JOINT NATURE CONSERVATION COMMITTEE

An inventory of UK estuaries

Volume 7
Northern Ireland

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The highly indented coastline of Strangford Lough supports a variety of habitats, including intertidal flats, saltmarsh, maritime heath and grassland. (Pat Doody)

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1 Foreword

Professor Peter Evans
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Viewed worldwide, estuaries are a scarce natural resource, even though some in the deltas of great rivers are of immense size. The British Isles are fortunate in holding a large number and variety of types of estuary, particularly when compared with the rest of temperate and Mediterranean Europe. Yet we have not used most of our estuaries either wisely or sustainably, probably for two reasons: first a lack of knowledge of the natural resources they contain and second a lack of understanding of the effects of the human uses to which they have been, or are being, put.

Pollution problems up-river have readily been apparent to anglers and recreational users alike and there have been long-standing campaigns to improve water quality in many of our rivers. These have begun to bear fruit. Many of the larger estuaries have not attracted such concern from the general public in relation to their water quality. People have increasingly turned their backs on the river corridors as they near the sea and looked further afield for clean recreational areas. As a result discharges of industrial and domestic wastes into estuaries have continued on a large scale, though restrictions are gradually being introduced (or even self-imposed by environmentally aware industrial concerns).

Even less obvious to the general public has been the steady loss of intertidal land within estuaries, to land-claim for industrial development and to dredging for the creation of wider and deeper shipping channels and berths needed to accept the larger vessels in which we import more raw material as our own accessible resources of many minerals and chemicals decline. Intertidal and even permanent shallow-water areas of estuaries have been buried under domestic rubbish and other solid wastes, or sometimes permanently flooded for water storage schemes. To these established, though often not sustainable, uses are being added new demands: barrage schemes for power generation, harbour developments for pleasure craft and many others.

Knowledge of the natural resources of the British estuaries has been slow to accumulate. Even one of the most obvious of the biological resources, the bird populations, had not been counted in more than a few of the smaller estuaries before the 'Birds of Estuaries Enquiry', now organised by the BTO, WWT, RSPB, and JNCC, was launched in 1969. The very idea of attempting a count of all the birds using the shores of the Wash in Lincolnshire and Norfolk was considered impractical before a Cambridge Bird Club team, of which I was a member, attempted the task in the mid-1950s. Quantification of other resources has proven even more difficult: fishery catch statistics do not necessarily permit identification of spawning and nursery areas, yet for several species these lie in estuaries and are vital for the continued health of our fish stocks. The role of algae and other plants in stabilising estuarine shores against erosion is only now becoming understood in a more quantitative way though it had been appreciated for more than half a century that planting of the cord-grass *Spartina* provided an extra line of defence against erosion of soft shores.

Now we are faced with the reality of sea level rise and the need for rethinking coastal defences. People have come to appreciate the value of the wildlife resources of estuaries, and industries located on estuaries increasingly appreciate the advantages of developing a 'green image' backed by actions such as the reduction of waste discharges to confirm it. This, therefore, is a particularly appropriate time to launch this *Inventory of UK estuaries*, building on the excellent publication *Nature conservation and estuaries in Great Britain* which appeared in 1991. That book, edited by Dr Davidson, who is a co-author of several of the chapters in these present inventory volumes, was the last major review published by the former Nature Conservancy Council. I am proud to have persuaded my fellow Council members in the mid-1980s to commission that work which has, I believe, influenced attitudes to estuary use in a most positive way.

I well recall, during the Examination in Public of the Teesside Structure Plan in 1975, appealing for a national planning policy to be developed for estuarine use. It was considered impossible at that time. But today there is great enthusiasm including guidance from government for coastal conservation and management, in part as a result of our growing international responsibilities for example in relation to the management of the North Sea, the implementation of the Ramsar Convention on Wetlands of International Importance and the acceptance of the EC Directives on the Conservation of Wild Birds (1979) and Habitats and Species (1992). The need for detailed information to enable sensible estuarine management plans to be formulated not only in a local but also a national and international context has never been greater. I commend these volumes to all interested in the planning, sustainable development, management and conservation of UK estuaries. It is an authoritative base-line from which to prepare for the 21st century.

Peter Evans

Durham, January 1993

2 Introduction

N.C. Davidson & A.L. Buck

Coastlines change continually under the forces of wave, tide, current and wind. In some places along the coast the hard rocks laid down millions of years ago or the softer, more recent, glacial deposits are being eroded. These eroded sediments are transported by currents, often for considerable distances, out into deeper water or along the shore. Much of this sediment is deposited along the coastline: coarse sediments forming shingle and sand beaches, and fine particles forming mudflats in sheltered bays, inlets and river estuaries. All these types of estuary act as 'sediment sinks' that trap much of the sediment moving along the coast. Where the estuary is formed by a river discharging into the sea, particles carried downstream by the rivers are deposited in the reduced currents and shelter of the river mouth, adding to the sediments of marine origin.

In time these sediments build up in estuaries, become stable and parts may become vegetated to provide a complex of habitats. Saltmarsh vegetation colonises intertidal flats that have accumulated to levels above mid-tide height. Where sand is blown onshore there is development of sand dunes, or where larger deposits move onshore shingle ridges develop. In the event of restricted drainage within sand dunes or shingle ridges, or even within saltmarshes, saline lagoons can form. This variety of coastal habitats is often in a state of change, adjusting to the short-term effects of winds, tides, waves and currents, and are shaped by the more gradual changes over periods of thousands of years as sea levels rise and fall.

The inflow of water from rivers and the sea brings a continual influx of nutrients. In river estuaries the freshwater brought down the river meets the saline water from the sea. In some estuaries these water bodies mix well, with tidal movements and variations in river flow creating large variations in water salinity over short periods of time.

The complex of estuarine habitats that develops under these conditions supports a variety of plants and animals which have adapted to exploit the nutrient-rich but continually changing tidal conditions. Relatively few species have evolved to cope with the extremes of constantly changing salinity and tidal levels of river estuaries but those that have often occur in great densities. As a result the estuarine mudflats and saltmarshes in temperate regions such as the United Kingdom are amongst the most productive ecosystems in the world. This rich plant and invertebrate life provides an abundant food supply for predators such as fish, which often use the shelter of estuaries for spawning and as nursery areas. Some species of birds and mammals feed on these fish, whilst many others feed directly on the saltmarsh vegetation and on the abundant molluscs, crustaceans and worms living in soft sediments. The relatively mild winter weather conditions of estuaries in the United Kingdom make them additionally attractive wintering grounds for migratory waterfowl from a large area of the northern hemisphere.

The coastline of the United Kingdom is particularly well endowed with estuaries, and these vary greatly in their geomorphological origins, size, shape, extent of freshwater influence, and the complex of marine and coastal habitats that occur there. These estuaries are widely recognised as one of the greatest natural assets in the UK.

UK estuaries vary greatly also in the extent to which they have been used, changed or destroyed by people exploiting their natural resources. People have used estuaries for many centuries and for many purposes. Some uses, such as ports, exploit the shelter offered by the physical structure of the estuary. Others, for example barrages, control or exploit tidal movements. Many traditional practices depend on sustainable use of the rich natural resources such as fish and shellfish found in estuaries. A recent trend has seen estuaries as the focus for leisure activities, in water, land and air. These range from organised activities such as sailing regattas to informal uses such as walking and the quiet enjoyment of these often spectacular wild landscapes and their wildlife.

Effective conservation of estuaries for their wildlife requires the maintenance of the diversity of the estuarine network throughout Britain and internationally, and the sustainable management of individual estuaries in this network. Yet many parts of estuaries have already been destroyed through human activities leading to land-claim and degradation. Such pressures continue and damage can arise through the subtle interaction of the human urge to control estuaries (e.g. by constructing sea defences against flooding) and the estuaries' natural movement in response to rising sea levels.

There is increasing recognition that managing and maintaining our coasts and estuaries for the future depends on co-operation between the groups of users, coastal managers and decision makers. This co-operation is increasingly being sought through processes of integrated coastal zone planning and management (CZM). Many CZM initiatives are focused on estuaries since it is often here that there is most overlap and potential conflict between people and the natural estuarine resource.

In developing estuary management plans there is a need for sound baseline information on the natural resource and how it is being used. Such information is needed both in detail for the estuary under consideration and more broadly so as to set a particular feature or site in its wider national and international context. To provide this British national context as a baseline for the development of sustainable use objectives, the Nature Conservancy Council (NCC) undertook an Estuaries Review which published *Nature conservation and estuaries in Great Britain* as a national overview of estuaries, their wildlife, their conservation and their human uses (Davidson *et al.* 1991).

An inventory of UK estuaries follows on from this national overview, and provides a summary of resource, wildlife, conservation status and human use features on each of the 163 estuaries identified by the Estuaries Review around the coasts of the United Kingdom. Much of the information presented in the inventory was collated between 1988 and 1991 during the work of the Estuaries Review. Where possible, however, we have included more up-to-date information. Where this more recent information is given the relevant dates are indicated in each display. The inventory thus provides a 'snap-shot' in time for the state of the UK estuarine resource at the end of the 1980s.

An inventory of UK estuaries takes the form of a series of standardised dossiers, taking each estuary (as defined by the Estuaries Review) in turn. Each of these reports gives a summary of the key features of interest or significance for estuary management from a nature conservation perspective. An inventory entry is designed to give initial summary information about a feature and to help direct users to more detailed sources of information should this be required. The inventory is not, however, intended to provide comprehensive listings of plant and animal species recorded on the estuary. Nor can it provide more than the initial basis for the development of practical coastal zone management initiatives such as integrated estuary management plans.

The inventory provides part of a sound information base for estuary management. Taken together with the national overview provided by *Nature conservation and estuaries in Great Britain,* the information in the inventory permits estuary managers to set the resource on a particular estuary in its national and international context - an important stage in the identification of management issues. The inventory should also help understanding of the great importance of the UK estuarine resource by the many user-groups and those involved in decision-making. Its availability for use in matters of development planning and control ensures that there is a readily available single source of summarised information, eliminating the need to search through a great variety of sources in many different styles of presentation. In addition the snap-shot information in the summary provides an easy-to-use basis for broad-scale monitoring of change in the estuarine resource and its human uses.

