservation Areas

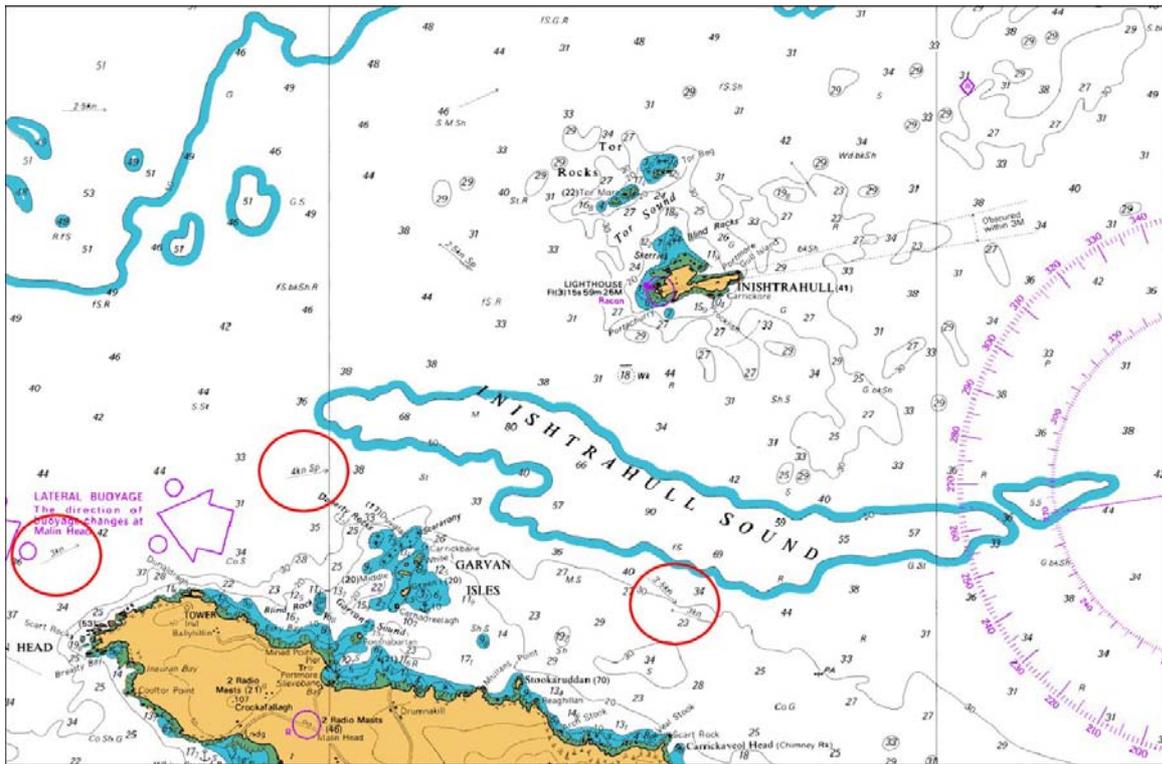
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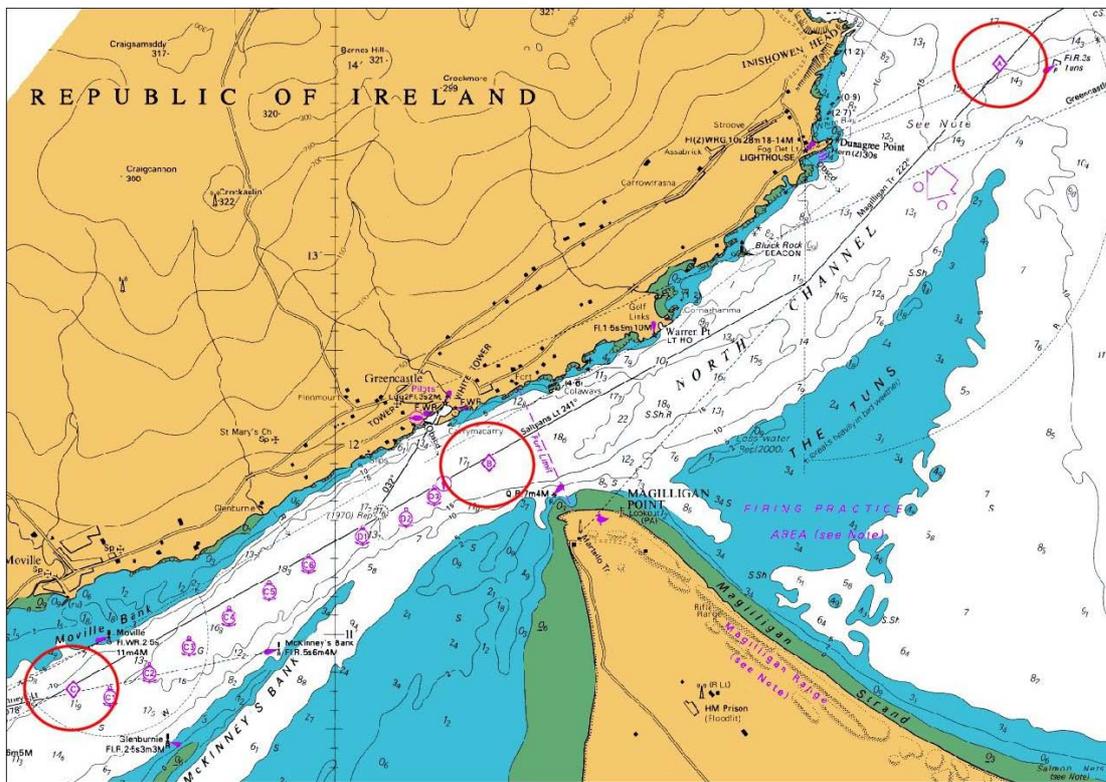
Eleven sites were identified in Chapter 4 as having sufficiently high current velocities to warrant further study. Extracts from Admiralty Charts are given in this appendix showing the location of each of these sites. Flood and eddy tidal stream vectors and tidal diamonds have been highlighted for any sites where they were given on the Admiralty Chart.

For each of these sites the conservation areas; Natural Heritage Areas (NHA), Special Areas of Conservation (SAC) and Special Protection Areas (SPA) are shown along with a brief description of each.

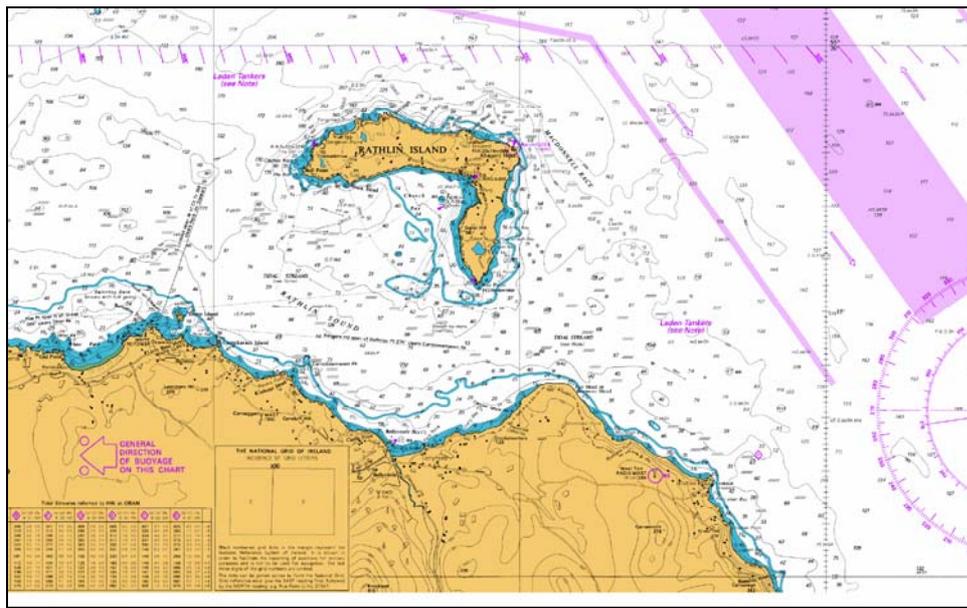
SEI
Tidal & Marine Current Energy Resources in Ireland



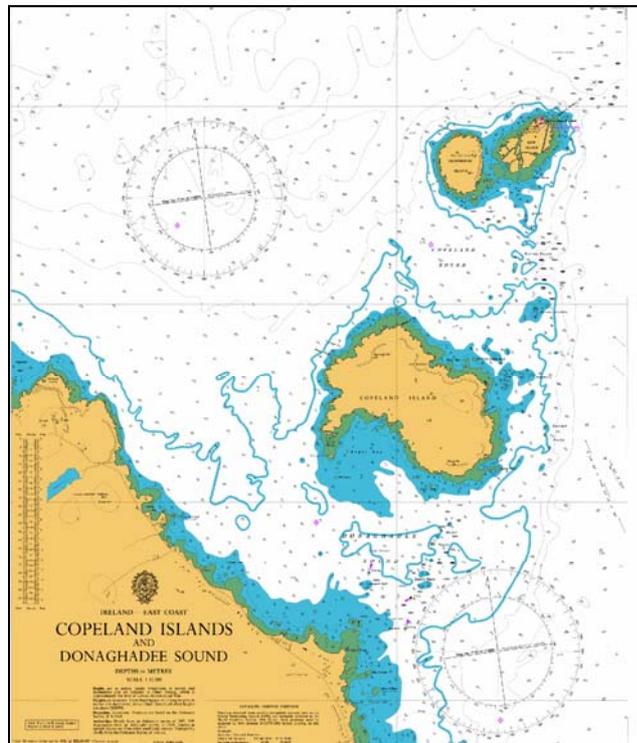
Site No.1 Inishtrahull Sound



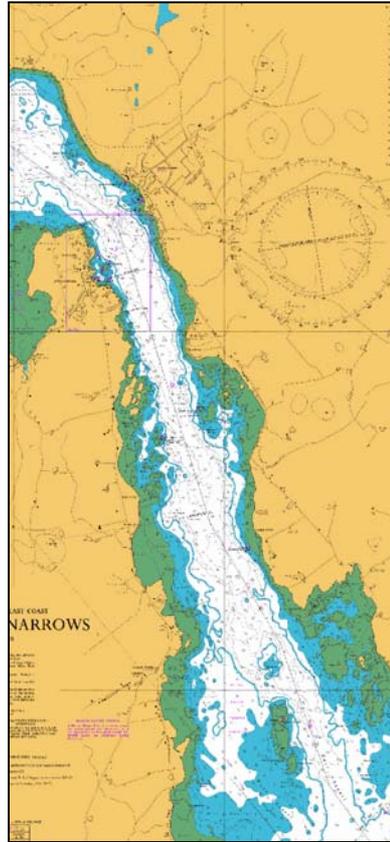
Site No. 2 Lough Foyle



Site No. 3 North East Coast

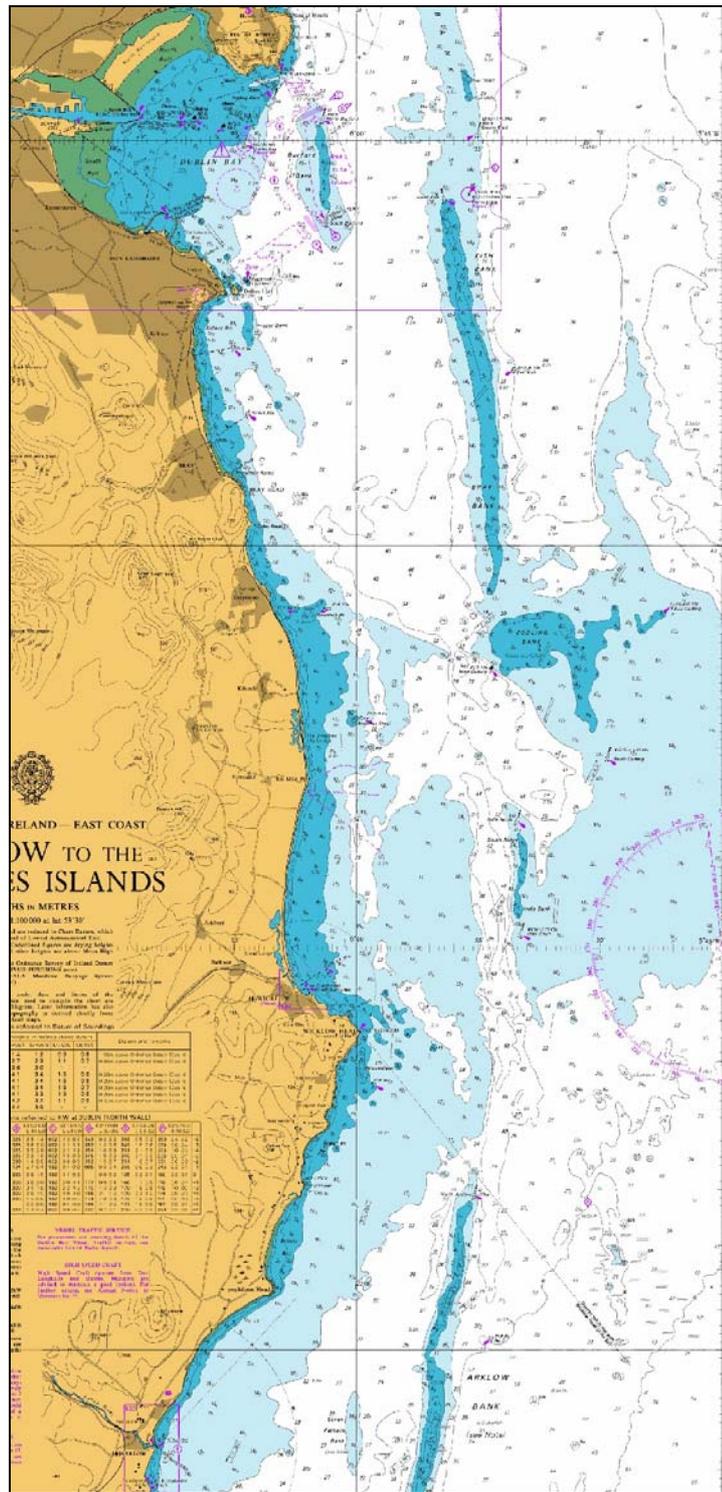


Site No. 4 Ram Race – Copeland Islands



Site No. 5

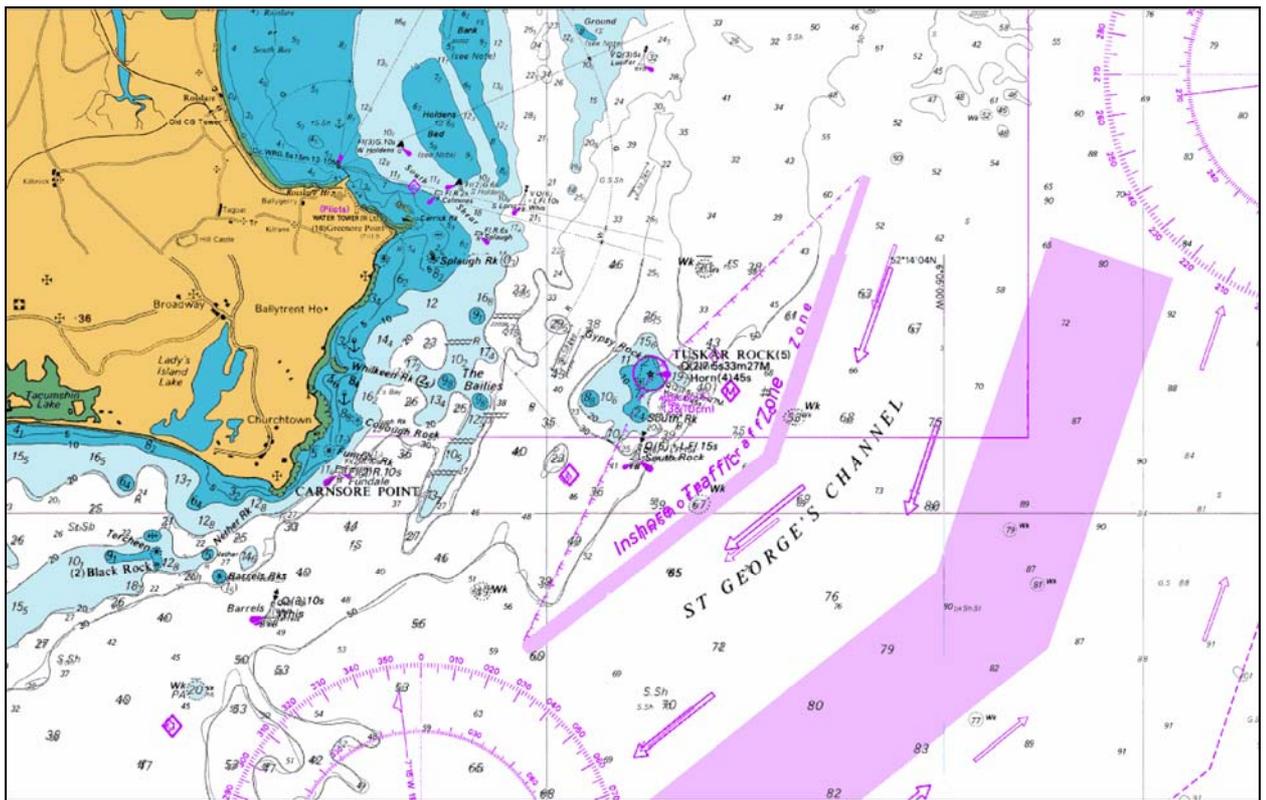
Strangford Lough



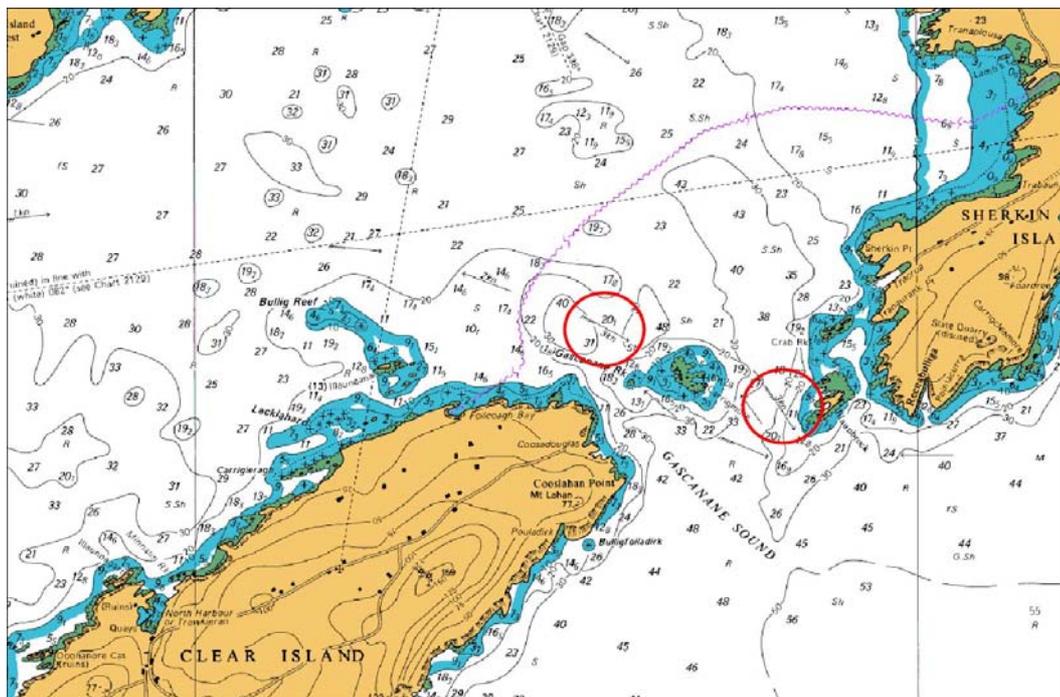
Site No.6

Codling and Arklow Banks

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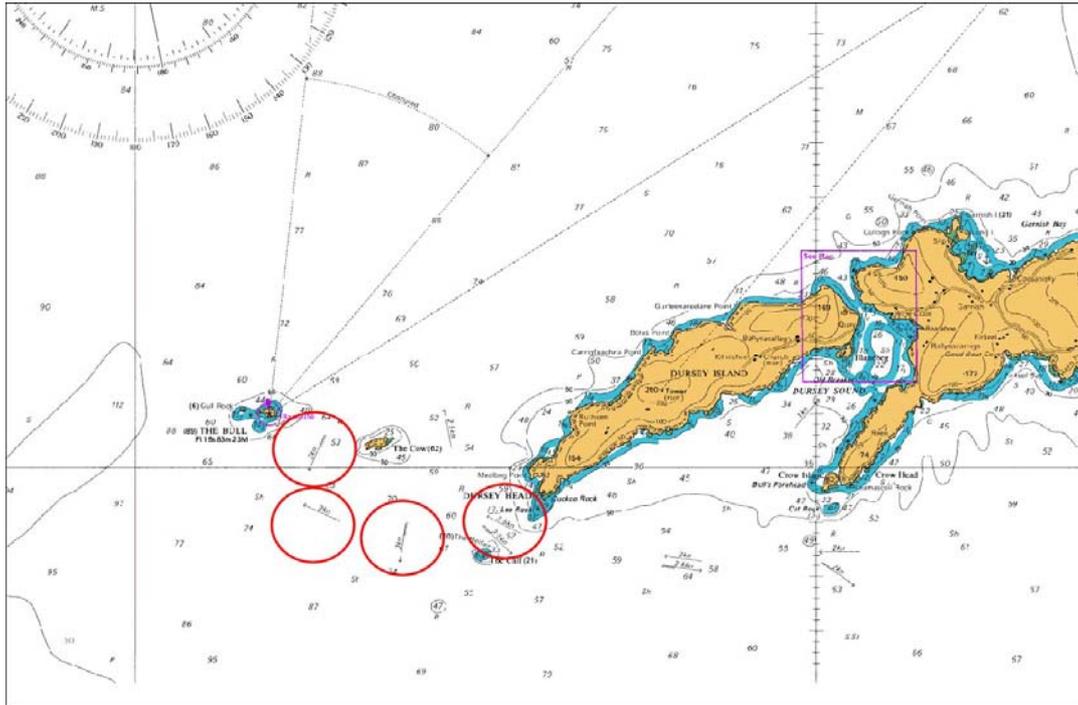


Site No. 7 Tuskar Rock / Carnsore Point



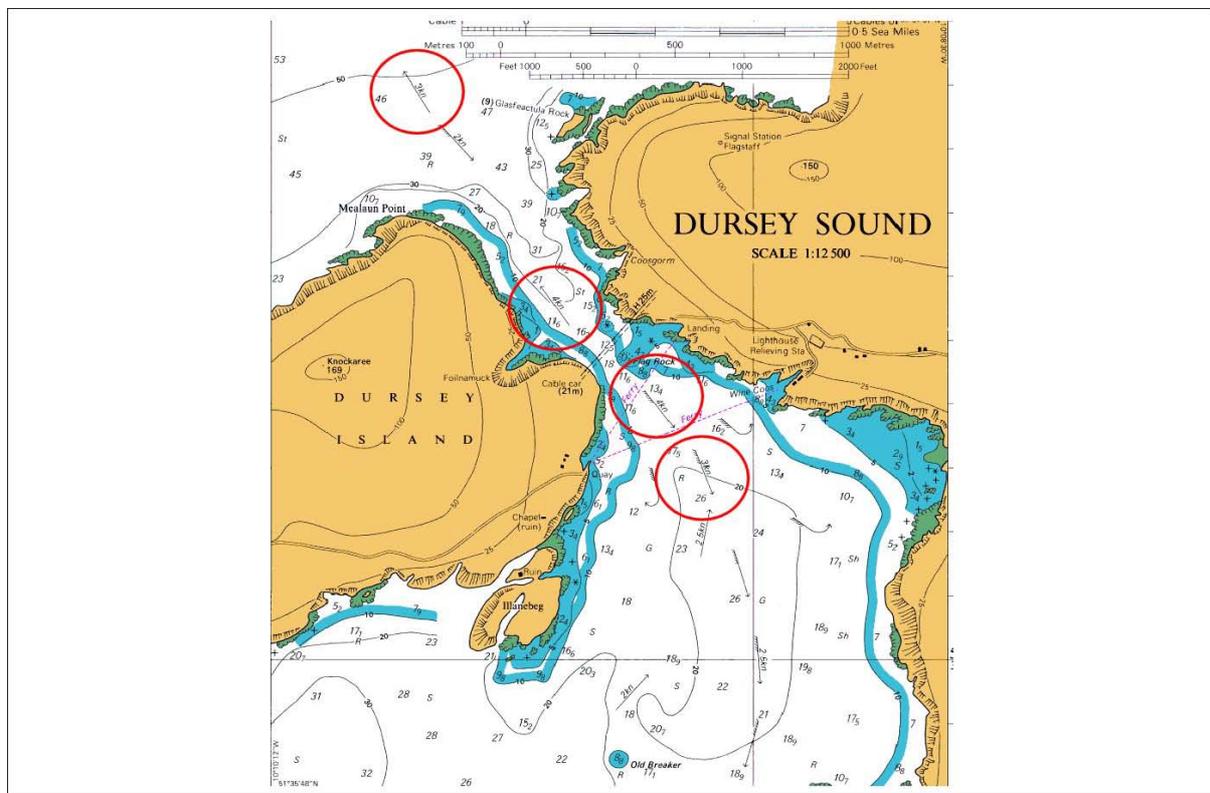
Site No.8 Gascanane Sound

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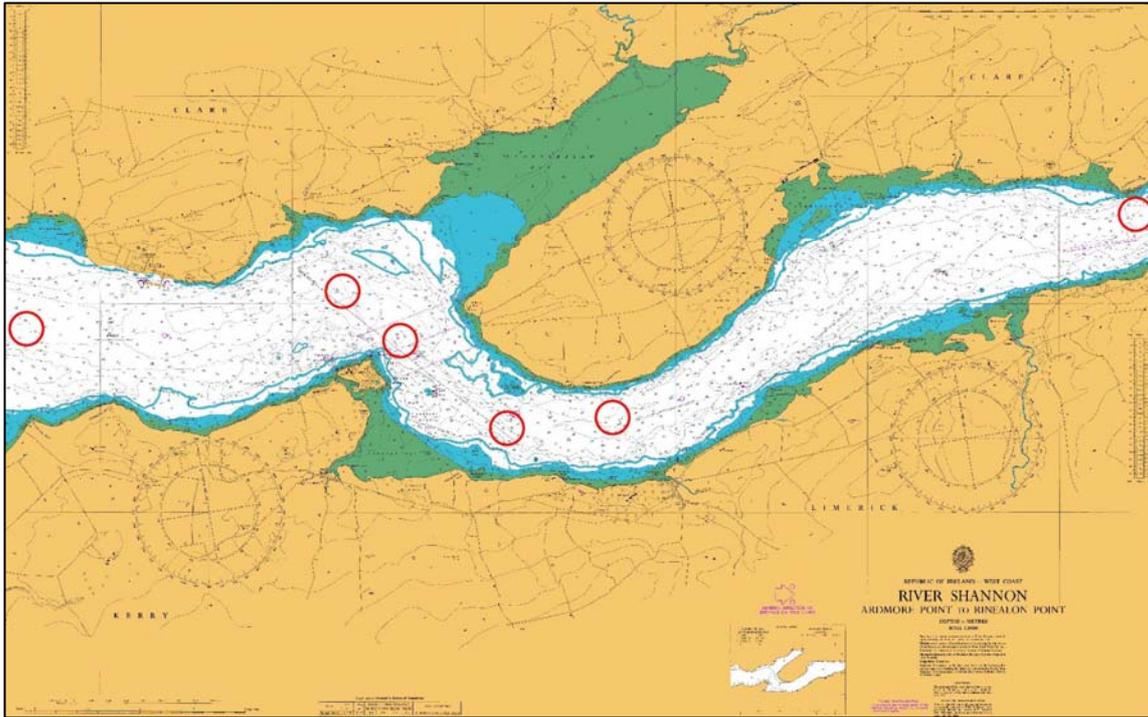
Site No.9a