An inventory of UK estuaries is being published in six regional volumes, most including 20-30 estuary reports. The regions are shown in Figure 1. Boundaries have been chosen largely on topographical grounds to provide meaningful geographical zones. For England and Wales these boundaries coincide broadly with the known divisions of major coastal sediment cells.

There is also an introductory volume (volume 1). This provides more detail of the rationale of the inventory, explanations of the approach to site definition and selection, details of the information sources used for the inventory, and summary tables listing estuary locations and characteristics updated and corrected from those in Davidson *et al.* (1991). Users of the inventory are strongly urged to consult this volume for definitions before undertaking detailed interpretation of site reports. Since many people who have helped with the Estuaries Review and inventory work have contributed to more than one volume we have included a full Acknowledgements section in this introductory publication rather than in each regional volume.

We give below a brief overview of the overall estuarine resource in the coastal area of Northern Ireland, then a short key to using and interpreting the information entries in each site report, followed by the site reports.

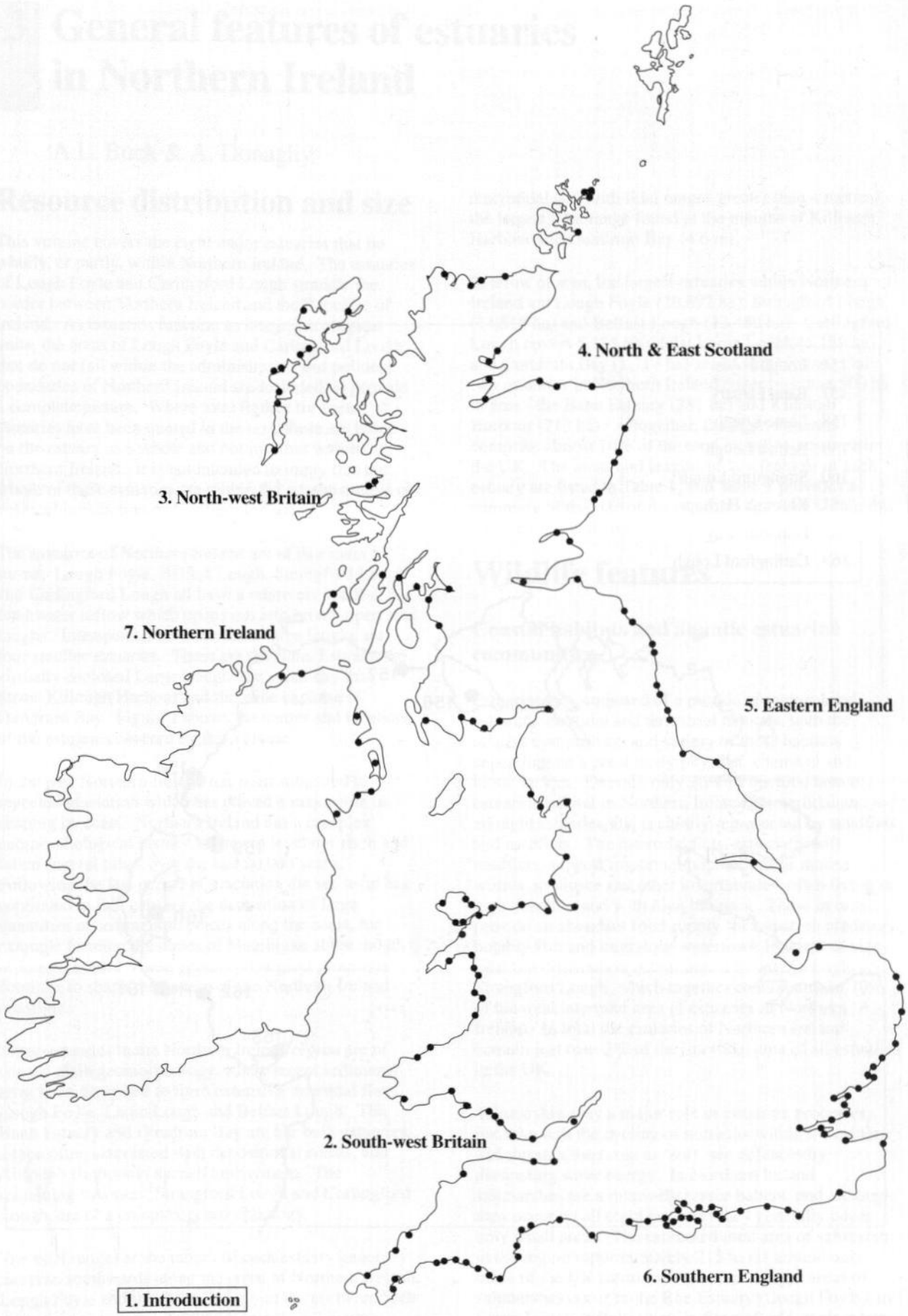

Figure 1 The regional volumes comprising *An inventory of UK estuaries.* Each estuary is marked by its centre grid reference.

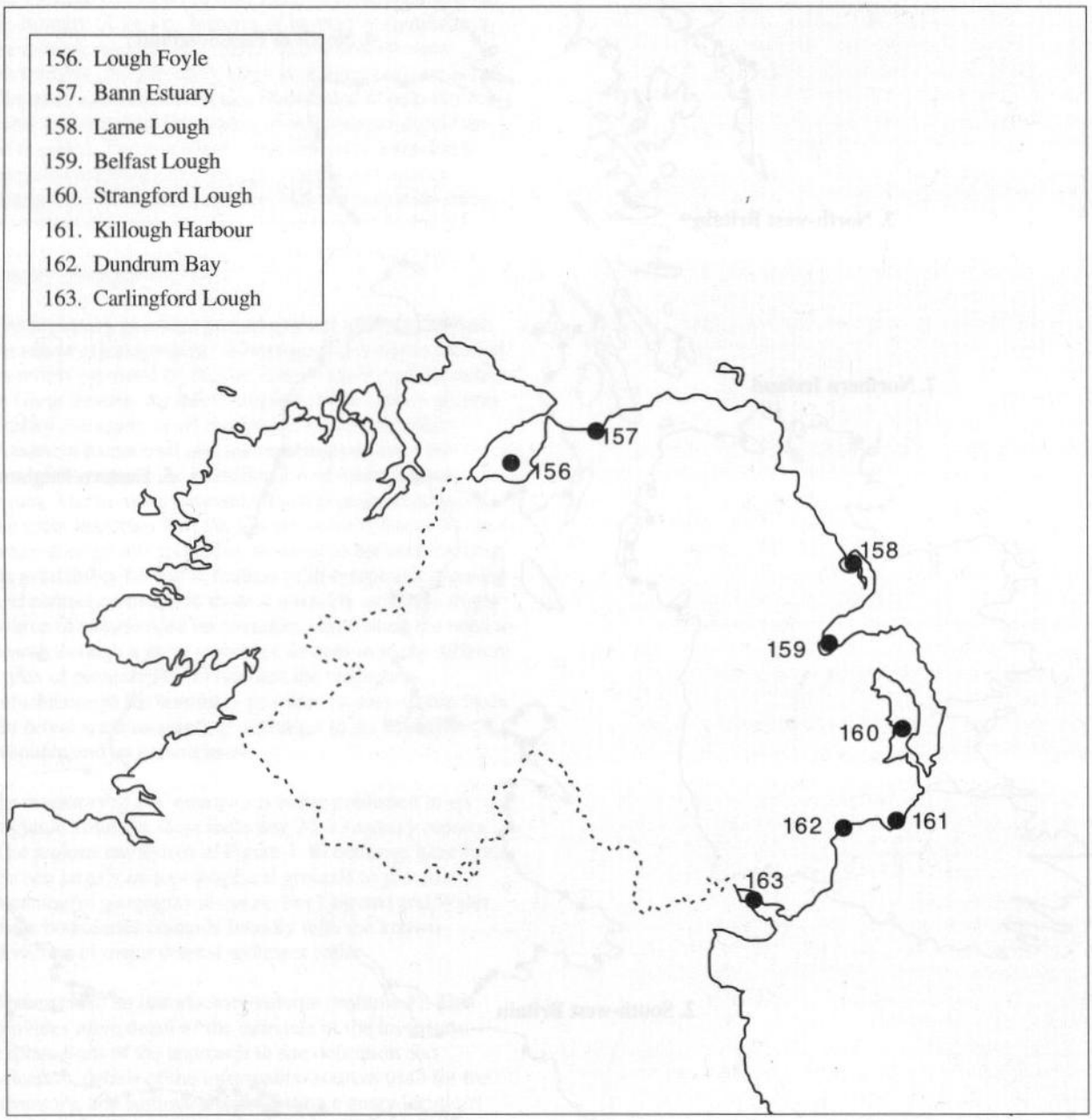

Figure 2 The locations and names of the 8 estuaries covered by Volume 7 of *An inventory of UK estuaries.* See the site map in each regional report for the precise boundaries of the site identified as the core estuary.

3 General features of estuaries in Northern Ireland

A.L. Buck & A. Donaghy

Resource distribution and size

This volume covers the eight major estuaries that lie wholly, or partly, within Northern Ireland. The estuaries of Lough Foyle and Carlingford Lough straddle the border between Northern Ireland and the Republic of Ireland. As estuaries function as integral ecological units, the areas of Lough Foyle and Carlingford Lough that do not fall within the administrative and political boundaries of Northern Ireland are included, to provide a complete picture. Where total figures for these estuaries have been quoted in the text, these are based on the estuary as a whole and not just that within Northern Ireland. It is not intended to imply that the whole of these estuaries are within the administrative or political jurisdiction of Northern Ireland.