Dursey Head

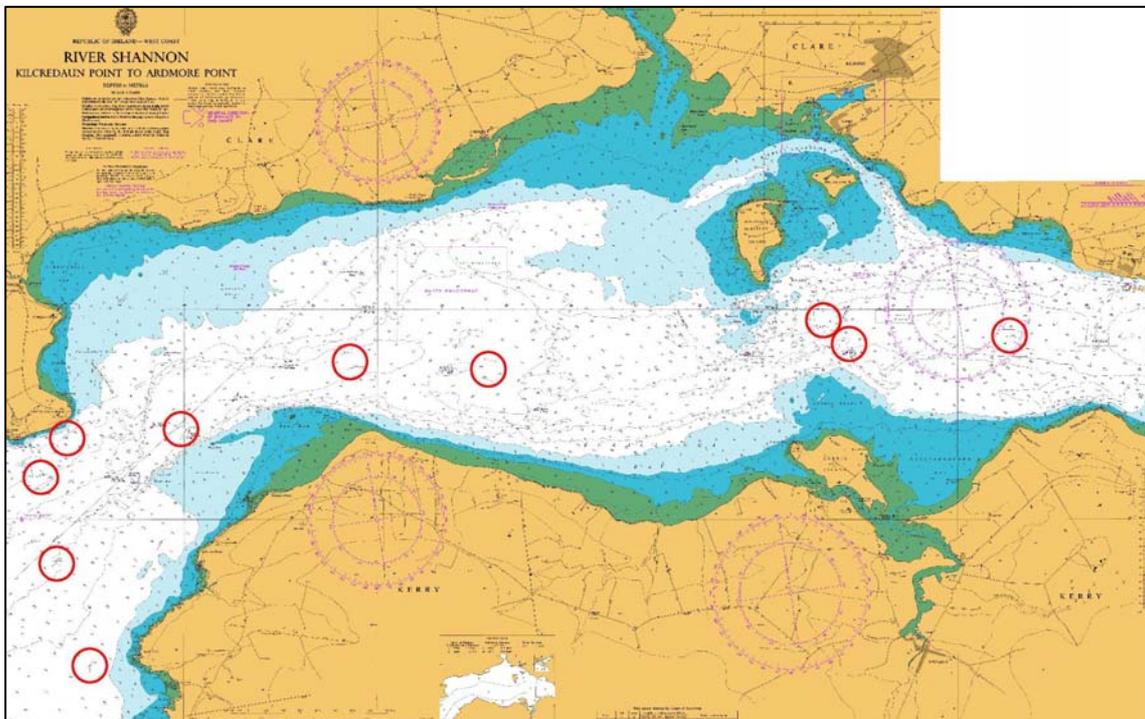


Site No.9b

Dursey Sound

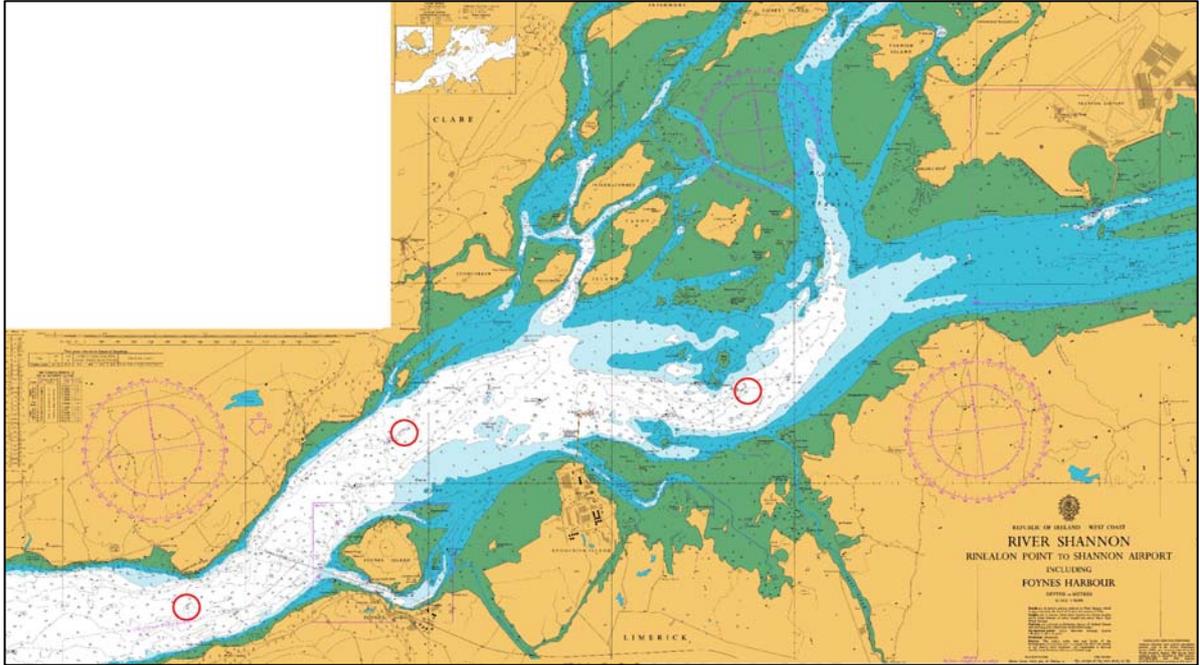


Site No. 10a **River Shannon (Kilcredaun Point to Ardmore Point)**

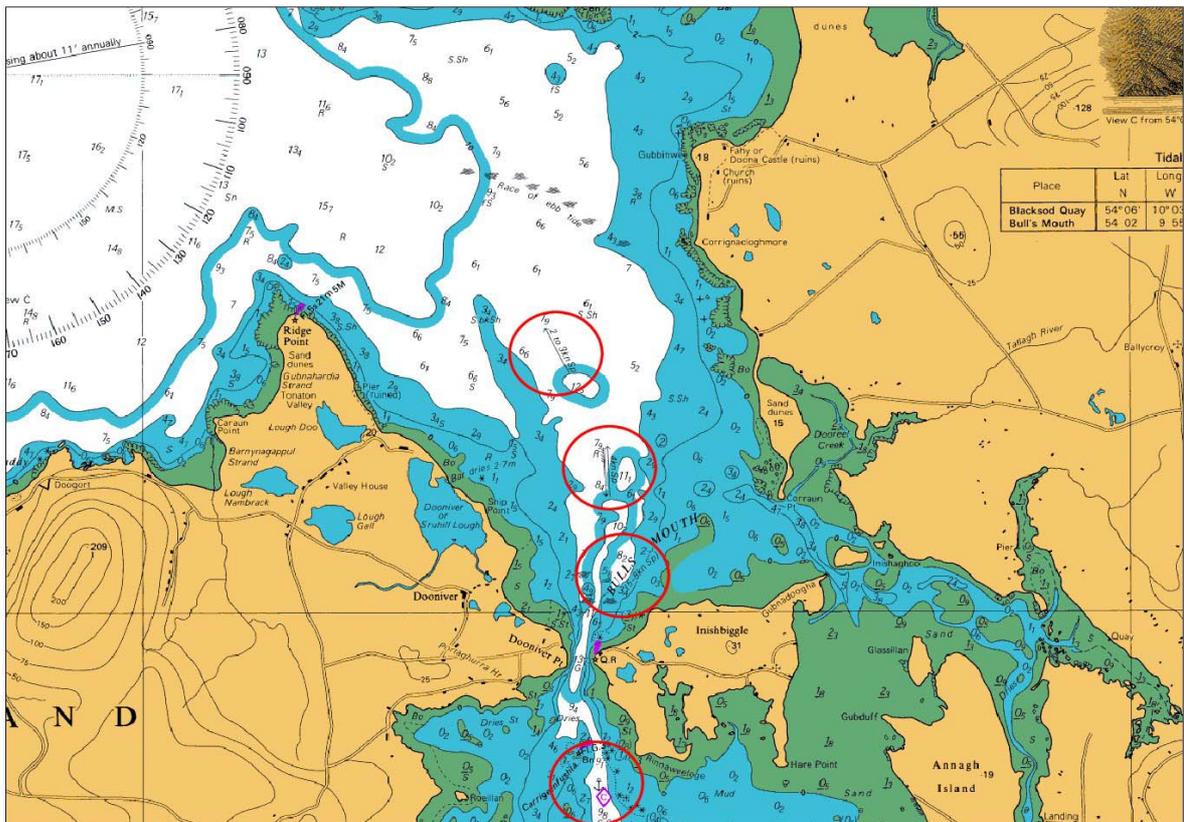


Site No.10b **River Shannon (Ardmore Point to Rinealon Point)**

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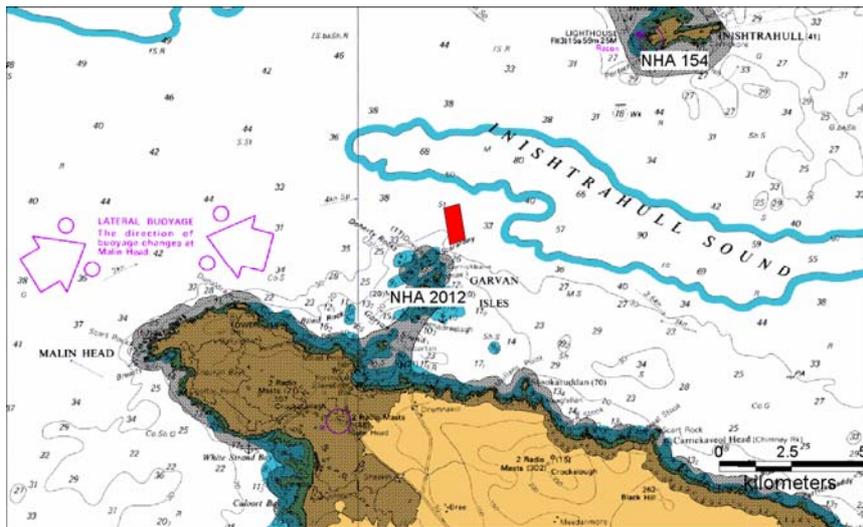


Site No. 10C River Shannon (Rinealon Point to Shannon Airport)

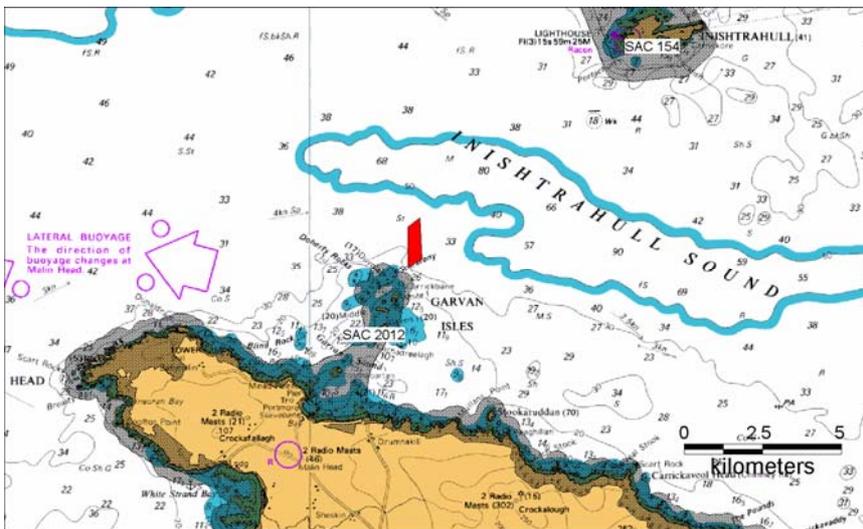


Site No.11 Bull's Mouth, Blacksod Bay

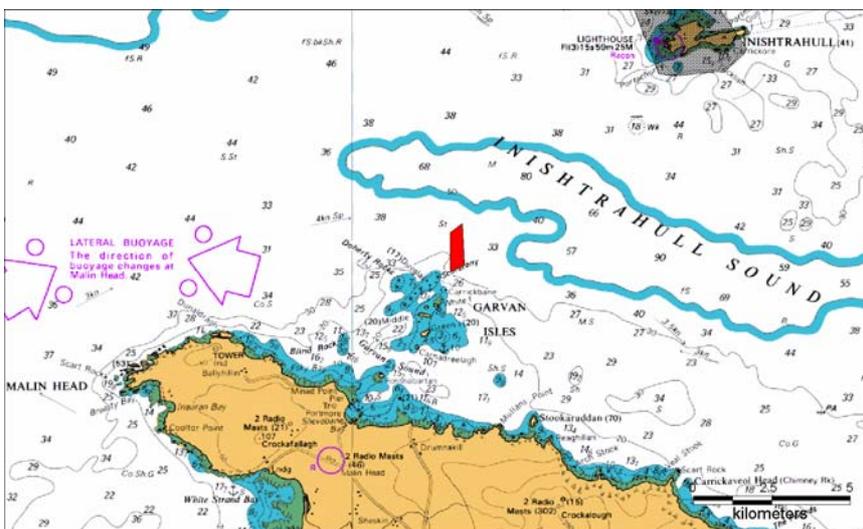
SEI
Tidal & Marine Current Energy Resources in Ireland



Site No. 1 – Inishtrahull- NHA



Site No. 1 – Inishtrahull- SAC



Site No. 1 – Inishtrahull- SPA

NHA, SAC SITE CODE: 002012

The North Inishowen Coast, covering the most northerly part of the island of Ireland, stretches from Crummies Bay in the west up to Malin Head and back down to Inishowen Head to the east. It encompasses an excellent variety of coastal habitats including high rocky cliffs, offshore islands, sand dunes, salt marsh, a large intertidal bay, and rocky, shingle and sand beaches. There are excellent raised beaches along the east coast including the oldest and best preserved late-glacial fossil coast in Ireland (between Ineuran Bay and Esky Bay). Indeed it is the only well preserved such coast in Europe and so is of international importance. Also of geomorphological interest is the small area of stone polygons near Malin Tower.

The cliffs contain a number of rare plant species, notably Scot's Lovage (*Ligusticum scoticum*), a legally protected species. Two other scarce species recorded at the site, Moss Campion (*Silene acaulis*) and Purple Saxifrage (*Saxifraga oppositifolia*), are listed in the Red Data Book as they are protected in Northern Ireland

Shingle beaches are well represented at the site, with the best examples at Rockstown harbour/Tullagh Point and along the north-western shoreline of Malin Head promontory. The rare and legally protected Oyster Plant (*Mertensia maritima*) has been recorded recently growing on shingle substrate within the site.

Sand dune systems occur within the site at several locations, with good examples of fixed dunes and machair. The dune habitat at the Isle of Doagh is by far the most extensive. Typical species of the fixed dunes include Marram Grass (*Ammophila arenaria*) and Red Fescue (*Festuca rubra*), accompanied by Bird's-foot trefoil (*Lotus corniculatus*), Sand Sedge (*Carex arenaria*), Mouse-ear (*Cerastium* spp.),

Significant areas of dry heath occur in the site at both low and high altitudes. The best-developed and most extensive areas are to be found at Dunaff Head and Binnion Hill, however the habitat is also encountered at sea level where it tends to form a mosaic with grassland vegetation.

This site has important bird interests. An Internationally Important population of Barnacle Geese occur in the area, with Trawbreaga Bay their most important haunt. For the four winters 1994/95 - 1997/98 the mean peak count was 673 birds. Barnacle Goose is listed on Annex I of the EU Birds Directive. A range of other waterfowl species winter at Trawbreaga

Bay, with an Internationally Important population of Brent Geese (338 in winters 1994/95-97/98).

Two Annex I Birds Directive species breed within the site. There are up to 12 breeding territories of Peregrine and 12 pairs of Chough. Both of these species are associated with the rocky sea cliffs, with the Choughs utilising the heath and sandy habitats for feeding.

This northern site is of high conservation value because of the extensive area of relatively unspoilt coastal habitats and the range of plant and animal species that these habitats support. Of particular note is the presence of good examples of two EU Habitats Directive Annex I priority habitats, fixed dunes and machair. Very good examples of several other Annex I habitats are found, notably sea cliffs, vegetated shingle banks, dry heath and intertidal sand and mud flats. There are two legally protected plant species and a range of scarce species. The diversity of bird species is of particular note, with wintering waterfowl, breeding seabirds and breeding waders. Important populations of three EU Birds Directive Annex I species occur - Barnacle Goose, Peregrine and Chough.

NHA, SAC SITE CODE: 000154

This site is situated approximately 12.5 km north-east of Malin Head and comprises the whole of the island of Inishtrahull and a group of islands, the Tor Rocks, which lie approximately 2 km north-north-west of Inishtrahull, and the intervening sea. The Tor Rocks, the most northerly point of land in Ireland, comprise six rocky pinnacles rising to approximately 20 m above the High Water Mark, with about eight sub-tidal rocks clustered about them. The island of Inishtrahull (34 ha) rises to 43 m at its western end and extends west-east for some 1.5 km. The geology of the site is of Lewisian gneiss, considered to be the oldest rock in Ireland, and having affinities with the rocks of southern Greenland and some of the Hebridean Islands. The soils found on Inishtrahull are either thin glacial tills or peaty podzols.

For most of its length the coastline of Inishtrahull is of cliffs. The cliffs are not particularly high, the highest point of the island being only 43 m at the western end where the cliffs are best developed. The cliffs are mostly not sheer and are indented by deep clefts. Plant species associated with the cliffs include Sea Pink (*Armeria maritima*), Rock Spurry (*Spergularia rupicola*), Red Fescue (*Festuca rubra*), Common Scurvy-grass (*Cochlearia*

officinalis), Sea Campion (*Silene maritima*), Sea Spleenwort (*Asplenium maritimum*), Buck's-horn Plantain (*Plantago coronopus*), Sea Plantain (*Plantago maritima*) and English Stonecrop (*Sedum anglicum*). In addition to these more common species, the cliff habitat supports the rare, Red Data Book species, Scots Lovage (*Ligusticum scoticum*). This species was first discovered on the island in 1938 and has been recorded there as recently as 1997.

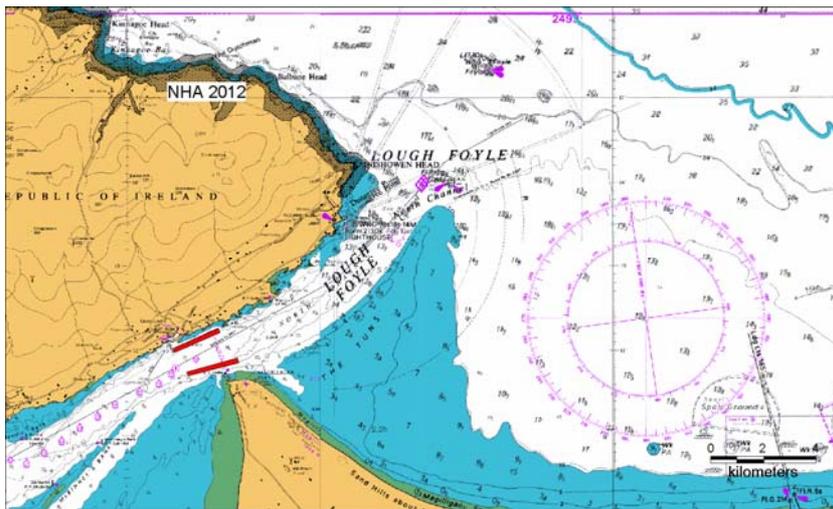
The vegetation of the interior of the island of Inishtrahull is predominantly grassland - trees are entirely lacking. A survey of the flora in 1939-1942 listed records for 119 vascular plant species.

The site supports important colonies of a variety of seabird species: Shag (500 pairs in 1991/92; 127 pairs in 1999), Herring Gull (500 pairs in 1991/92; 20 pairs in 1999), Fulmar (250 pairs in 1991/92; 95 pairs in 1999), Eider (over 200 pairs in 1991/92, the first Irish breeding site for the species), Lesser Black-backed Gull (100 pairs in 1991/92; 35 pairs in 1999), Great Black-backed Gull (50 pairs in 1991/92; 40 pairs in 1999), Common Gull (30 pairs in 1991/92 and in 1999), Kittiwake (43 pairs in 1999) and Black Guillemot (20 pairs in 1991/92; 12 individuals in 1999). Small numbers of breeding Common Tern and Arctic Tern have been recorded in the past, but have not been seen recently.

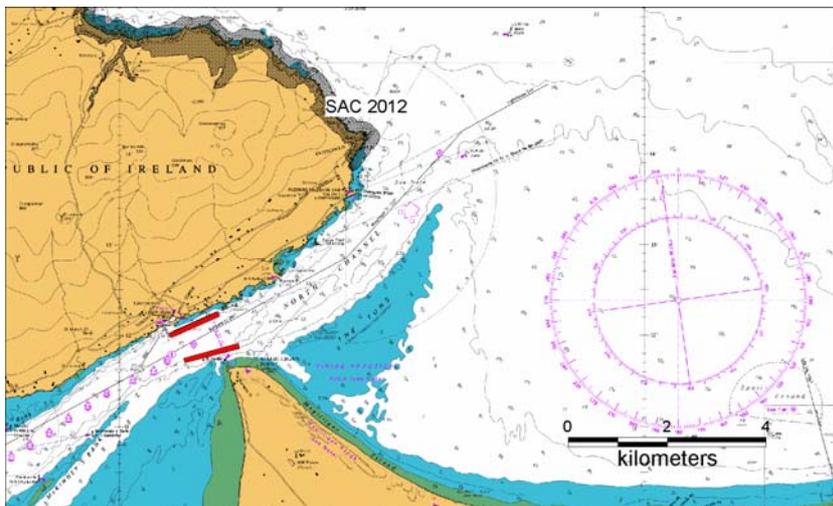
Several other bird species also breed, notably Meadow Pipit, Rock Pipit, Wheatear, Oystercatcher and Ringed Plover. A lighthouse on the island attracts large numbers of migrant birds on overcast nights and, because of its strategic position, Inishtrahull is an important staging area for passage migrants. On occasion the site supports a flock of Barnacle Geese (153 individuals in 1993) which feed here during the winter.

Grey Seals frequent the area and haul out on Inishtrahull - up to 600 individuals have been recorded from the area during the summer.

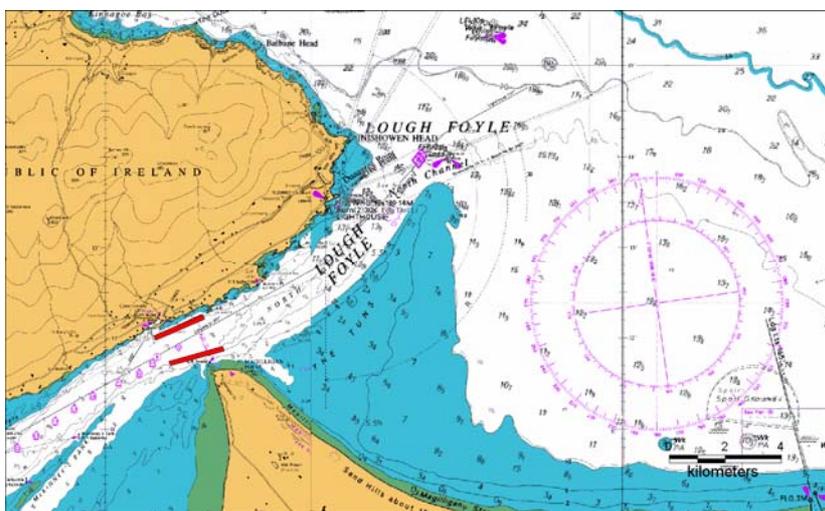
The site is of considerable conservation significance, particularly for the presence of vegetated sea cliffs, a habitat that is listed on Annex I of the E.U. Habitats Directive.



Site No. 2 – Lough Foyle- NHA



Site No. 2 – Lough Foyle- SAC



Site No. 2 – Lough Foyle- SPA

NHA, SAC SITE CODE: 002012

The North Inishowen Coast, covering the most northerly part of the island of Ireland, stretches from Crummies Bay in the west up to Malin Head and back down to Inishowen Head to the east. It encompasses an excellent variety of coastal habitats including high rocky cliffs, offshore islands, sand dunes, salt marsh, a large intertidal bay, and rocky, shingle and sand beaches. There are excellent raised beaches along the east coast including the oldest and best preserved late-glacial fossil coast in Ireland (between Ineuran Bay and Esky Bay). Indeed it is the only well preserved such coast in Europe and so is of international importance. Also of geomorphological interest is the small area of stone polygons near Malin Tower.

The cliffs contain a number of rare plant species, notably Scot's Lovage (*Ligusticum scoticum*), a legally protected species. Two other scarce species recorded at the site, Moss Campion (*Silene acaulis*) and Purple Saxifrage (*Saxifraga oppositifolia*), are listed in the Red Data Book as they are protected in Northern Ireland

Shingle beaches are well represented at the site, with the best examples at Rockstown harbour/Tullagh Point and along the north-western shoreline of Malin Head promontory. The rare and legally protected Oyster Plant (*Mertensia maritima*) has been recorded recently growing on shingle substrate within the site.

Sand dune systems occur within the site at several locations, with good examples of fixed dunes and machair. The dune habitat at the Isle of Doagh is by far the most extensive. Typical species of the fixed dunes include Marram Grass (*Ammophila arenaria*) and Red Fescue (*Festuca rubra*), accompanied by Bird's-foot trefoil (*Lotus corniculatus*), Sand Sedge (*Carex arenaria*), Mouse-ear (*Cerastium* spp.),

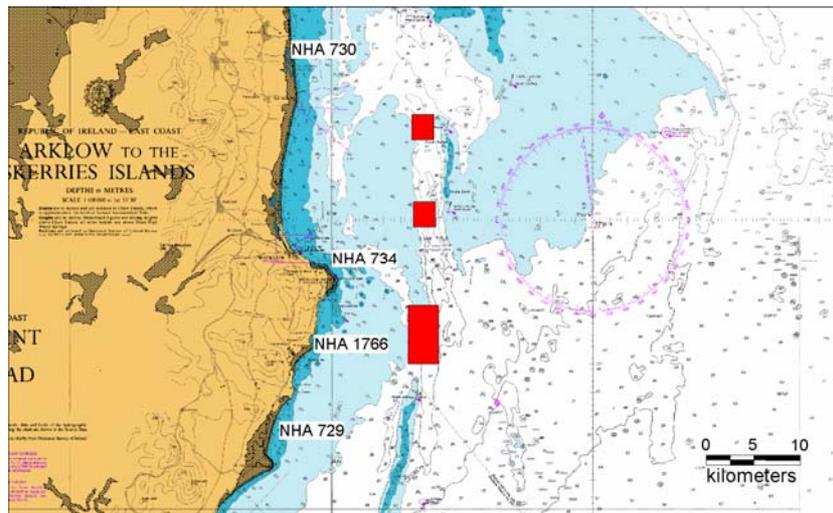
Significant areas of dry heath occur in the site at both low and high altitudes. The best-developed and most extensive areas are to be found at Dunaff Head and Binnion Hill, however the habitat is also encountered at sea level where it tends to form a mosaic with grassland vegetation.

This site has important bird interests. An Internationally Important population of Barnacle Geese occur in the area, with Trawbreaga Bay their most important haunt. For the four winters 1994/95 - 1997/98 the mean peak count was 673 birds. Barnacle Goose is listed on

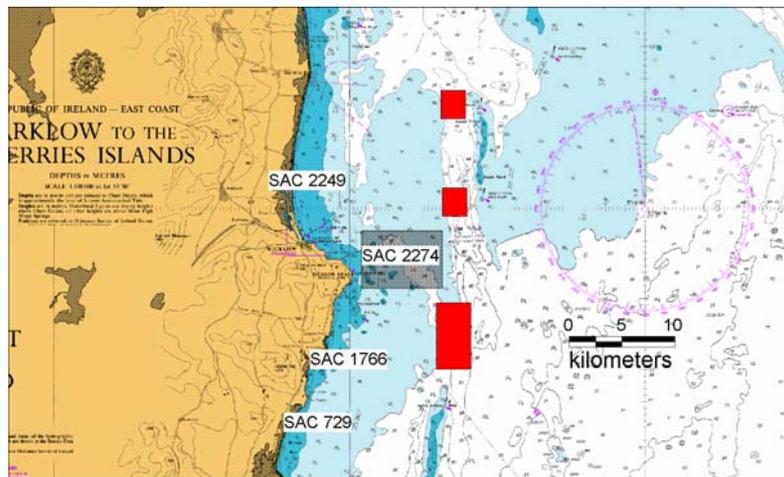
Annex I of the EU Birds Directive. A range of other waterfowl species winter at Trawbreaga Bay, with an Internationally Important population of Brent Geese (338 in winters 1994/95-97/98).

Two Annex I Birds Directive species breed within the site. There are up to 12 breeding territories of Peregrine and 12 pairs of Chough. Both of these species are associated with the rocky sea cliffs, with the Choughs utilising the heath and sandy habitats for feeding.

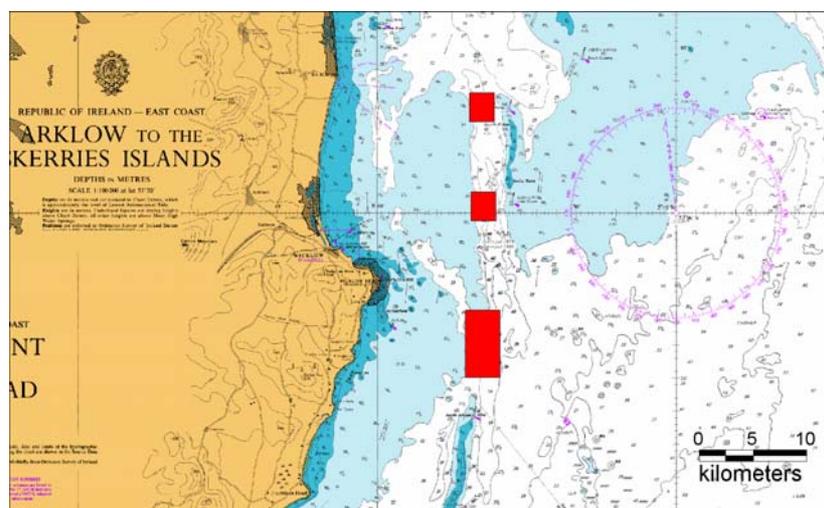
This northern site is of high conservation value because of the extensive area of relatively unspoilt coastal habitats and the range of plant and animal species that these habitats support. Of particular note is the presence of good examples of two EU Habitats Directive Annex I priority habitats, fixed dunes and machair. Very good examples of several other Annex I habitats are found, notably sea cliffs, vegetated shingle banks, dry heath and intertidal sand and mud flats. There are two legally protected plant species and a range of scarce species. The diversity of bird species is of particular note, with wintering waterfowl, breeding seabirds and breeding waders. Important populations of three EU Birds Directive Annex I species occur - Barnacle Goose, Peregrine and Chough.