The estuaries of Northern Ireland are of two main forms. Lough Foyle, Belfast Lough, Strangford Lough and Carlingford Lough all have a relatively small freshwater inflow which opens out into broad, open sea loughs. Interspersed between these large loughs are four smaller estuaries. These are the Bann Estuary, the virtually enclosed Larne Lough, the small bay that forms Killough Harbour and the wide expanse of Dundrum Bay. Figure 2 shows the names and locations of the estuaries covered by this volume.

In the past Northern Ireland has been subjected to repeated glaciation which has played a major role in shaping its coast. Northern Ireland has a complex geomorphological history as the sea level has risen and fallen several times over the last 20,000 years. Following the last period of glaciation the sea level has continued to fall, causing the deposition of large quantities of sediment in places along the coast, for example forming the dunes of Magilligan at the mouth of Lough Foyle. These geomorphological processes continue to shape the pattern of the Northern Ireland coastline.

Three estuaries in the Northern Ireland region are of coastal plain geomorphology, where recent sediments have been deposited to form extensive intertidal flats: Lough Foyle, Larne Lough and Belfast Lough. The Bann Estuary and Dundrum Bay are bar built estuaries, a type often associated with depositional coasts, and Killough Harbour is a small embayment. The remaining two sites, Strangford Lough and Carlingford Lough, are of a complex geomorphology.

The tidal ranges at the mouth of each estuary generally increase southwards along the coast of Northern Ireland. Lough Foyle and the Bann Estuary in the north are both microtidal (i.e. with tidal ranges less than 2 metres), while Larne Lough, Belfast Lough and Strangford Lough are mesotidal (i.e. with tidal ranges between 2 and 4 metres). The remaining three estuaries are macrotidal (i.e. with tidal ranges greater than 4 metres), the largest tidal range found at the mouths of Killough Harbour and Dundrum Bay (4.6 m).

In terms of area, the largest estuaries within Northern Ireland are Lough Foyle (20,692 ha), Strangford Lough (14,513 ha) and Belfast Lough (13,480 ha). Carlingford Lough covers 5,135 ha whilst Larne Lough (1,189 ha) and Dundrum Bay (1,117 ha) are of similar size. Only two estuaries in Northern Ireland cover less than 500 ha in area - the Bann Estuary (281 ha) and Killough Harbour (213 ha). Altogether, the eight estuaries comprise almost 10% of the total estuarine resource in the UK. The areas and lengths of key features of each estuary are listed in Table 1, and Table 2 provides a summary of the size of the estuarine resource within this Northern Ireland volume.

Wildlife features

Coastal habitats and aquatic estuarine communities

Estuaries are composed of a mosaic of inter-related subtidal, intertidal and terrestrial habitats, with the relative composition and variety of these habitats depending on a great many physical, chemical and biotic factors. Overall, only 20% of the total area of estuarine habitat in Northern Ireland is intertidal and in all eight estuaries this is chiefly represented by sandflats and mudflats. The intertidal flats, especially soft mudflats, support important populations of marine worms, molluscs and other invertebrates, often living in high densities and with high biomass. These in turn provide an abundant food supply for estuarine predators, notably fish and migratory waterfowl. In terms of size, tidal flat distribution is dominated by Lough Foyle and Strangford Lough, which together contain almost 70% of the total intertidal area of estuaries in Northern Ireland. In total the estuaries of Northern Ireland contain just over 3% of the intertidal area of all estuaries in the UK.

Saltmarshes play a major role in estuarine processes, both through the cycling of nutrients within the estuary and through their role as 'soft' sea defences by dissipating wave energy. In Northern Ireland saltmarshes are a relatively scarce habitat, and although they occur on all eight estuaries they generally cover only small areas. The estimated total area of saltmarsh in the region (approximately 215 ha) is around only 0.5% of the UK saltmarsh resource. Larger areas of saltmarshes occur in the Roe Estuary (Lough Foyle), in Larne Lough at Ballycarry, in Strangford Lough, where the saltmarsh is confined mostly to the northern flats and a few other dispersed localities, and at Mill Bay in Carlingford Lough. Together with the Bann Estuary,

Table 1. Areas, shoreline and channel lengths and mean spring tidal range measurements for estuaries partly or wholly within Northern Ireland.

Estuary	Area (ha)	Intertidal area (ha)	Shoreline (km)	Channel length (km)	Tidal range (m)
156. Lough Foyle	20,692	4,097	180.8	60.5	1.8
157. Bann Estuary	281	128	32.9	11.4	1.8
158. Larne Lough	1,189	398	34.0	11.3	2.4
159. Belfast Lough	13,480	554	100.0	28.4	2.9
160. Strangford Lough	14,513	3,390	242.7	35.8	3.2
161. Killough Harbour	213	106	8.5	2.7	4.6
162. Dundrum Bay	1,117	1,037	43.1	7.9	4.6
163. Carlingford Lough	5,135	1,490	63.4	26.7	4.1

Table 2. Total areas and lengths of the regional estuarine resource partly or wholly within Northern Ireland.

Total area (ha)	Subtidal area (ha)	Intertidal area (ha)	Intertidal flats (ha)	Saltmarsh (ha)*	Shoreline (km)	Channel length (km)
56,620	45,420	11,200	10,985	215	705.4	184.7

* estimate only (DoE (NI), pers. comm.)

where the vegetation shows the transition to inundated grassland and non-tidal fen communities, it is at these localities that the most varied saltmarsh vegetation is found. In Northern Ireland there are very few localities where pioneer saltmarsh vegetation occurs and at most locations the saltmarsh is composed of mid- and upper saltmarsh vegetation. At many sites the saltmarsh shows a transition to freshwater or grassland vegetation, although in some locations the extent of this vegetation is truncated by embankments, constructed for flood defence or for agriculatural land-claim.

The cord-grass *Spartina anglica* is found in several areas along the coast of Northern Ireland and in Strangford Lough *Spartina* covers a reasonably large area. Between 1993-1996 increases from 10 m^2 to 300 m^2 were recorded in some areas of Strangford Lough. On at least three estuaries in the region (Lough Foyle, Strangford Lough and Carlingford Lough) *Spartina* was deliberately planted in the past to encourage stabilisation; however, there have been recent attempts to control the *Spartina* on these estuaries.

There are particularly extensive sand dune systems on parts of the coast of Northern Ireland, where the high-energy environment and the conditions of prevailing and dominant winds combine to form large accumulations of sand. Locations in the area between Lough Foyle and Portrush to the east of the Bann Estuary have some of the oldest recorded dunes in Ireland, dated around 5,000 B.P. (Carter & Wilson 1991). At Murlough dunes, adjacent to Dundrum Bay, sand deposition is known to have occurred prior to 5,000 years B.P. and continued until around 2,000 years B.P. Five estuaries in Northern Ireland have associated sand dune systems, of which two are of recognised international importance. These are the dune system of Magilligan at the mouth of Lough Foyle, and Murlough Dunes at the mouth of Dundrum Bay, which are both included in the UK list of Special Areas of Conservation under the terms of the EC Habitats Directive. Three other estuaries have at least a small area of sand dunes associated with them, namely Carlingford Lough, Bann Estuary and Strangford Lough.

In Northern Ireland there are no substantial shingle or cobble structures associated with estuaries, although most estuaries within the region have patches of bare intertidal shingle. Shingle is found on over half (five) of the estuaries in this region but is most notable at the mouth of Strangford Lough, where Ballyquintin Point is formed by a raised cobble beach that forms large banks.

On the Republic of Ireland shore of Carlingford Lough there is an area of shingle that supports vegetation an annual driftline flora and perennial vegetation. This area is proposed as a Special Area of Conservation under the terms of the EC Habitats Directive.

Other coastal habitats are found in association with the estuaries of Northern Ireland. Coastal saline lagoons are associated with five estuaries in the region and all of these are of anthropogenic origin. Lowland grasslands are associated with six of the estuaries in Northern Ireland.

Comprehensive marine biological studies of Northern Ireland were undertaken in the mid to late 1980s (Wilkinson *et al.* 1988; Erwin *et al.* 1990). The benthic communities of many of the estuaries within Northern Ireland have been very well studied and sites of marine biological and conservation importance have been identified. The diversity of both soft substrate and hard substrate communities within Northern Ireland is generally higher than that of many estuaries in the UK, with the largest diversity recorded in Strangford Lough, Belfast Lough, Carlingford Lough and Killough Harbour. Lough Foyle and Dundrum Bay also rate highly. Only the Bann Estuary and Larne Lough have a relatively low diversity of aquatic estuarine benthic communities. Of the eight estuaries in Northern Ireland, Strangford Lough is considered to be of international marine biological importance for its aquatic estuarine flora and fauna, and has been recognised in its designation as a Marine Nature Reserve and is also on the UK list of proposed Special Areas of Conservation under the terms of the EC Habitats Directive.

Plant and animal species

At least five estuaries in the Northern Ireland support Red Data Book (RDB) species of vascular plant. The largest number of RDB species associated with an estuary (seven) is found on the Bann Estuary. These species are dwarf spring vetch *Vicia lathyroides*, dwarf spike-rush *Eleocharis parvula*, Scottish lovage *Ligusticum scoticum*, green figwort *Scrophularia umbrosa*, seaside centaury *Centaurium littorale*, shepherd's cress *Teesdalia nudicaulis* and smooth cat's-ear *Hypochaeris glabra*. Lough Foyle supports five Red List species: dwarf spring vetch, smooth cat's-ear, seaside centaury, Scottish lovage and hoary whitlowgrass *Draba incana*. The dunes adjacent to Dundrum Bay support three species, dwarf spring vetch, shepherd's cress and blue fleabane *Erigon acer*; the green winged orchid *Orchis morio* grows adjacent to Strangford Lough and oysterplant *Mertensia maritima* grows on Carlingford Lough. In addition to these RDB plants, the estuaries of Northern Ireland are known support a number of other species that are rare or uncommon in Ireland.