Site No. 6 – Codling- NHA



Site No. 6 – Codling- SAC



Site No. 6 – Codling- SPA

NHA SITE CODE: 000730

The Murrough is a coastal wetland complex which stretches for 15 km from Ballygannon to north of Wicklow town, and in parts, extends inland for up to 1 km. A shingle ridge stretches the length of the site and carries the mainline Dublin-Wexford railway.

The site is important as it supports a number of habitats listed on Annex I of the EU Habitats Directive, a number of bird species listed on Annex I of the EU Birds Directive as well as a wide range of migratory birds not listed on Annex I of this directive.

The rare, Narrow-leaved Marsh Orchid (*Dactylorhiza traunsteineri*) has been recorded at Five Mile Point.

This wood also contains a rich invertebrate community with at least eight rare or notable species of fly (order Diptera) occurring, including *Syntormon setosus*, a species unknown elsewhere in Britain or Ireland.

Where drains have been cut, there are many other species such as Greater Spearwort (*Ranunculus lingua*), Bogbean (*Menyanthes trifoliata*) and the scarce Reed Sweet-grass (*Glyceria maxima*).

The Murrough is an important site for wintering waterfowl and breeding birds. A number of EU Birds Directive Annex I bird species are found on the site including Red-throated Diver, Little Egret, Bewick's Swan, Whooper Swan, Greenland White-fronted Goose, Golden Plover, Kingfisher, Sandwich Tern and Little Tern.

Winter bird counts in 1994/95 - 1997/98 showed the site to have an internationally important population of Brent Geese

This site is of importance as it is the largest coastal wetland complex on the east coast of Ireland. Although much affected by drainage, it still contains a wide range of coastal and freshwater habitats, some of which contain threatened plants. Areas on the site contain a rich invertebrate fauna, including several rarities. It is an important site for both wintering and breeding birds and supports a wide variety of EU Birds Directive Annex I bird species.

NHA SITE CODE: 000734

Wicklow Head is a rocky headland with extensive exposures of mica-schist. It is situated about a mile south of Wicklow town. A coastguard station and lighthouse are located on the headland.

The southern side of the headland is indented with inlets. The sheer cliffs provide nesting sites for sea birds, mostly Kittiwakes and smaller numbers of Fulmars, Razorbills and Guillemots. Black Guillemots, Herring Gulls and a few pairs of Shags also nest.

This site is important as a good example of a rocky headland showing nice rock exposures on steep cliffs, which also provide habitat for regionally important

concentrations of nesting sea birds. The small area of heath, grassland and wet scrub increase the habitat diversity of this coastal site.

NHA SAC SITE CODE: 001766

This sand dune system is situated at Ardmore Point, about 5 km south of Wicklow Head. The Three Mile Water River enters the sea through the dunes. The site is fairly intact, though some areas are being naturally eroded by wind and sea, in particular at the southern end, where bedrock has been exposed.

The drift banks extend to Ardmore Point, which forms the northern boundary of the site. The site includes several sand dune types that are listed on Annex II of the EU Habitats Directive: embryonic dunes, marram dunes, fixed dunes and decalcified dune heath. Two other habitats which are listed on this annex also occur on the site: petrifying springs and driftlines.

The site is of importance in that it is a fine example of a dune system which is fairly intact and which has a well-developed flora.

NHA, SAC SITE CODE: 000729

This site is a complex of coastal habitats located about 10 km south of Wicklow town. It comprises two main sand dune systems, Brittas Bay and Buckronev Dunes, connected on the coast by the rocky headland of Mizen Head. Ten habitats listed on the EU Habitats Directive, including two priority habitats, occur within the site.

Stable fixed dunes, a priority habitat on Annex I of the EU Habitats Directive, are well developed at Brittas and Buckronev.

This is one of the few Irish east coast sites to possess good wet dune slacks with a rich and varied flora. Of particular interest is the presence of Sharp Rush (*Juncus acutus*), a scarce species in eastern Ireland and one that is indicative of a saline influence.

The site is also notable for the presence, at the back of the dunes, of areas of decalcified dune heath, a rare habitat in Ireland and one that is also listed with priority status on the EU Habitats Directive.

This site contains two rare plant species protected under the Flora (Protection) Order, 1999: Wild Asparagus (*Asparagus officinalis* subsp. *prostratus*), in its most northerly Irish station, and Meadow Saxifrage (*Saxifraga granulata*). Other rare species which occur within the site include Green-flowered Helleborine (*Epipactis phyllanthes*), Bird's-foot (*Ornithopus perpusillus*) and Spring Vetch (*Vicia lathyroides*). All of these are Red Data Book species.

Little Tern, a species listed on Annex I of the EU Birds Directive, has bred or attempted to breed at Buckronev strand in recent years.

This site is important as an extensive sand dune/fen system with well developed plant communities. Several coastal habitats listed on the EU Habitats Directive, including two priority habitats - fixed dune and decalcified dune heath - are present. The area contains two legally protected plants, as well as a number of other rare or scarce plant species. The site provides habitat for some rare species of invertebrate and for the vulnerable Little Tern.

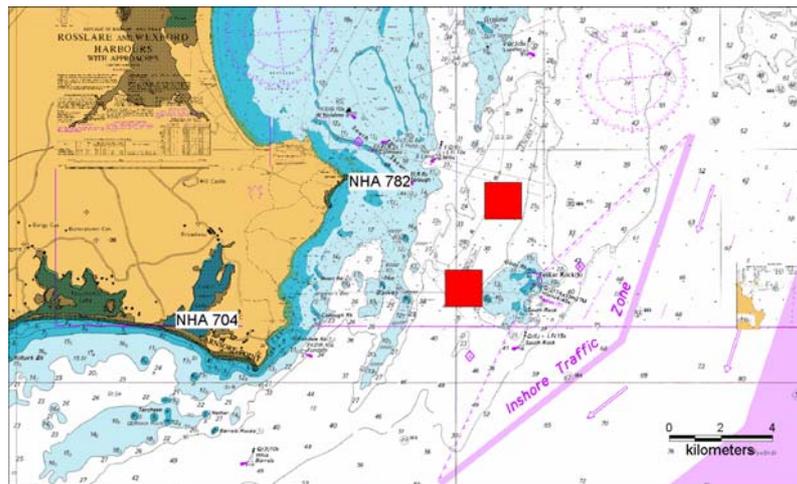
SAC SITE CODE: 002274

Wicklow Reef is situated just to the north of Wicklow Head on the east coast of county Wicklow. The substrate is a mixture of cobbles, bedrock and sand and is subject to strong tidal streams. Reefs are listed under Annex I of the EU Habitats Directive.

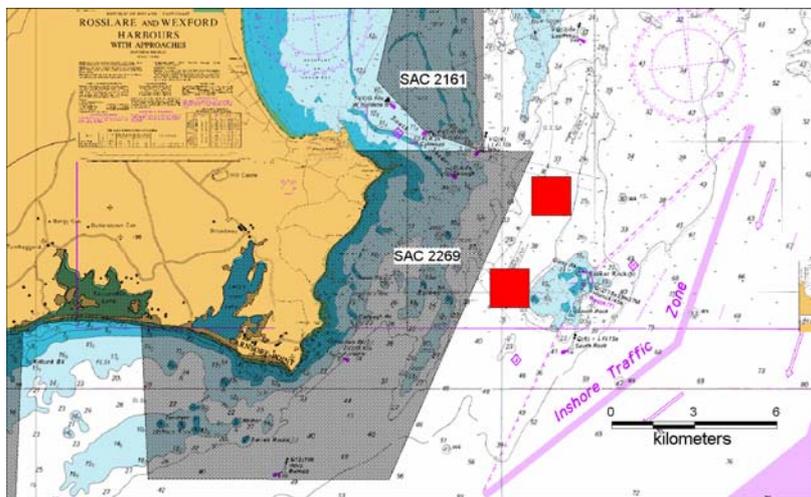
Wicklow Reef is an example of a subtidal reef constructed by the honeycomb worm *Sabellaria alveolata*. In Irish waters this worm normally constructs reefs on intertidal rocks, in areas subject to some sand scour, and such reefs are widespread but uncommon. *Sabellaria alveolata* subtidal reefs are known to occur in the Mediterranean but this example is an extremely unusual feature and may be the first record for Britain and Ireland.

The reef occurs at a depth of 12-30 m and reaches a thickness of at least 0.3-0.5 m. It is composed of consolidated sand grains formed into a honeycomb structure by the activities of the worm. There is a good diversity of species associated with the reef, including hydroids (*Hydrallmania falcata*), a variety of polychaete worms, the snail *Calliostoma zizyphinum*, the bivalves *Musculus discor* and *Mytilus edulis*, molluscs, bryzoans, barnacles, amphipods and crabs, starfish, brittlestars and sea squirts. Three of the species associated with this biogenic reef are rare in Irish waters. The bryozoan *Phaeostachys spinifera* is only known from five locations, with the majority on the west coast and no records in the Irish sea south of Co. Antrim. The polychaete *Eulalia ornata* and the amphipod *Unciola crenatipalma* are only known from one and two sites respectively in Ireland.

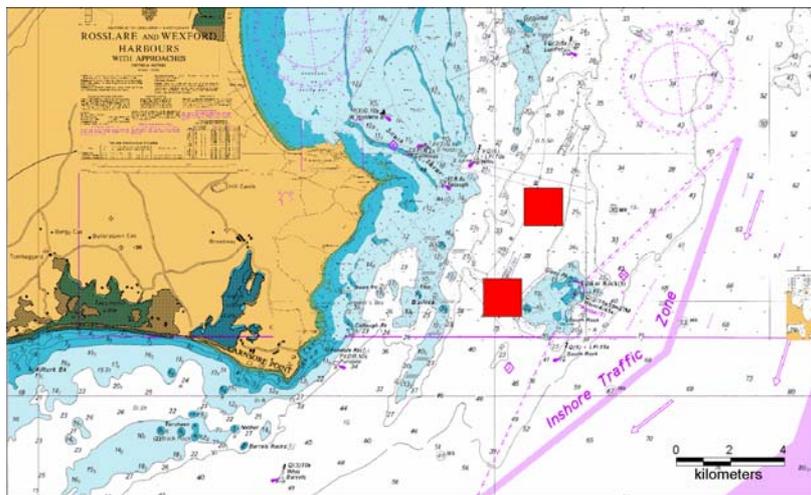
Wicklow Reef is of high conservation value as it is the only documented example in Ireland of a biogenic reef.



Site No. 7 – Rosslare- NHA



Site No. 7 – Rosslare- SAC



Site No. 7 – Rosslare- SPA

NHA SITE CODE : 000704

The site is comprised of a shallow, brackish coastal lagoon with islands and Ring Marsh developed behind a sand and shingle barrier.

The site is internationally important and is designated as a Special Protection Area under the Birds Directive and in part (Inish and Sgarbheen islands) as a Refuge for Fauna under the Wildlife Act.

(b) Geomorphology: The coast of South Wexford (Carnsore Point to Cullenstown) contains the best example in Ireland of a landward moving (transgressive) system of gravel-based barriers. The sequence of back barrier washover and seepage structures are among the best in Europe. Lady's Island Lake remains the last "intact" example in Europe.

(c) The site is still nationally important for Tufted Duck, Scarp and Red-breasted Merganser.

(d) Botany: It is a major station for the Rare and legally protected (Flora Protection Order, 1987) Cottonweed (*Otanthus maritimus*). Two other Rare and legally protected plants, the Lesser Centaury (*Centaureum pulchellum*), and the Penny Royal (*Mentha pulegium*) also occur, although the latter has not been seen in recent years.

The lagoon contains important brackish-water aquatic and marginal vegetation communities which depend upon fluctuating water and salinity levels. These communities contain plant species listed in The Irish Red Data Book, i.e. Stoneworts (*Lamprothamnium papillosum* and *Chara canescens*) and Golden Dock (*Rumex maritimus*).

SAC SITE CODE : 002161

Long Bank and Holdens Bed are situated several kilometres to the east of Rosslare and Wexford Harbour on the East coast.

The site is of conservation importance for its submerged sandbanks, a habitat that is listed on Annex I of the EU Habitats Directive.

SAC SITE CODE: 002269

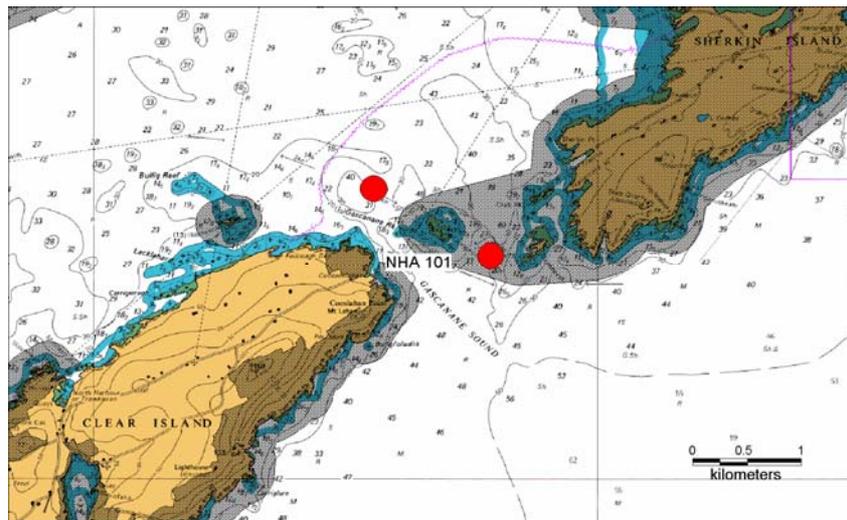
This site is situated in the south-east of Co. Wexford and comprises the area of sea and underlying bedrock and sediments off Carnsore Point.

There is a good example of a subtidal reef community.

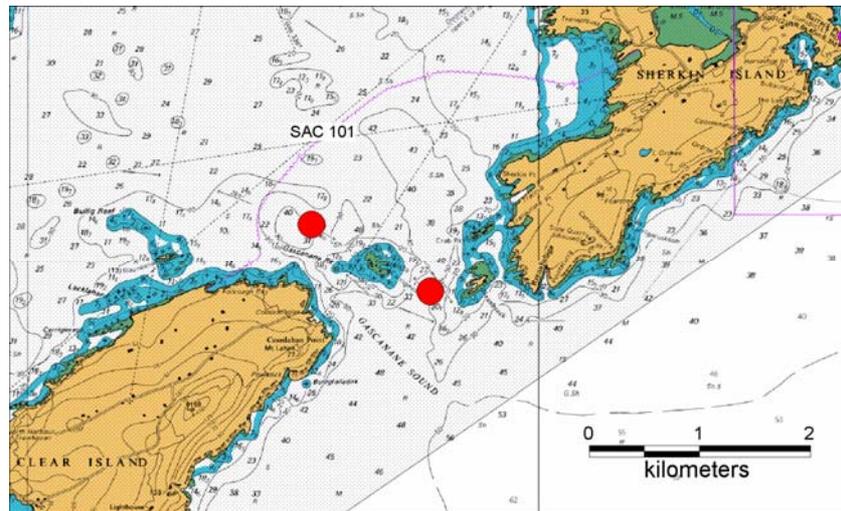
A number of species with a limited distribution in Ireland occur at two or more sites within the area. These are the sponge *Tethyspira spinosa*, the anemone *Cataphellia brodricii* and the sea squirts *Distomus variolosus*, *Stolonica socialis* and *Archdistoma aggregatum*, and *Polycarpa scuba*.

The littoral sediment communities of Carnsore Point are represented by a moderately exposed shore at Carne Beach.

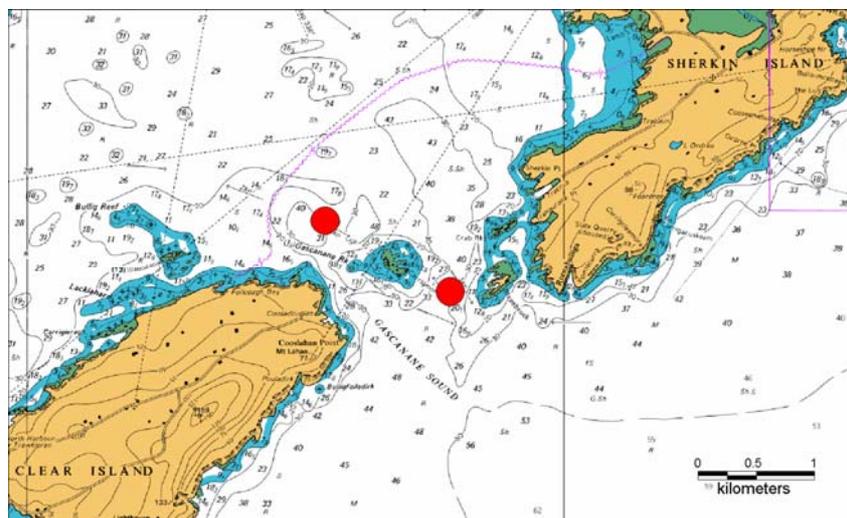
The site is of considerable conservation significance for the presence of intertidal mud/sand flats and of reefs, both habitats that are listed on Annex I of the E.U. Habitats Directive.



Site No. 8 – Gascanane Sound- NHA



Site No. 8 – Gascanane Sound- SAC



Site No. 8 – Gascanane Sound- SPA

NHA, SAC SITE CODE: 000101

Roaringwater Bay, Co. Cork, is a wide shallow bay located on the southwest coast. The site includes the immediate coastline on the mainland from Long Island to Baltimore together with the whole bay and most of the islands.

The bay itself has a wide variety of reef and sediment habitats, subject to a range of wave exposures and tidal currents, and has been selected for three marine habitats listed under the EU Habitats Directive, i.e. large shallow inlets and bays, marine caves and reefs. The sedimentary communities in Roaringwater Bay are exceptional. Of particular interest is the extensive bed of the calcareous free living red alga *Lithophyllum dentatum*, (generally termed maerl but may be locally know as 'coral') which is the largest in the country for this species.

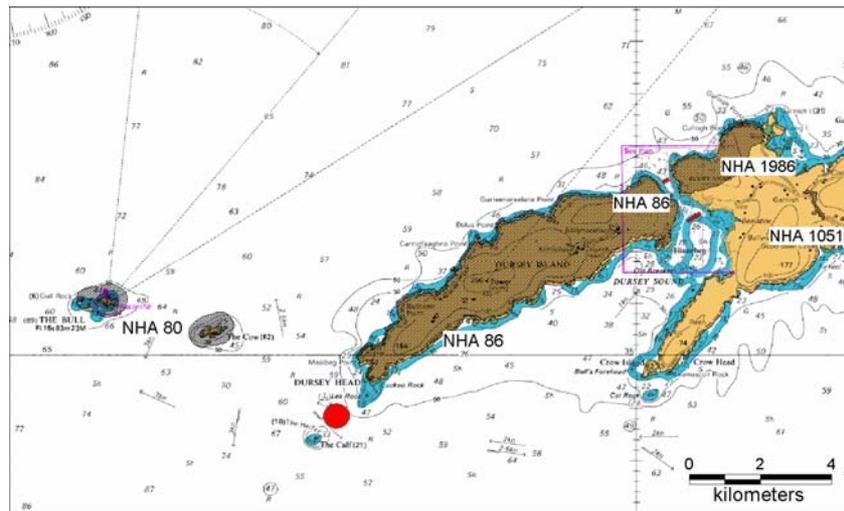
The terrestrial habitats are also of conservation interest and include three habitats listed under the EU Habitats Directive, i.e. dry heath, sea cliffs and lowland hay meadows.

Two other Red Data Book plants, Little Robin (*Geranium purpureum*) and Sea Pea (*Lathyrus japonicus*) occur rarely on shingle beaches while Ray's Knotgrass (*Polygonum raii*) is more widespread.

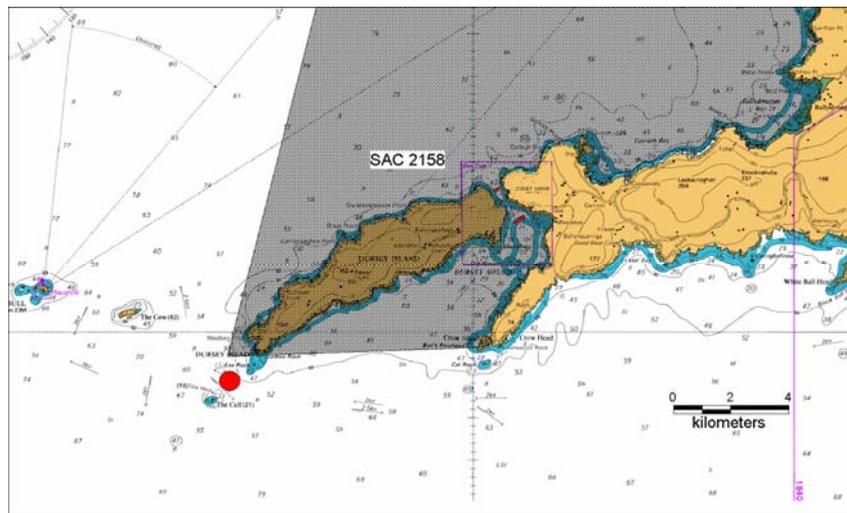
Otter and Grey seal, two mammal species listed on Annex II of the EU Habitats Directive, occur within the site. Terns are listed on Annex I of the EU Bird's Directive. There are also significant numbers of Choughs (18 pairs in 1992), another species listed on Annex I of the Bird's Directive.

In conclusion, Roaringwater Bay and Islands is a site of exceptional conservation importance, supporting diverse marine and terrestrial habitats, six of which are listed under the EU Habitats Directive. The site is also notable for the presence of Otter and Grey Seal plus a number of rare species and also supports important sea bird colonies.

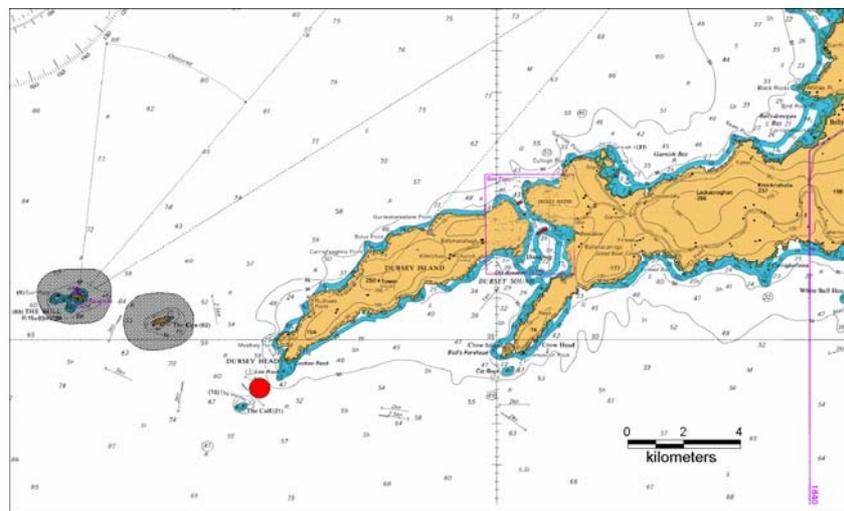
SEI
Tidal & Marine Current Energy Resources in Ireland



Site No. 9 – Dursey Sound- NHA



Site No. 9 – Dursey Sound- SAC



Site No. 9 – Dursey Sound- SPA

NHA SITE CODE: 000086

Dursey Island forms the extremity of the Beara Peninsula apart from the Bull and Cow Rocks isolated some 3km offshore. It is a sandstone ridge with three separate hills, the central one of which rises to 250m.

Heath is the predominant vegetation with permanent pasture in the fields. The heath is based on Autumn Gorse (*Ulex gallii*), Bell Heather (*Erica cinerea*) and Heather (*Calluna vulgaris*) with Cross-leaved heath (*E. tetralix*) and Common Bent (*Agrostis capillaris*).

Grassland on the island is unintensified and contains species such as Knapweed (*Centaurea nigra*), Catsear (*Hypochaeris radicata*), Greater Birdfoot Tefoil (*Lotus uliginosus*) and Eyebrights (*Euphrasia* spp).

Close to the sea, Plantains (*Plantago coronopus*, *P. maritimus*), Pearlwort (*Sagina procumbens*) and Allseed (*Radiola linoides*) assume greater importance in the community until at the extremity of the island they alone form a smooth green skin 1-2cm about the peat. This is plantain sward, characteristic of the most exposed sites on the west coast but especially well-developed here.

Dursey has a sizeable population of Fulmar (275 pairs in early 1990's) with, at that time, Shag (10 pairs), Herring Gull (50 pairs) and Great Black-backed Gull (6 pairs). There are also many Choughs, estimated at 10 pairs in 1992. These feed in pastures where there have been animals grazing so they are intimately tied up with land use.

In summary the island has an important Fulmar and Chough populations with varied examples of exposed heathland and maritime vegetation.

NHA SITE CODE: 001986

Garinish (or Garnish) Point is the western extremity of the Beara Peninsula off which lies Dursey Island. It consists of a low hill (150m.) with fields of permanent pasture to the south and east.

For the most part the vegetation of the site is heath and grassland although there is local development of peat and a strong influence of sea spray and of springs on the north-western side.

Grassland forms the other major component of this site and it is found in old fields around Bealaboe and the White Strand. Where little reclamation has been done and the ground is still flushed by spring water during wet weather an interesting community develops which is characterised by the Rare and legally protected (Flora Protection Order, 1987) Betony (*Stachys officinalis*).

The whole area is used by Choughs for feeding but is listed mainly for the survival of old rough grassland communities and varied heathland.

NHA SITE NO. 001051

Firkeel Gap is a small dry valley that runs NW-SE through the end of the Beara Peninsula. There is little drift or soil on the slopes and the slaty sandstone shows as outcrops and in stabilised screes in many places.

The sides of the valley are covered by heath vegetation which includes bushes of Eared Willow (*Salix aurita*) or Bramble (*Rubus fruticosus*) around cliffs and other rocks. Betony (*Stachys officinalis*), a rare and protected (Flora Protection Order, 1987) species occurs frequently, both in this vegetation and near rocks in the purer heath that covers the eastern side.

The site is an important one for Betony which is rare everywhere in the country and restricted in Cork to the Beara Peninsula.

SAC SITE NO: 002158

Kenmare River, Co. Kerry, is a long and narrow, south-west facing bay. It is a deep, drowned glacial valley and the bedrock is mainly Old Red Sandstone which forms reefs along the middle of the bay throughout its length.

Kenmare River has a very wide range of marine communities from exposed coast to ultra-sheltered areas. The site contains three marine habitats listed on Annex I of the EU Habitats

Directive, namely reefs, large shallow bay and caves. There is also an extremely high number of rare and notable marine species present (24) and some uncommon communities.

The Annex I habitat 'perennial vegetation of stony banks' is well represented at two locations within Kenmare River – Pallas Harbour and Rossdohan Island.

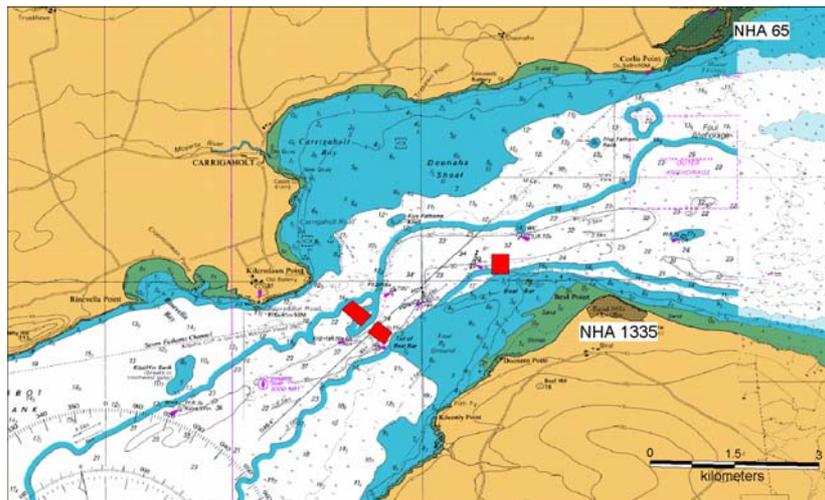
Within the Derrynane Bay area on the south side of the Iveragh Peninsula there are good examples of a number of habitats listed on Annex I of the EU Habitats Directive including dry heath, fixed dunes, marram dunes, sea cliffs and salt meadows (both Atlantic and Mediterranean types). Kerry Lily is protected under the Flora (Protection) Order 1999.

Fixed dunes, a priority habitat on the Habitats Directive, occur at Derrynane. In damp slacks amongst the sand dunes, the rare snail *Vertigo angustior* has been found. This species is listed on Annex II of the EU Habitats Directive. The Natterjack Toad is protected under the Wildlife Act (1976) and is listed in the vertebrate Red Data Book.