Many estuaries in the UK are of great importance to migratory and wintering waterfowl (waders and wildfowl) and the habitat mosaics of estuaries in Northern Ireland provide feeding and roosting sites for many waterfowl species. Many of these birds, which come from a vast area of Arctic and boreal breeding grounds between Canada and Siberia, are wholly or largely dependent on estuaries during their non-breeding period. Average peak winter counts of waterfowl suggest that at least 140,000 birds may be using the estuaries in Northern Ireland during the winter period. As the number of areas counted is known to be incomplete (Cranswick *et al.* 1995) this figure is considered to be an underestimate.

Seven of the eight estuaries in Northern Ireland (all except the Bann Estuary) attain international importance by supporting over 1% of the flyway population of at least one species. Three of these estuaries are currently of international importance for supporting over 20,000 waterfowl during winter (Lough Foyle 35,800; Belfast Lough 20,300; Strangford Lough 58,900), making this an important part of the UK coastline for waterfowl.

There is over 1% of the flyway population or biogeographic population of at least seven species of waterfowl on seven of the estuaries in Northern Ireland. These species are whooper swan *Cygnus cygnus*, light-bellied brent goose *Branta bernicla hrota*, wigeon *Anas penelope*, shelduck *Tadorna tadorna*, knot *Calidris canutus*, redshank *Tringa totanus* and turnstone *Arenaria interpres*. These estuaries also support nationally important populations of a further 25 species of wintering waterfowl. The Bann Estuary does not currently support nationally important populations of a species of wintering wader or wildfowl, but provides a wintering ground for around 4,000 waterfowl and makes a significant contribution to the geographical network of sites upon which waterfowl depend.

The coast of Ireland is of particular importance during periods of severe weather elsewhere in Europe, for with a mild oceanic climate Ireland's coastal wetlands remain unfrozen in winter when other parts of Europe are frozen and birds are forced to look elsewhere for feeding areas. Consequently, the estuaries of Ireland are of additional importance for the survival of waterfowl in severe winters in particular. Outside the wintering period, many estuaries in Northern Ireland have additional importance as staging and moulting areas in autumn and spring for migratory waterfowl populations. During these periods birds pass through rapidly, so many more individuals depend on these estuaries than are present at any one time.

Groups of seals regularly use several estuaries within Northern Ireland. Common seals *Phoca vitulina* breed in Strangford Lough (20% of the Ireland breeding population), Dundrum Bay and Carlingford Lough. A small group breeding just outside Belfast Lough feed within the estuary. Small numbers of grey seals *Halichoerus gryphus* feed within Strangford Lough, Belfast Lough, Dundrum Bay and Carlingford Lough.

Conservation status

The important and diverse wildlife and landscape features of much of the UK estuarine resource has been recognised by many parts of estuaries and their surroundings being designated under a variety of local, national and international measures, both statutory and non-statutory. The estuaries of Northern Ireland are typical of this pattern in which there are often overlapping site designations covering parts of an estuary. In addition to this site-based approach through

which much of estuarine conservation has traditionally been delivered, Strangford Lough and Belfast Lough are among a growing number of UK estuaries that are included in a variety of coastal zone planning and management initiatives.

National Nature Reserves (NNRs) and Areas of Special Scientific Interest (ASSIs) are the major statutory designations for the delivery of site-based wildlife conservation in Northern Ireland. (ASSIs are equivalent to SSSIs in Great Britain.) NNRs and ASSIs cover sometimes large areas of the intertidal and terrestrial areas associated with estuaries in Northern Ireland.

There are 13 declared NNRs in Northern Ireland that cover intertidal or terrestrial habitats of the eight estuaries covered by this volume. These include several areas of intertidal flats or saltmarshes, e.g. Roe Estuary on Lough Foyle, and a total of seven NNRs around the shores of Strangford Lough. Other NNRs include the sand dunes of Magilligan Point and Ballymaclary on Lough Foyle, Swan Island on Larne Lough, the sand dunes of Murlough on Dundrum Bay and Rostrevor Forest adjacent to Carlingford Lough. In addition to the NNRs there are thirteen ASSIs covering additional areas of Lough Foyle, Larne Lough, Belfast Lough, Strangford Lough, Dundrum Bay and Carlingford Lough. At the time of writing (October 1996) these ASSIs formed just over 10% of the total area of ASSIs in Northern Ireland.

The designation of an Area of Scientific Interest (ASI) requires the local planning authority to consult on any development application within the ASI. In practice, a number of ASIs have now been redesignated as ASSIs. There are two ASIs that have not been redesignated as yet that are associated with estuaries in Northern Ireland: Carrickhugh on Lough Foyle, and on Carlingford Lough, South Mourne Coast ASI covers part of the Lough. In addition, parts of the shore of Carlingford Lough are noted as a proposed candidate Natural Heritage Area in the Republic of Ireland.

Two estuaries in Northern Ireland have no statutory designations covering any part of the core area or terrestrial area: the Bann Estuary and Killough Harbour. On the remaining six estuaries, the pattern of NNRs/ASSIs is similar to that of NNRs/SSSIs in Great Britain, where SSSIs generally cover only parts of an estuary. A mixture of relatively small estuary areas are notified for their geological or geomorphological features with a few larger sites of biological or mixed interest covering tidal flats, saltmarshes and associated terrestrial habitats. Larne Lough and Strangford Lough are notable exceptions; most of Larne Lough has been designated as an ASSI and over 40% of the area of Strangford Lough has been designated as a NNR or ASSI. Strangford Lough is also designated as a Marine Nature Reserve, one of only three MNRs in the UK.

Two international designations are particularly relevant to estuarine habitats and their birds. The Ramsar Convention designates wetlands of international importance especially as waterfowl habitat (Ramsar sites) and Special Protection Areas (SPAs) are classified under the EC Directive on the Conservation of Wild Birds (79/409/EEC). For estuarine waterfowl populations both designations often apply. At present, on the estuaries in Northern Ireland only Swan Island on Larne Lough has been classified as an SPA and no estuary Ramsar sites have yet been designated. However, in the Republic of Ireland, part of the northern shore of Lough Foyle and part of the shore of Carlingford Lough have been designated as SPAs. Further estuarine areas in Northern Ireland presently meet the criteria for a Ramsar site and as an SPA: parts of Lough Foyle, Belfast Lough, Strangford Lough, Killlough Harbour, Dundrum Bay and Carlingford Lough.

A further international designation relevant to estuarine habitats has recently come into force. Under the EU Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (the 'Habitats Directive'), sites may be designated as Special Areas of Conservation (SACs) for the habitats or species they support that are considered to be under threat. There are three estuarine sites in Northern Ireland that are proposed as SACs: the dunes of Magilligan on Lough Foyle, Strangford Lough and the dunes of Murlough on Dundrum Bay. These sites are three of 17 SACs that are proposed in Northern Ireland. In the Republic of Ireland, part of the shore of Carlingford Lough is proposed as a SAC for its driftline and shingle vegetation.

Other wildlife conservation sites on estuaries include RSPB reserves on or adjacent to three estuaries (Lough Foyle, Larne Lough and Carlingford Lough), one Ulster Wildlife Trust reserve on Lough Foyle and a Wildfowl and Wetlands Trust reserve at Castle Espie on Strangford Lough.

There are, in addition, several landscape or other conservation designations that encompass estuaries in Northern Ireland. Parts of Lough Foyle and Strangford Lough fall within Areas of Outstanding Natural Beauty and parts of Dundrum Bay and Carlingford Lough fall within the Mourne Environmentally Sensitive Area. The National Trust are the main landowners on Strangford Lough and through the Strangford Lough Wildlife Scheme they manage substantial areas within the Lough. The National Trust also own and manage land adjacent to the Bann Estuary, Belfast Lough and Dundrum Bay.

Features of human use

Many parts of the coastline of Northern Ireland are largely natural and little affected by damaging human activities. Rather few people live close to the estuaries covered in this volume. A major exception is Belfast Lough, where the estuary has been significantly altered by the growth and expansion of the city of Belfast. Belfast Lough is one of only six estuaries in the UK with a surrounding population of more than 50,000 people. Of the other seven estuaries in Northern Ireland, only two have towns with significant populations directly adjacent to their shores: the city of Londonderry, on the uppermost reaches of the Foyle, and Newry, on the uppermost reaches of Carlingford Lough. Hence there are relatively few parts of the estuarine resource in Northern Ireland that have been subjected to the major urban and industrial pressures characteristic of estuaries close to large conurbations in other parts of the UK.

Generally, estuaries in Northern Ireland have not been subject to the construction of sea walls along considerable parts of their shoreline. This is due, in part, to land areas rising relative to sea level (isostatic rebound after the last ice age), and to the fact that large parts of some estuary shores are rocky, e.g. Belfast Lough, Strangford Lough. As a result, the erosion problems which often lead to the construction of major sea defences are not as significant in Northern Ireland as they are, for example, in South-east England. Although all eight estuaries in Northern Ireland have some length of concrete sea walls, on the whole these are not extensive and are generally associated with urban areas. Earth embankments are more common. The most significant estuarine flood defence scheme in Northern Ireland is the Quoile Barrage on the south-west of Strangford Lough. This barrage was constructed in 1957 to protect the town of Downpatrick from flooding. The construction compounded around 4 kms of the former estuary, and significantly altered the flow of water into the Pondage. The water retained behind the barrage has since become freshwater.

There have been a small number of places where intensive human use occurs and where there has been substantial loss or damage to the estuarine resource. The most striking example in Northern Ireland is Belfast Lough, where there has been extensive areas of historical land-claim. An estimated 85% of the original area of mudflat has been lost to land-claim (Wells 1988) and these areas are now dominated by the port and docks of Belfast and associated industries. On other estuaries in Northern Ireland less extensive areas have been claimed, mainly involving the enclosure of saltmarshes for agricultural use. However, this has been localised and is generally small-scale, particularly in comparison with estuaries in other areas of the UK. On many other sites in the UK considerable parts of the resource have been subsequently further altered through intense agricultural use or urban spread. This has not been a major factor in Northern Ireland.