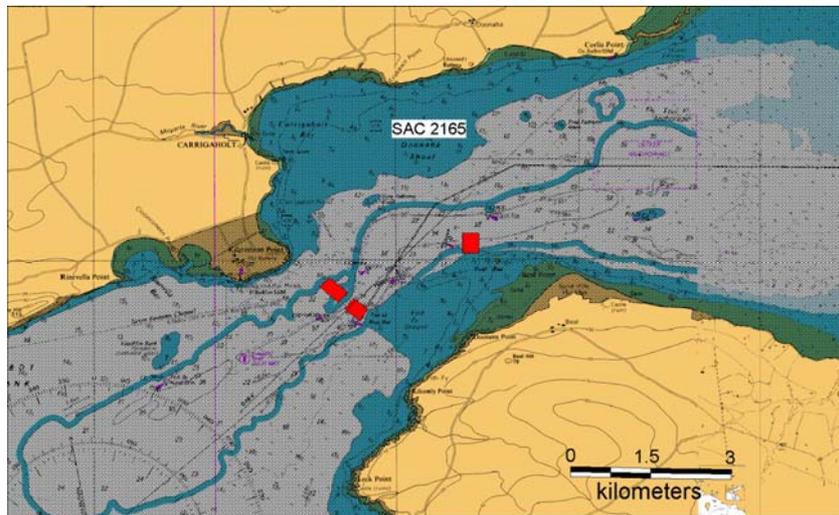
Kenmare River holds an important population of Common Seal (maximum annual) Otters are also known to occur within the site. Both the Common Seal and the Otter are listed on Annex II of the EU Habitats Directive. Two internationally important roosts of the Lesser Horseshoe Bat, another species listed on Annex II of the EU Habitats Directive, are included in the site.

Grazing at Derrynane is managed by Dúchas for the conservation of the dune habitats and the rare species they contain.

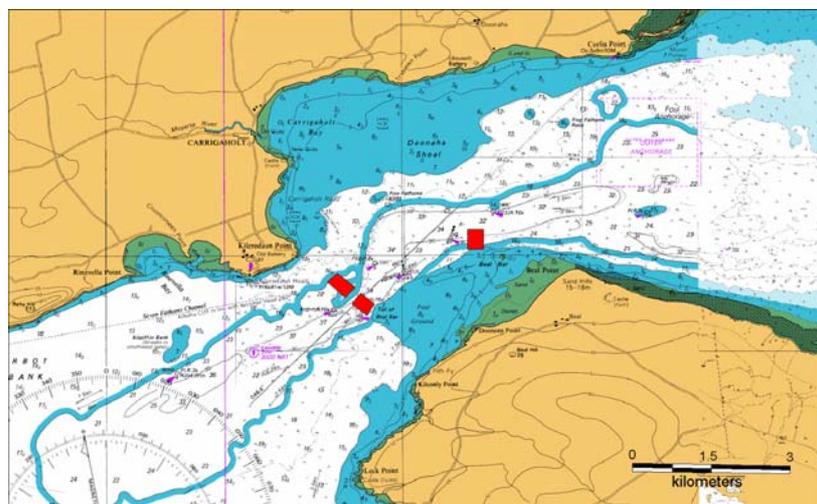
Kenmare River contains an exceptional complement of marine and terrestrial habitats, many of which are listed on Annex I of the EU Habitats Directive. The presence of a number of rare species, including two species listed on Annex II of the Directive and a protected plant, together with the ornithological interest of the area, adds further to the importance of the site.



Site No. 10a – Shannon - NHA



Site No. 10a – Shannon - SAC



- Site No. 10a – Shannon - SPA

NHA SITE NO: 001335

Beal Point is a small coastal site (c. 32ha) on the southern shore of the mouth of the Shannon estuary. Primarily the site is a sand dune system, formerly managed by a rabbit warren but now frequently used for cattle grazing. To the east of the point there is a small area of salt marsh.

Marram grass (*Ammophla avenana*) occurs abundantly throughout the site and there are also areas of fixed dunes with Fescue (*Festuca* species) grassland. The flatter salt marsh are to the east, near the river mouth, has a good representation of the species for the west coast of Ireland.

NHA SITE CODE: 000065

Poulnasherry Bay is situated near the mouth of the Shannon estuary, and about 4 km west of Kilrush.

It is a wide stoney estuary with abundant growths of brown seaweed (*Fucus* spp.) and green algae.

Poulnasherry Bay is an important ornithological site, forming part of the Shannon and Fergus estuarine complex.

This site is primarily of ornithological importance but is also a good example of an estuarine habitat.

SAC SITE CODE : 002165

This very large site stretches along the Shannon valley from Killaloe to Loop Head/ Kerry Head, a distance of some 120 km.

The site is a candidate SAC selected for lagoons and alluvial wet woodlands, both habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for floating river vegetation, *Molinia* meadows, estuaries, tidal mudflats, Atlantic salt meadows, Mediterranean salt meadows, *Salicornia* mudflats, sand banks, perennial vegetation of stony banks, sea cliffs, reefs and large shallow inlets and bays all 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 – Bottle-nosed Dolphin, Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Atlantic Salmon and Otter.

The Shannon and Fergus Estuaries form the largest estuarine complex in Ireland.

Saltmarsh vegetation frequently fringes the mudflats.

Alluvial woodland occurs on the banks of the Shannon and on islands in the vicinity of the University of Limerick.

Woodland is infrequent within the site, however Cahiracon Wood contains a strip of old Oak woodland.

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 small area of actively regenerating cut away raised bog at Ballyrorheen. It is situated approx. 5km north west of Cappamore Co. Limerick.

A number of plant species that are Irish Red Data Book species occur within the site - several are protected under the Flora (Protection) Order, 1999:

- Triangular Club-rush (*Scirpus triquetus*) - in Ireland this protected species is only found in the Shannon Estuary, where it borders creeks in the inner estuary.
- Opposite-leaved Pondweed (*Groenlandia densa*) - this protected pondweed is found in the Shannon where it passes through Limerick City.
- Meadow Barley (*Hordeum secalinum*) - this protected species is abundant in saltmarshes at Ringmoylan and Mantlehill.
- Hairy Violet (*Viola hirta*) - this protected violet occurs in the Askeaton/Foynes area.
- Golden Dock (*Rumex maritimus*) - noted as occurring in the River Fergus Estuary.
- Bearded Stonewort (*Chara canescens*) - a brackish water specialist found in Shannon Airport lagoon.
- Convergent Stonewort (*Chara connivens*) - presence in Shannon Airport Lagoon to be confirmed.

Overall, the Shannon and Fergus Estuaries support the largest numbers of wintering waterfowl in Ireland. 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.

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.

There is a resident population of Bottle-nosed Dolphin in the Shannon Estuary consisting of at least 56-68 animals (1996). This is the only known resident population of this E.U. Habitats Directive Annex II species in Ireland. Otter, a species also listed on Annex II of this directive, is commonly found on the site.

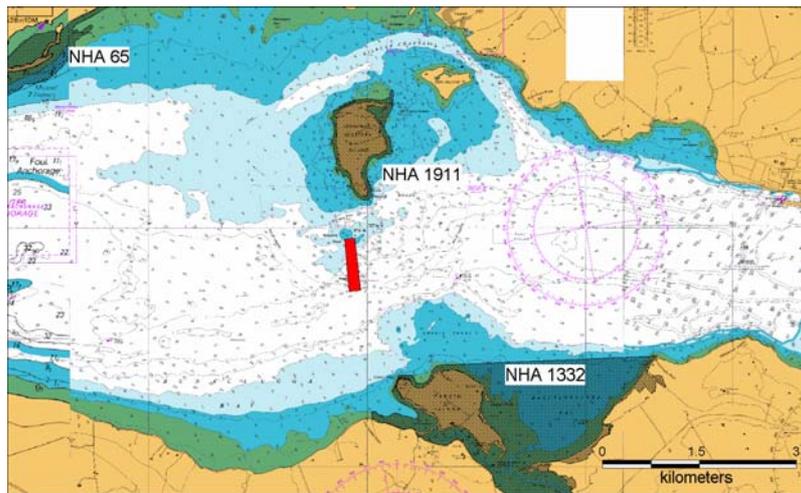
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Two additional fish of note, listed in the Irish Red Data Book, also occur, namely Smelt (*Osmerus eperlanus*) and Pollan (*Coregonus autumnalis pollan*).

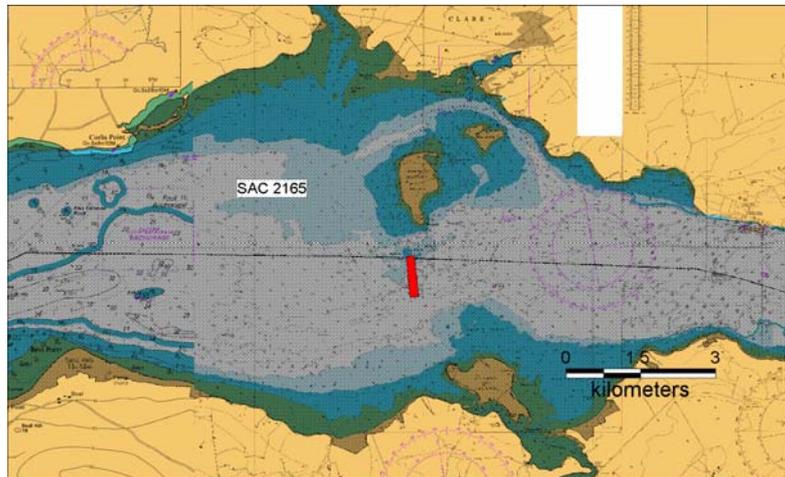
Freshwater Pearl-mussel (*Margaritifera margaritifera*), a species listed on Annex II of the E.U. Habitats Directive, occurs abundantly in parts of the Cloon River.

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 habitat lagoon, the only known resident population of Bottle-nosed Dolphin in Ireland and all three Irish lamprey species. A good number of Red Data Book species are also present, perhaps most notably the thriving populations of Triangular Club-rush. A number of species listed on Annex I of the E.U. Birds Directive are also present, either wintering or breeding. Indeed, the Shannon and Fergus Estuaries form the largest estuarine complex in Ireland and support

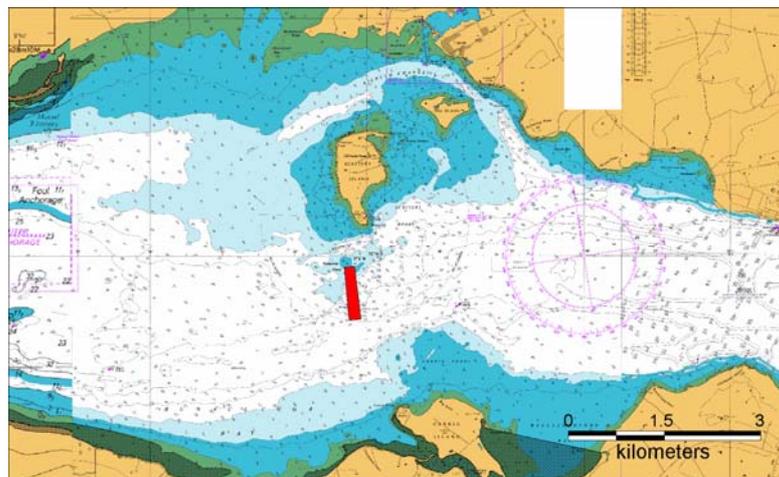
more wintering wildfowl and waders than any other site in the country. Most of the estuarine part of the site has been designated a Special Protection Area (SPA), under the E.U. Birds Directive, primarily to protect the large numbers of migratory birds present in winter.



Site No. 10b – Shannon - NHA



Site No. 10b – Shannon - SAC



Site No. 10b – Shannon - SPA

NHA SITE CODE: 001911

Scattery Island is located near the mouth of the Shannon estuary, about 3 km from Kilrush.

Much of the island is grassland, which is generally species rich.

Some small areas of saltmarsh had Thrift (*Armeris maritima*) and a few patches of Cordgrass (*Spartina* spp). The saltmarsh at the south end of the island had reedbeds (*Phragmites australis*).

NHA SITE NO: 001332

Ballylongford Bay is an inlet on the southern side of the Shannon Estuary and runs northwards from the town of Ballylongford in County Kerry.

The scientific interest of the area lies in the large concentrations of waterfowl that feed on the mudflats there.

It constitutes the largest estuarine complex in the country and is of international importance for Black-tailed Godwit (5,370) and Redshank (1,880) and national importance for Cormorant (200), Greylag Goose (69), Shelduck (502 - two seasons only), Wigeon (2,229), Teal (1,277), Mallard (509), Scamp (206), Golden Plover (5,361), Grey Plover (63), Lapwing (13,029), Knot (513), Dunlin (7,149), Bar-tailed Godwit (625), and Curlew (1,180).

The importance of the Shannon estuary is underlined by its proposal as a Special Protection Area.

NHA SITE CODE: 000065

Poulnasherry Bay is situated near the mouth of the Shannon estuary, and about 4 km west of Kilrush.

It is a wide stoney estuary with abundant growths of brown seaweed (*Fucus* spp.) and green algae.

Poulnasherry Bay is an important ornithological site, forming part of the Shannon and Fergus estuarine complex.

This site is primarily of ornithological importance but is also a good example of an estuarine habitat.

SAC SITE CODE : 002165

This very large site stretches along the Shannon valley from Killaloe to Loop Head/ Kerry Head, a distance of some 120 km.

The site is a candidate SAC selected for lagoons and alluvial wet woodlands, both habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for floating river vegetation, *Molinia* meadows, estuaries, tidal mudflats, Atlantic salt meadows, Mediterranean salt meadows, *Salicornia* mudflats, sand banks, perennial vegetation of stony banks, sea cliffs, reefs and large shallow inlets and bays all 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 – Bottle-nosed Dolphin, Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Atlantic Salmon and Otter.

The Shannon and Fergus Estuaries form the largest estuarine complex in Ireland.

Saltmarsh vegetation frequently fringes the mudflats.

Alluvial woodland occurs on the banks of the Shannon and on islands in the vicinity of the University of Limerick.

Woodland is infrequent within the site, however Cahiracon Wood contains a strip of old Oak woodland.

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 small area of actively regenerating cut away raised bog at Ballyrorheen. It is situated approx. 5km north west of Cappamore Co. Limerick.

A number of plant species that are Irish Red Data Book species occur within the site - several are protected under the Flora (Protection) Order, 1999:

- Triangular Club-rush (*Scirpus triquetus*) - in Ireland this protected species is only found in the Shannon Estuary, where it borders creeks in the inner estuary.
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Overall, the Shannon and Fergus Estuaries support the largest numbers of wintering waterfowl in Ireland. 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.