As with other estuaries in the UK, heavy industrial activities are concentrated on the larger estuaries, notably on Belfast Lough where an extensive port and dock system and a series of former industrial sites dominate the inner parts of the estuary. The ports and harbours on many of the estuaries in Northern Ireland have declined as Belfast became the main focus for most trade/shipping activity. The largest other port developments include Larne, at the mouth of Larne Lough, Coolkeeragh on Lough Foyle, which now deals with the trade that formerly went to Londonderry, and the port of Warrenpoint in Carlingford Lough. The only areas of large-scale industry found on Northern Ireland's estuarine sites are at Belfast and at Coolkeeragh on Lough Foyle.

The coastline of Northern Ireland is largely undeveloped and there are many popular spots for tourism and recreation, particularly where these are easily accessible and close to large population centres. The Northern Ireland coastline is a major tourist resource and there have been recent increases in the tourist trade with caravans, hotels, marinas, interpretation centres, and other leisure-based activities. A wide variety of leisure pursuits, from general beach use and bathing to water-based recreation, take place on parts of these estuaries especially during the summer months, and recreational pursuits can be intensive in some areas. This is particularly true for the beaches of Portrush and Portstewart at the mouth of the Bann Estuary, and the beaches around Newcastle on the western shores of Dundrum Bay.

Alongside recreation there are a variety of traditional land uses which exploit the natural plant and animal resources of these Northern Ireland estuaries. Some grazing of dune grassland occurs; but stock grazing of saltmarsh is limited. Shellfish cultivation occurs on the larger estuaries in Northern Ireland; species harvested include Pacific and native oysters, mussels and Manila clams. The larger estuaries also support commercial fisheries for fish, shellfish such as cockles and winkles, and lobster and crab-potting occurs in some areas.

Whilst this is only a brief overview of some of the key features of the estuaries of Northern Ireland and their human uses, it is clear that this network of estuaries is both of great interest and value for wildlife and has a wide variety of human uses. Despite some areas of degradation and past land-claim, many estuaries in Northern Ireland have not been severely damaged by over-exploitation. There is great opportunity therefore for all those involved in using and managing these estuaries to collaborate, through such approaches as integrated coastal zone management. Such future management can ensure that this wild and beautiful part of the UK's estuarine heritage continues to be used in sustainable ways that allow for the retention of its varied wildlife.

4 Using the inventory

A.L. Buck

This section provides brief descriptions and keys to interpreting the presentation of information in the site reports. Full descriptions of the methodology, information sources and presentations are given in Volume 1 (Introduction) of the inventory. The rationale for site definition and selection follows that developed by Davidson *et al.* (1991).

A short key to the inventory

Inventory sites are numbered and presented in clockwise sequence from Lough Foyle. The numbering of estuaries in Northern Ireland follows on from those in Great Britain. Where data was collected or measured from sources other than JNCC/RSPB, these sources are identified below. Information refers to the period 1992-1993 unless otherwise stated.

Site map

Sites were selected for inclusion in the inventory using a definition of an estuary based on that developed by NERC (1975): a partially enclosed area at least partly composed of soft tidal shores, open to saline water from the sea, and receiving fresh water from rivers, land run-off or seepage.

For the inventory, only sites with a tidal channel longer than 2 km or sites with a shore width of over 0.5 km at low water along a shoreline greater than 2 km are included. The upstream limit is normally taken as the Normal Tidal Limit (NTL) and seaward limits are set as either a 'bay closing line' or 'across mouth' (XM) or an 'along shore' (AS) set by the low water mark. For sites in England, Scotland and Wales the upper shoreline limit is an interpreted high water mark approximating to the highest astronomical tides (EHWS). However, on sites in Northern Ireland it was not possible to interpret a similar upper shoreline limit and consequently the Mean High Water (MHW) mark shown on 1:50,000 O.S. maps was used. On sites that are not isolated from their neighbours, an arbitrary boundary 'between adjacent estuaries' (BAE) has been set, usually at the mid-point of the shore between the sites, or where the intertidal zone is at its narrowest.

It is difficult to define standard geographical zones for the inclusion of terrestrial habitats associated with estuaries. This is particularly true for sites in Northern Ireland where it was not possible to interpret the influence of the highest astronomical tide from available maps. For this reason we have followed the Estuaries Review in collating information for an 'associated terrestrial' zone that varies in extent between sites, but which includes functional units of maritime-influenced wildlife habitat and areas of human use that closely affect the core estuary.

Estuary size characteristics and description

Measurements of *total area* and *intertidal area* have been rounded to the nearest 1 ha.

Shore length and *channel length* measurements have been rounded to the nearest 0.1 km.

Tidal ranges have been derived from High and Low Water for Mean Spring Tides for the site closest to the defined estuary mouth, from Hewit & Lees-Spalding (1988).

Geomorphological type is based on the classification in Davidson *et al* (1991) and Davidson & Buck (in prep). The late Prof. Bill Carter provided advice on the geomorphological classification of estuaries in Northern Ireland.

Human population gives numbers of people living in the largest towns reaching within 1 km of the tidal shore, from results of the 1991 population census. Population figures have been rounded off to the nearest 1,000.

Wildlife features

All *coastal habitat* areas are rounded to the nearest 1 ha. Areas for sandflats and mudflats were not measured separately and are given as a combined figure. For Northern Ireland there are no accurate measurements for saltmarsh or sand dune areas currently available.

Aquatic estuarine communities. The classification of aquatic estuarine communities - subtidal and intertidal marine communities of substrates not vegetated by higher plants - was prepared by the Estuaries Review using methodology developed by the Marine Nature Conservation Review (MNCR). The Estuaries Review classification was prepared before completion of all relevant survey work by MNCR. Comprehensive information on the presence of these benthic communities (rather than the substrates on which they occur) was not available. The benthic plant and animal communities are divided into two broad categories: those on soft substrates and those on hard substrates, and are further divided into communities describable largely on their physico-chemical characteristics. Some of the communities occur on both the intertidal and subtidal parts of estuaries. Communities are as follows:

Soft substrates

1. Gravel/shell gravel community
2. Maerl beds
3. Exposed sand community
4. Clean sand community
5. Common mussel beds
6. Horse mussel beds
7. European oyster beds
8. Surface algal community
9. Current-swept sand community
10. Sandy/muddy sand community
11. Muddy gravel community
12. Muddy 'offshore' sand community
13. Normal/variable salinity muddy community
14. *Zostera* and *Ruppia* beds
15. Variable/reduced salinity mud community
16. Reduced salinity mud community

Hard substrates

17. Exposed rocky shore community
18. Moderately exposed rocky shore community
19. Sheltered rocky shore community
20. Variable salinity rocky shore community
21. Reduced (variable) salinity rocky shore community
22. Reduced salinity rocky shore community
23. *Sabellaria* reef community
24. Current-exposed sheltered rocky shore community
25. Exposed rock community
26. Sheltered rock community
27. Hydrozoan/bryozoan turf community
28. Slipper limpet beds
29. Artificial substrata community
30. Variable salinity rock community
31. Variable salinity clay community
32. Reduced (variable) salinity rock community
33. Reduced salinity rock community

Birds. Major sources of information on wintering waders and wildfowl are the Wetland Bird Survey (WeBS) counts organised and funded by the British Trust for Ornithology, the Wildfowl and Wetlands Trust, the Royal Society for the Protection of Birds and the Joint Nature Conservation Committee. These WeBS counts unify the previous schemes of the National Wildfowl Counts and the Birds of Estuaries Enquiry. Information presented in the inventory is calculated from five year peak monthly counts for waterfowl for the winters 1990/91 - 1994/95. The proportions of international and national populations of individual species are shown where these are of national or international importance ($\geq$ 1% of the relevant population except where this value is < 50 birds). Note that for these Northern Ireland sites, "nationally important" refers to the all-Ireland context, rather than GB or UK. A "nationally important" population represents $\geq$ 1% of the Irish population as a whole.

It should be noted that for the two cross-border sites, Lough Foyle and Carlingford Lough, the figures presented do not necessarily include data from sites adjacent to the shores of Ireland. Such sites are administered under the new Irish Wetland Bird Survey, for which long-term data are not presently available; however, data from the winter of 1994/95 are presented in Delaney (1995). Where individual areas along the Irish shores of Lough Foyle and Carlingford Lough are known to have held internationally or nationally important populations of species in their own right, these are noted in the text.

Additional wildlife features. Information presented here includes Red List plants (i.e. species listed as such in the *Irish Red Data Book* (Curtis & McGough 1988); the term 'Red List' refers solely to the Irish Red Data List. The presence of mammals is also noted. Information on otters is taken from Chapman and Chapman (1982).

Conservation status

The presence of both statutory and non-statutory wildlife and landscape conservation sites is shown. There are often several designations that overlap. For clarity, the national statutory designation with the greatest protection for wildlife is shown on the map. For example, where a NNR, ASSI and ASI overlap, it is the NNR that is shown on the map.

Conservation designations that apply only to the Republic of Ireland are noted in the text. Known proposals for National Nature Reserves and sites that meet the criteria for classification as 'Ramsar' sites, Special Protection Areas or Special Areas of Conservation are also indicated.

Abbreviations to the designations are as follows:

NNR	National Nature Reserve
ASSI (B)	Area of Special Scientific Interest (biological)
ASSI (G)	Area of Special Scientific Interest (geological and/or geomorphological)
ASSI (M)	Area of Special Scientific Interest (mixed: biological and geological/geomorphological)
ASI	Area of Scientific Interest
LNR	Local Nature Reserve
Ramsar	Wetland of International Importance (Ramsar Convention)
SPA	Special Protection Area (EC Directive on the conservation of wild birds)
SAC	Special Area of Conservation (EC Habitats Directive)
MNR	Marine Nature Reserve
AONB	Area of Outstanding Natural Beauty
CWT	County Wildlife Trust reserve (Ulster Wildlife Trust)
RSPB	Royal Society for the Protection of Birds reserve
ESA	Environmentally Sensitive Area

WWT	Wildfowl and Wetlands Trust centre/reserve
NT	National Trust land
Other	Areas of Special Protection, Country Parks, Natural Heritage Area (applicable only in the Republic of Ireland), etc.

Human use

Features of human use data were collected and collated between October 1992 to March 1993 through a joint RSPB/JNCC/DoE(NI) project. The data were collated from a variety of sources including field visits, members of RSPB (NI) and DoE (NI) staff and other local contacts. Activities listed as 'Present and/or 'Proposed' indicate that status only during that period. Proposals include both those developments subject to consent applications and those subject to less formal public discussion and/or investigation. As more recent information has become available, changes in these present or proposed activities that have arisen since 1993 are noted in the text.

Categories of human use. The bar chart shows, for each broad use category, the percentage of activity types in that category known to occur in 1993. For a fuller explanation of this analysis see the introductory volume of the Inventory.

Further reading

Further reading lists selected references containing further information on the estuary and its wildlife. Note that not all this further reading refers to detailed scientific studies: some sources are general or are historical descriptions of life on these estuaries.

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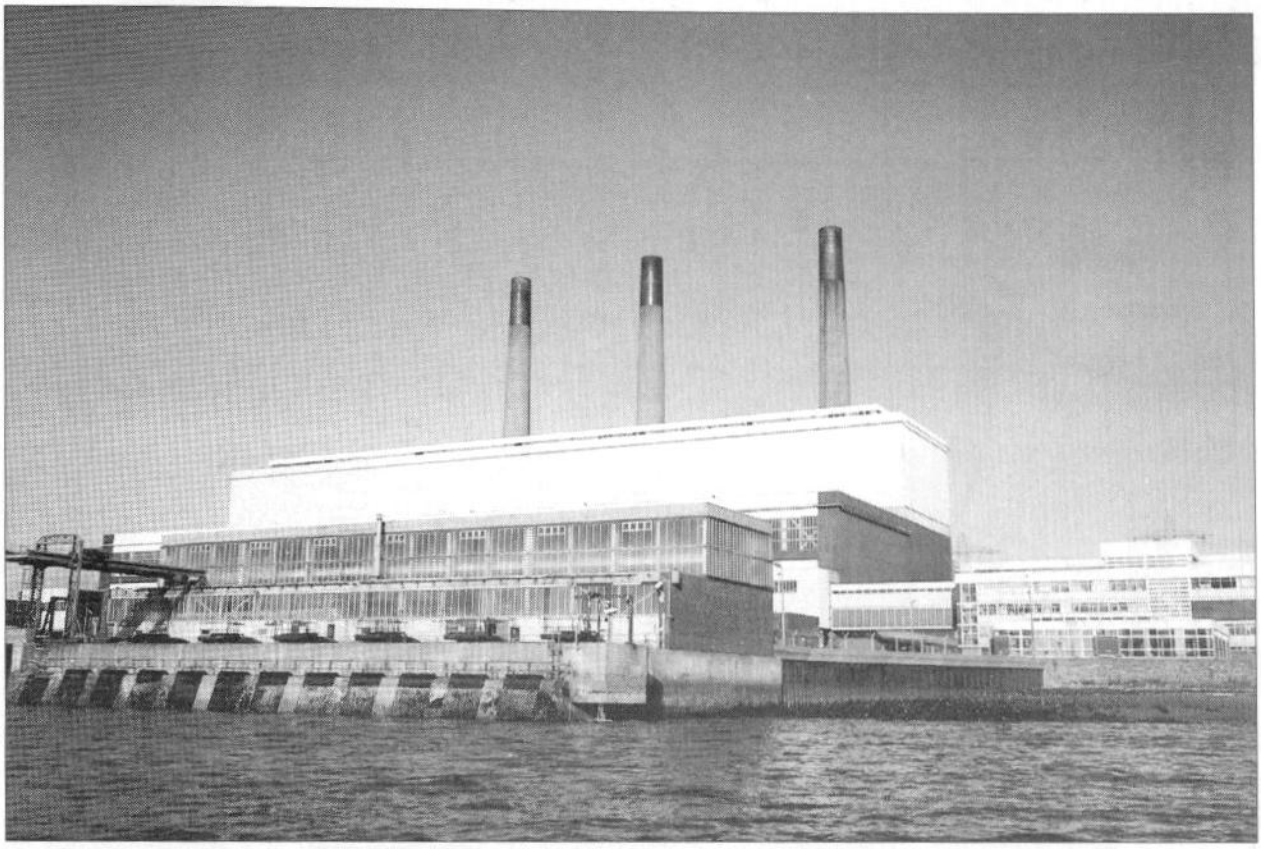
5 The estuaries

A.L. Buck



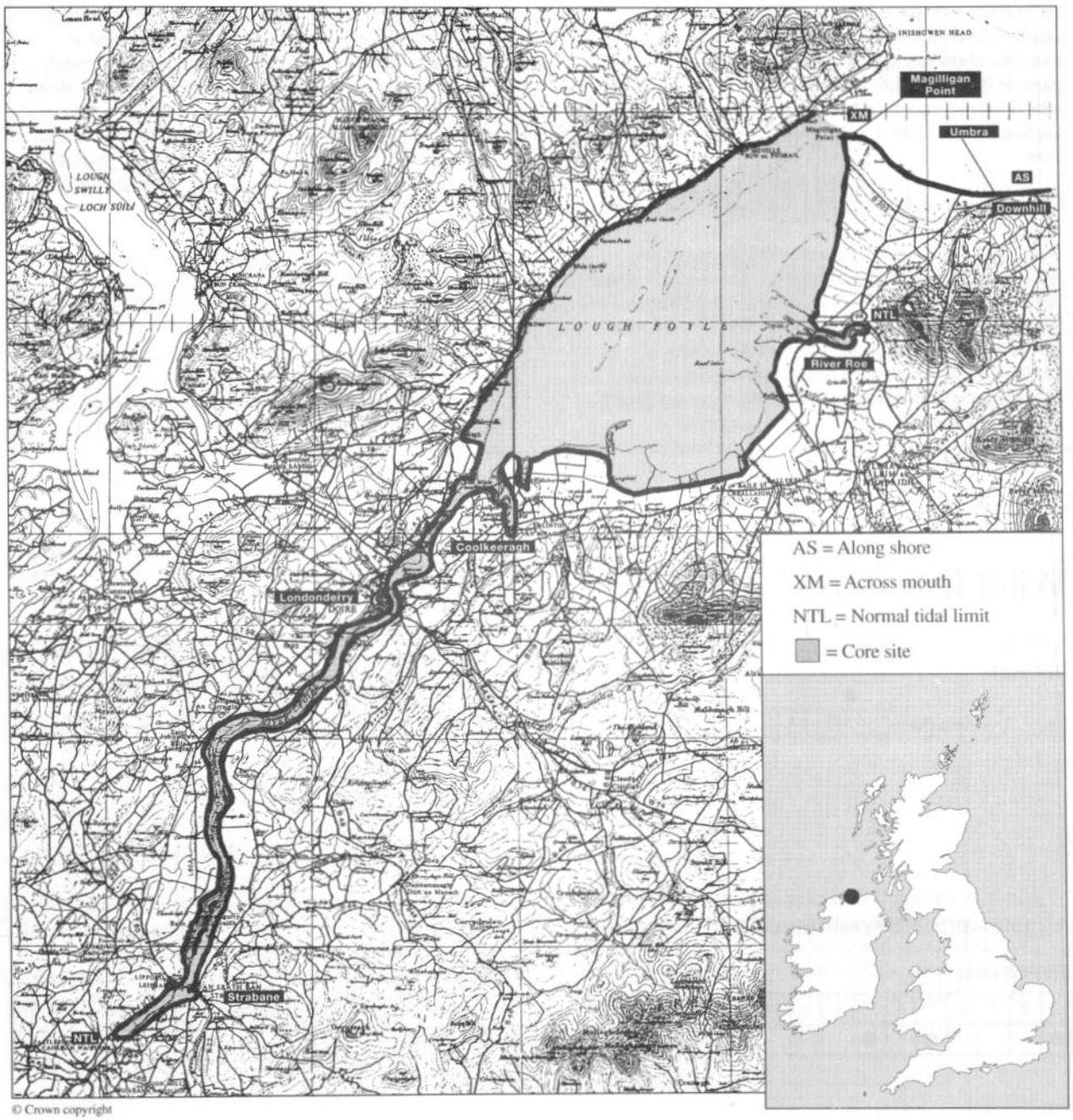
Ballylumford Power Station on the shores of Larne Lough. (David Connor)

156 Lough Foyle

Centre grid: C5630
Counties: Londonderry, Donegal, Tyrone

Districts: Limavady, Coleraine, Derry
Countries: Northern Ireland, Ireland

Review site location



Total area (ha)	Intertidal area (ha)	Shore length (km)	Channel length (km)	Tidal range (m)	Geomorph. type	Human population
20,692	4,097	180.8	60.5	1.8	Coastal plain	86,000

Description

Lough Foyle straddles the border between the Republic of Ireland and Northern Ireland. The Lough receives its main freshwater inflow from the River Foyle, which is tidal as far upstream as Strabane. In its upper reaches the river channel is narrow and relatively deep, with an accumulation of silt, but at Coolkeeragh the estuary opens out into a large, shallow embayment. Here the bottom sediments are sandy and frequently very mobile and barren, with a generally low species diversity.

At low tide extensive intertidal flats are exposed on the southern and eastern shores of Lough Foyle. In places there are abundant swards of eelgrass *Zostera* spp. and on parts of the lower shore there are extensive mussel beds which extend into the sublittoral. Along the more exposed northern shore there is only a relatively narrow intertidal zone.

On the eastern shore where the River Roe flows into the lough there is an area of saltmarsh that shows a good zonation from lower to higher saltmarsh vegetation. *Spartina* is present in the saltmarsh. The higher saltmarsh vegetation communities are the major components of the vegetation, with some transition communities on the northern shore of the River Roe and dense beds of *Phragmites* reed. Patterns of erosion and deposition dominate the flora of the saltmarsh, for the eastern and southern shores of Lough Foyle are subject to considerable erosion; the banks along the southern shore are severely undercut.