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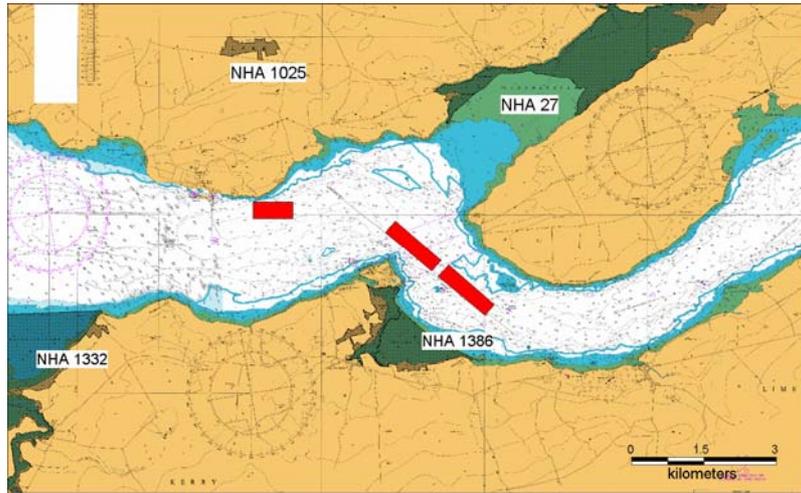
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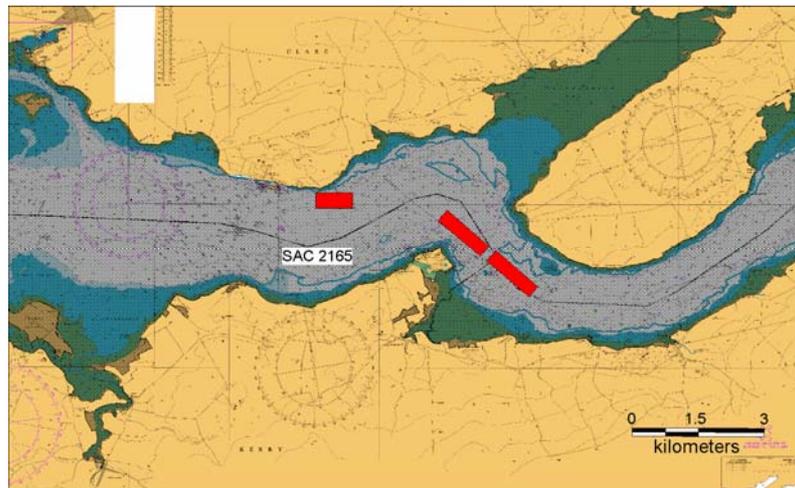
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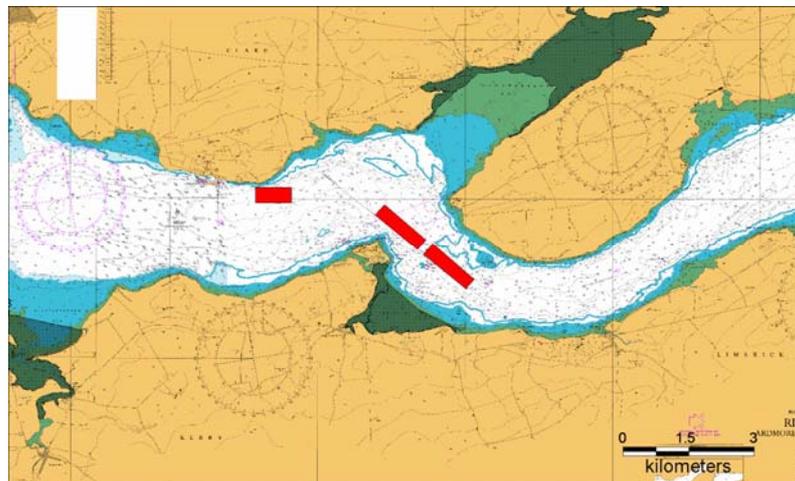
This site is of great ecological interest as it contains a high number of habitats and species listed on Annexes I and II of the E.U. Habitats Directive, including the priority habitat lagoon, the only known resident population of Bottle-nosed Dolphin in Ireland and all three Irish lamprey species. A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



Site No. 10C – Shannon - NHA



Site No. 10C – Shannon - SAC



Site No. 10C – Shannon 2- SPA

NHA SITE NO: 001332

Ballylongford Bay is an inlet on the southern side of the Shannon Estuary and runs northwards from the town of Ballylongford in County Kerry.

The scientific interest of the area lies in the large concentrations of waterfowl that feed on the mudflats there.

It constitutes the largest estuarine complex in the country and is of international importance for Black-tailed Godwit (5,370) and Redshank (1,880) and national importance for Cormorant (200), Greylag Goose (69), Shelduck (502 - two seasons only), Wigeon (2,229), Teal (1,277), Mallard (509), Scamp (206), Golden Plover (5,361), Grey Plover (63), Lapwing (13,029), Knot (513), Dunlin (7,149), Bar-tailed Godwit (625), and Curlew (1,180).

The importance of the Shannon estuary is underlined by its proposal as a Special Protection Area.

NHA SITE CODE: 001025

This is an acidic lake with a significant marsh habitat.

Broadly speaking there are three important habitats here. Although the most obvious the lake itself is less valuable than the surrounding marsh. However, the lake margins are colonised by the Common Reed (*Phragmites communis*), in places. This is associated with a number of other plants notably some mosses including the peat-forming Sphagnum Moss. Peat is being formed here in this very wet moss-rich marsh. As such this is a thriving habitat and is going through a long term process which was once very common in this Country.

The presence of open water marsh including Sphagna, and cutaway bog indicate that this is a valuable site. Its small size does not take away from its value, on the contrary it allows for a measure of control not practicable on larger sites.

NHA SITE NAME: 000027

This narrow bay off the Shannon estuary is situated east of Knock and west of Labasheeda. It is the estuary of the Crompaun and Cloon Rivers.

The site includes all of the intertidal mudflats of the bay.

The site is an important bird site, as it is part of the internationally important Shannon-Fergus estuarine complex. Maximum numbers of wildfowl in the three winters 1972/73, 1973/74 and 1974/75 were 1,100, 1,700 and 1,500 respectively.

Although this site is primarily important as an ornithological site, it is also a fine example of a high quality estuarine site.

SAC SITE CODE : 002165

This very large site stretches along the Shannon valley from Killaloe to Loop Head/ Kerry Head, a distance of some 120 km.

The site is a candidate SAC selected for lagoons and alluvial wet woodlands, both habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for floating river vegetation, *Molinia* meadows, estuaries, tidal mudflats, Atlantic salt meadows, Mediterranean salt meadows, *Salicornia* mudflats, sand banks, perennial vegetation of stony banks, sea cliffs, reefs and large shallow inlets and bays all 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 – Bottle-nosed Dolphin, Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Atlantic Salmon and Otter.

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Woodland is infrequent within the site, however Cahiracon Wood contains a strip of old Oak woodland.

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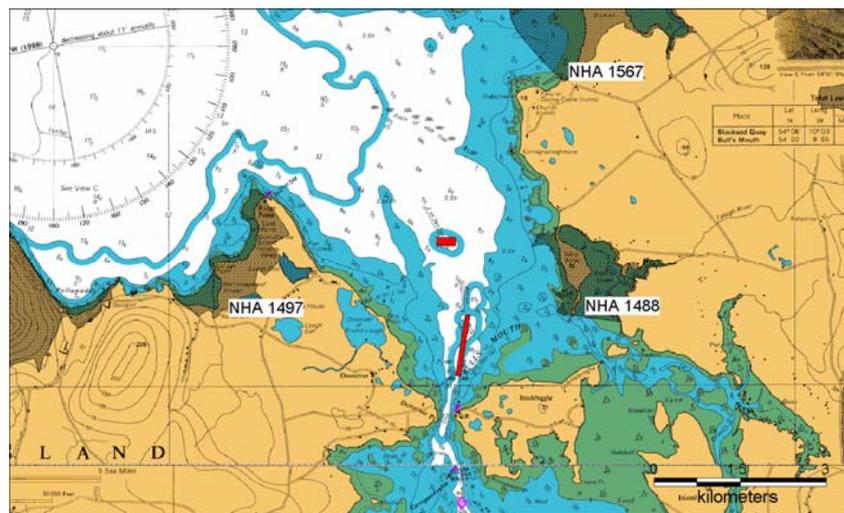
There is a resident population of Bottle-nosed Dolphin in the Shannon Estuary consisting of at least 56-68 animals (1996). This is the only known resident population of this E.U. Habitats Directive Annex II species in Ireland. Otter, a species also listed on Annex II of this directive, is commonly found 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*), Twaité Shad (*Allosa fallax fallax*) and Salmon (*Salmo salar*). There are few other river systems in Ireland which contain all three species of Lamprey.

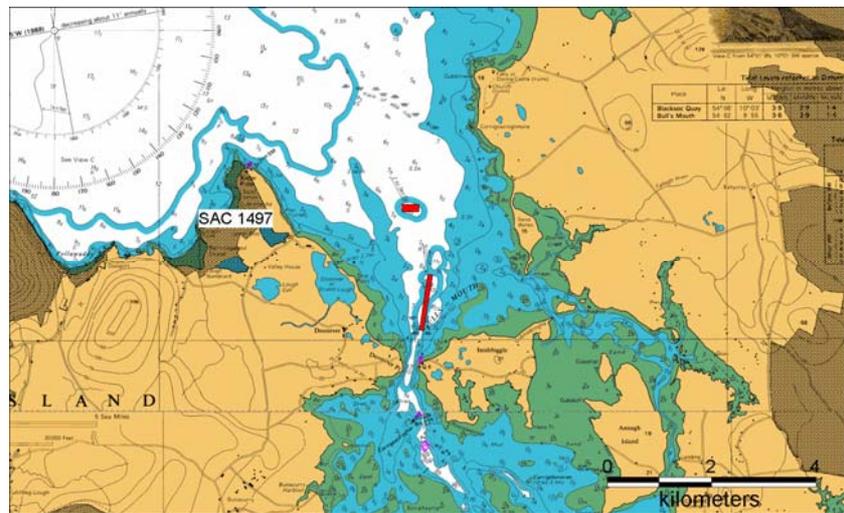
Two additional fish of note, listed in the Irish Red Data Book, also occur, namely Smelt (*Osmerus eperlanus*) and Pollan (*Coregonus autumnalis pollan*).

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.

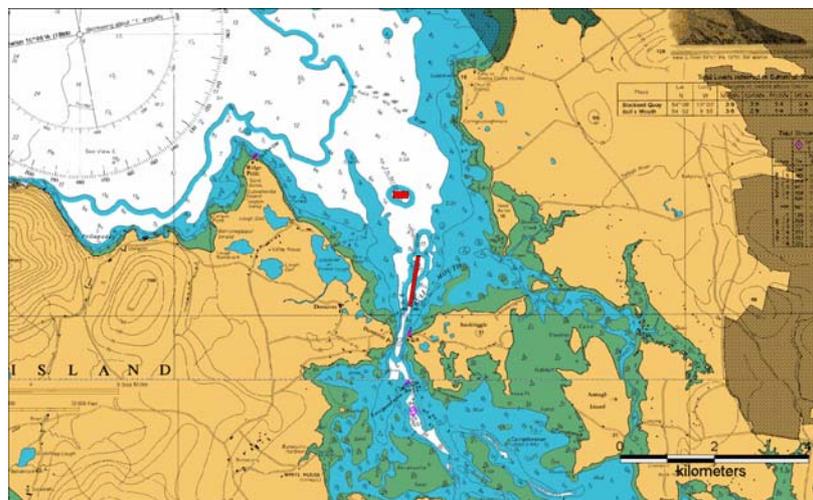
This site is of great ecological interest as it contains a high number of habitats and species listed on Annexes I and II of the E.U. Habitats Directive, including the priority habitat lagoon, the only known resident population of Bottle-nosed Dolphin in Ireland and all three Irish lamprey species. A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



Site No. 11 – Bull's Mouth- NHA



Site No. 11 – Bull's Mouth- SAC



- Site No. 11 – Bull's Mouth- SPA

NHA SITE CODE: 001567

Tullaghan Bay is situated approximately 10km south-west of Bangor on the west coast of County Mayo. It is a large shallow sea bay with small estuarine rivers surrounded by low-lying farmland and areas of blanket bog.

The site is important because of the variety of coastal habitat types occurring within the bay and the proximity of areas of blanket bog. Transitions between saltmarsh and machair vegetation are also of interest.

Tullaghan Bay is part of the proposed Special Protection Area called Broadhaven/Blacksod Bay Complex.

Tullaghan Bay is internationally important for Brent Geese and is visited by Greenland White-fronted Geese.

NHA SITE CODE: 001488

This site, situated 9 miles north north-west of Mullranny, Co. Mayo, faces the north east corner of Achill Island. It contains a range of coastal habitats in a relatively small area.

Corraun Point Machair/Dooreel Creek is of scientific interest due to the diversity and typicality of the habitat types found in a relatively natural state. Machair grassland and saltmarsh habitats are reasonably infrequent and both are in evidence on this site. Dooreel Creek is one of the better examples of saltmarsh along the NW coast of Mayo.

NHA SITE NO : 001497

This is a small coastal site lying in the north-east corner of Achill Island, adjacent to the village of Valley and approximately 3km east of Doogort.

Among the rich moss and liverwort flora at this site, Petalwort (*Petalophyllum ralfsii*) has been recorded. This rare species is listed on Annex II of the European Habitats Directive.

This scenic coastal site contains a good diversity of habitats in a small area. The machair here is a good example of a habitat type which is increasingly rare and receives priority status under Annex I of the European Habitats Directive. An outstanding feature of this site is its moss and liverwort flora, which includes a number of rarities, including an Annex II species. Achill Island is one of the foremost areas in Ireland, and is of international

importance, for its mosses and liverworts. A number of oceanic species occur here which are rare in a European context.

SITE NO : 001497

This is a small coastal site lying in the north-east corner of Achill Island, adjacent to the village of Valley and approximately 3km east of Doogort.

Most of the site consists of machair, i.e. a coastal grassland on a sandy substrate, which fronts onto the shoreline.

Among the rich moss and liverwort flora at this site, Petalwort (*Petalophyllum ralfsii*) has been recorded. This rare species is listed on Annex II of the European Habitats Directive.

The occurrence of Dunlin is of particular note as it is a rare Irish breeding bird and is listed as a Red Data Book species.

The machair here is a good example of a habitat type which is increasingly rare and receives priority status under Annex I of the European Habitats Directive. An outstanding feature of this site is its moss and liverwort flora, which includes a number of rarities, including an Annex II species. Achill Island is one of the foremost areas in Ireland, and is of international importance, for its mosses and liverworts. A number of oceanic species occur here which are rare in a European context.