The mouth of the estuary is constricted by Magilligan Point, one of the largest depositional shoreline features in Britain and Ireland. This dune system reaches from the Point eastwards to the steep cliffs and rocky promontory at Downhill. The dunes here are the most calcareous in Northern Ireland and are a superlative example of dune processes and vegetation. The open coast is undergoing severe erosion and Magilligan Point is the only area which is still naturally accreting. Where there has been little disturbance there are substantial sand ridges, and at Doaghs the vast, wide series of ridges grade to a sandy plain leading down to the Foyle shore. The dunes along this whole system have very little foredune vegetation. At Ballymaclary there is an intricate pattern of dune slacks that support a wide range of calcareous slack vegetation communities. Further west at Umbra is the greatest variety of vegetation types of the dune system.

Lough Foyle is an estuary of international importance for wintering waterfowl. The site regularly supports internationally important populations of light-bellied brent goose, whooper swan, bar-tailed godwit and wigeon, and nationally important populations of at least thirteen species. The site is also an important staging post for very large numbers of migratory waterfowl, supporting large numbers of light-bellied brent geese and wigeon in autumn.

Wildlife features

Coastal habitats

	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	●	◉	●	●	●	◉		◉	◉	
Area (ha)	16,595	4,097								

● = major habitat ◉ = minor habitat

Aquatic estuarine communities

Soft substrate

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
●				●		●						●	●	●	●

Hard substrate

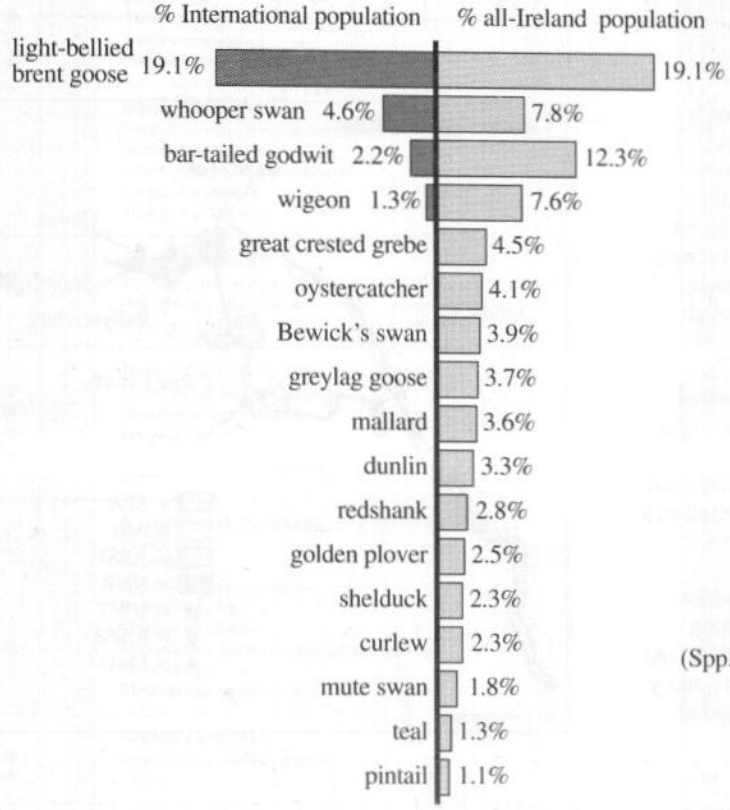
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
			●							●						

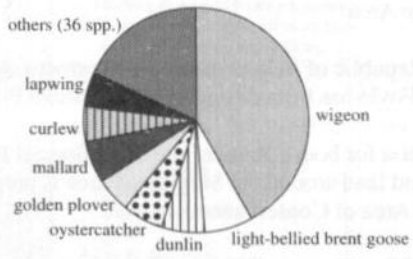
Birds

Wintering birds[1]

1990/91 – 1994/95 data

Total waterfowl: 36,100





Wintering species assemblage
(Spp. forming >5% assemblage shown separately)

Breeding birds: there is a moderate-sized colony of fulmar and small colonies of herring gull, common tern and arctic tern within the Lough. Little terns have bred within Lough Foyle in the past and were last recorded breeding here in 1980.

[1]figures presented in this section are taken from WeBS count sites adjacent to the Northern Ireland shore. Data from the Irish Wetland Bird Survey 1994-95 (Delany 1995) indicate that, in their own right, areas on the Irish shore held internationally important populations of whooper swan and nationally important numbers of teal.

Additional wildlife features

Several Red Data Book plants are found on or adjacent to the estuary, including the dwarf spring vetch *Vicia lathyroides*, smooth cat's ear *Hypochaeris glabra*, seaside centaury *Centaurium littorale*, hoary whitlowgrass *Draba incana* and Scottish lovage *Ligusticum scoticum*.

The Foyle supports a number of fish species, including dab *Limanda limanda*, which is common within the estuary, and salmon *Salmo salar* and sea trout *Salmo trutta* which migrate up the River Roe, River Faughan and the River Foyle. Otters are present on Lough Foyle.

Conservation status

● = designated ● = proposed/meets criteria for

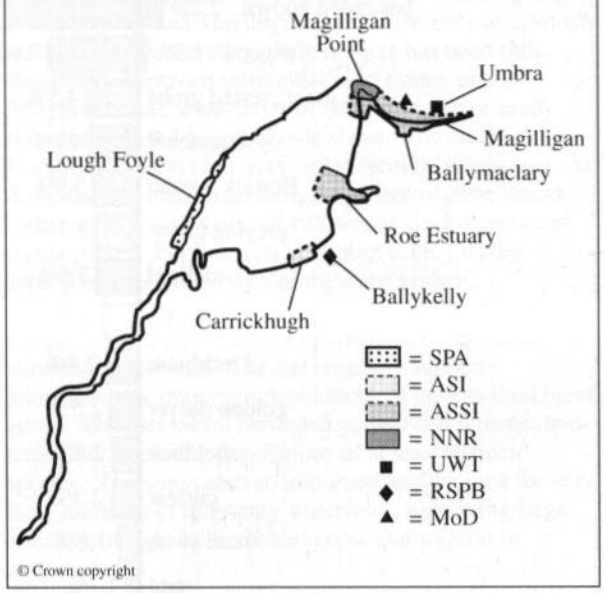
	NNR	ASSI (B)	ASSI (G)	ASSI (M)	ASI	LNR	Ramsar	SPA	SAC	AONB	CWT	RSPB	WWT	NT	HC	Other
	●			●	●		●	●	●	●	●	●				●
No.	3			1	1		1	1	1	1	1	1				1

Relatively small areas of the estuary lie within three National Nature Reserves: the Roe Estuary (474 ha), Magilligan Point (57 ha) and Ballymaclary (227 ha). Magilligan (1,069 ha) is an Area of Special Scientific Interest for its biological and geomorphological interest and Carrickhugh (158 ha) is an Area of Scientific Interest. In the Republic of Ireland a section of the River Foyle from Mongalvin to Carrigans is proposed as a Natural Heritage Area.

In the Republic of Ireland, part of the northern shore of Lough Foyle has been designated as a Special Protection Area. Further areas of the Lough in Northern Ireland meet the criteria for both a Ramsar site and a Special Protection Area, and land around the Magilligan area is proposed as a Special Area of Conservation.

The RSPB manages 1,320 ha of foreshore and mudflat centred on Ballykelly, the Ulster Wildlife Trust have a reserve on the Umbra and large areas of Magilligan Strand are under MOD ownership. The outer parts of the estuary lie within the North Derry Area of Outstanding Natural Beauty.

Conservation status



Human activities

Present	Proposed	
●	●	**Coast protection & sea defences**
		Linear defences
		Training walls
		Groynes
●		Brushwood fences
●		*Spartina* planting
●		Marram grass planting
		Barrage schemes
		Weirs & barrages for river management
		Storm surge barrages
		Water storage barrages & bunds
		Leisure barrages
		Tidal power barrages
●		**Power generation**
		Thermal power stations
		Import/export jetties (power generation)
		Wind-power generation
●		**Industrial, port & related development**
●		Dock, port & harbour facilities
●		Manufacturing industries
●		Chemical industries
●		Ship & boat building/repair
		Others
		Extraction & processing of natural gas & oil
		Exploration
		Production
		Rig & platform construction
		Pipeline construction
		Pipeline installation
●		Import/export jetties & single-point moorings
		Oil refineries
		Mothballing of rigs & tankers
●		**Military activities**
●		Overflying by military aircraft
		Others
●		**Waste discharge**
●		Domestic waste disposal
●		Sewage discharge & outfalls
●		Sewage treatment works
●		Rubbish tips
●		Industrial & agricultural waste discharge
●		Thermal discharges (power stations)
●		Dredge spoil
●		Accidental discharges
		Aerial crop spraying
●	●	Waste incinerators
		Others
●		**Sediment extraction**
●		Capital dredging
		Maintenance dredging
●		Commercial estuarine aggregates extraction
		Commercial terrestrial aggregates extraction
		Non-commercial aggregates extraction
		Hard-rock quarrying
●		**Transport & communications**
●		Airports & helipads
●		Tunnels, bridges & aqueducts
		Causeways & fords
●		Road schemes
●		Ferries
		Cables
		Urbanisation
		Land-claim for housing & car parks
●		**Education & scientific research**
●		Sampling, specimen collection & observation
●		Nature trails & interpretative facilities
		Seismic studies & geological test drilling
		Marine & terrestrial archaeology
		Fossil collecting

Present	Proposed	
		Tourism & recreation
		Infrastructure developments
		Marinas
●		Non-marina moorings
		Dinghy & boat parks
●		Caravan parks & chalets
●		Leisure centres, complexes & piers
		Aquatic-based recreation
●		Power-boating & water-skiing
●		Jet-skiing
●		Sailing
●		Sailboarding & wind-surfing
		SCUBA & snorkelling
●		Canoeing
●		Surfing
		Rowing
		Tourist boat trips/leisure barges
●		Angling
		Other non-commercial fishing
●		Bathing & general beach recreation
		Terrestrial & intertidal-based recreation
●		Walking, including dog walking
●		Bird-watching
●		Sand-yachting
●		4WD & trial-biking
		Car sand-racing
●		Horse-riding
		Rock-climbing
●		Golf courses
●		Clay-pigeon shooting
		Others
		Airborne recreation
●		Overflying by light aircraft
●		Radio-controlled model aircraft
●		Others
●		**Wildfowling & hunting**
		Wildfowling
		Other hunting-related activities
●		**Bait-collecting**
		Digging & pumping for lugworms & ragworms
		Hydraulic dredging for worms
		Others
●		**Commercial fisheries**
●		Fish-netting & trawling
●		Fyke-netting for eels
●		Fish traps & other fixed devices & nets
●		Crustacea
●		Molluscs – Hand-gathering
		Dredging
		Hydraulic dredging
●		**Cultivation of living resource**
●		Saltmarsh grazing
		Sand dune grazing
		Agricultural land-claim
		Fish-farming
		Shellfish farming
		Bottom & tray cultivation
		Suspended cultivation
		Crustacea farming
		Reeds for roofing
		Salicornia picking
		Others
●		**Management & killing of birds & mammals**
		Killing of mammals
		Killing of birds
		Adult fish-eating birds
		Adult shellfish-eating birds
		Gulls
		Geese
●		**Wildlife habitat management**
		Spartina control
		Habitat creation & restoration
		Marine
		Intertidal
		Terrestrial
●		Habitat management
		Others

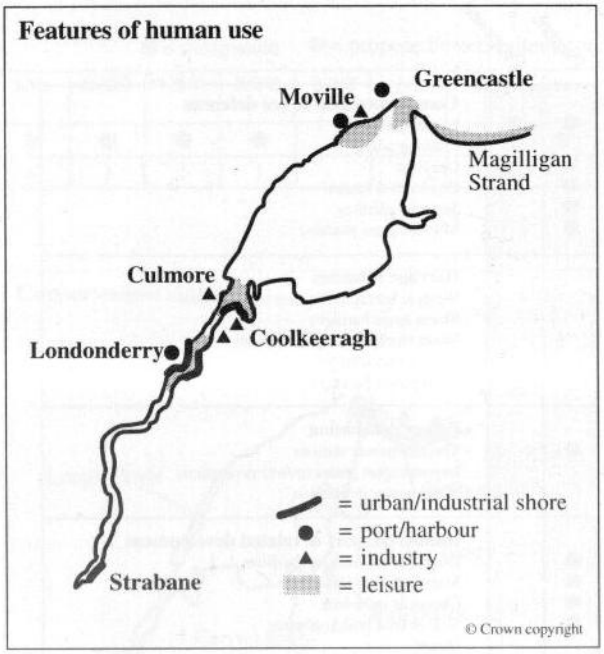
Features of human use

Leisure pursuits are numerous on Lough Foyle but take place over only a relatively small area. There are moorings at Londonderry, Culmore and Moville sailing clubs which are the main areas for sailing, water-skiing and canoeing. Around Londonderry and Moville are centres for water-skiing and jet-skiing. Beach recreation and land-based pursuits such as sand-yachting, four-wheel drive, trial-biking and horse-riding occur along Magilligan Strand.

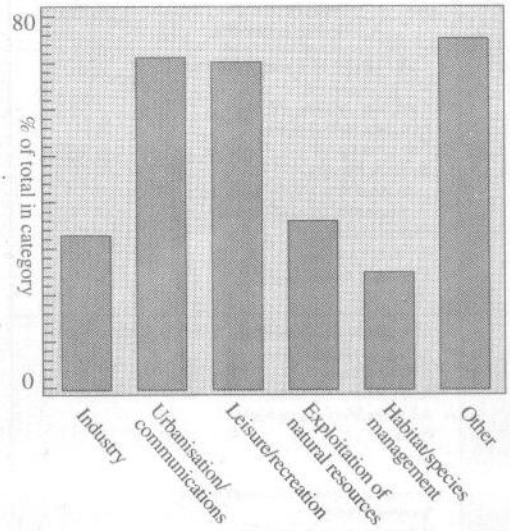
Industrial activities on the estuary include docks or harbours at Greencastle, Londonderry and Coolkeeragh, where the existing port has undergone some development. The trade from the port at Londonderry will be transferred to Coolkeeragh. There is a large chemical works and an oil-fired power station at Coolkeeragh and a light engineering works at Culmore. Sediment extraction within Lough Foyle includes capital dredging at Greencastle to accommodate a new pier, maintenance of shipping channels at Londonderry and extraction of sand from the upper reaches of the river at Ballydonaghy.

Lough Foyle is subject to waste discharges from various sources, including sewage treatment works, industrial discharges from the chemical industry at Coolkeeragh and thermal discharges from the oil-fired power station. There is a major landfill site at Culmore.

Exploitation of the natural resources includes netting for the extensive salmon fishery within the estuary, lobster and crab-potting and dredging for mussels, cockles and oysters. Wildfowlers shoot over the mudflats of the Lough. The upper reaches of the Roe Estuary, east of the railway bridge, are a refuge area.



Categories of human use



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157 Bann Estuary

Centre grid: C8235
Counties: Londonderry, Antrim

District: Coleraine

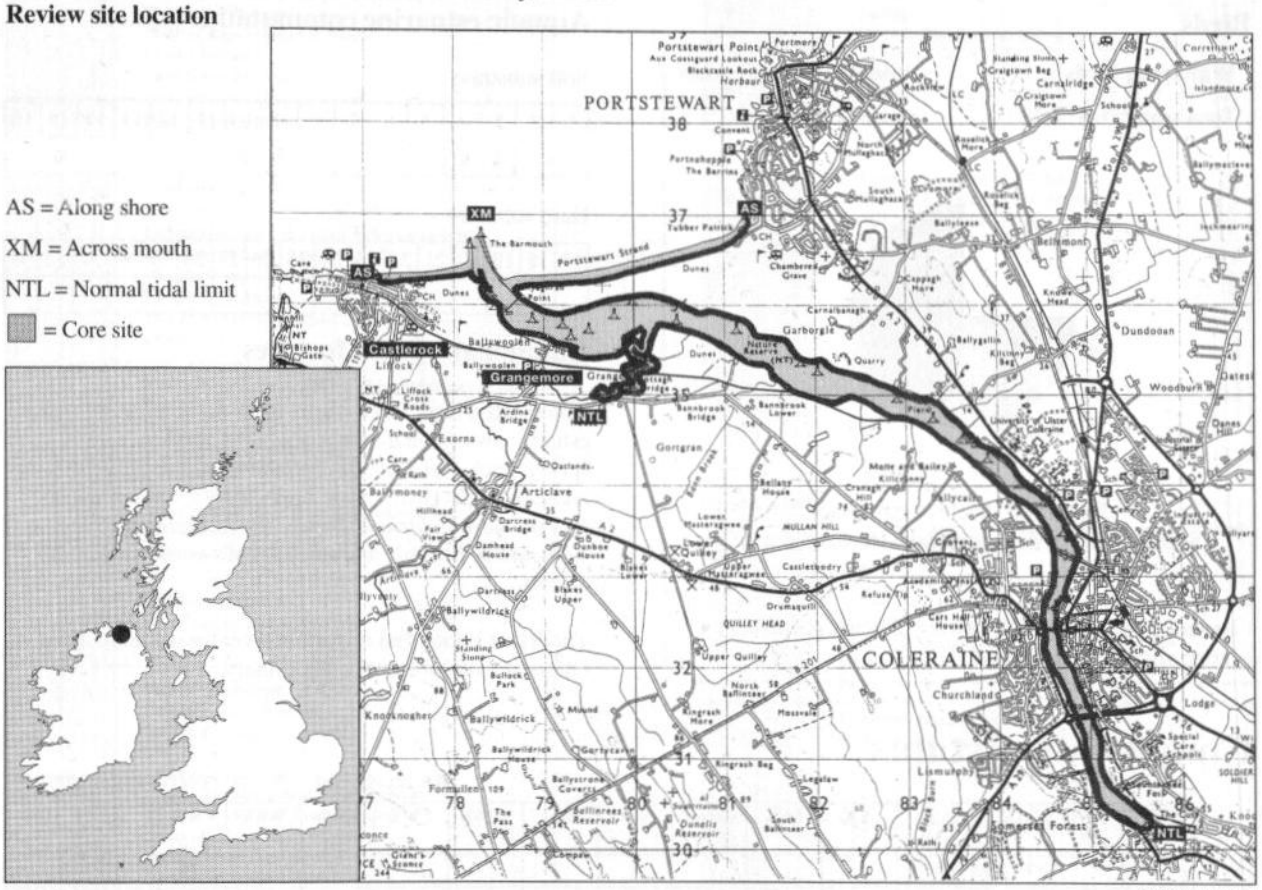
Review site location

AS = Along shore

XM = Across mouth

NTL = Normal tidal limit

= Core site



Total area (ha)	Intertidal area (ha)	Shore length (km)	Channel length (km)	Tidal range (m)	Geomorph. type	Human population
281	128	32.9	11.4	1.8	Bar built	28,000

Description

The estuary of the River Bann is a long, narrow estuary that flows past the town of Coleraine in its upper reaches and discharges into the sea between two large piers (Bar Mouth). The mouth of the estuary was once a constantly shifting series of sand shoals and channels, but with the building of training walls in the late 1800s, and with the more recent construction of the two large piers, the sediments here have become more stable.

At Grangemore where the Articlave River flows into the estuary, the low-lying estuarine plain supports an area of saltmarsh. The vegetation here is dominated by mid-upper saltmarsh and extensive areas show the transition to non-tidal fen and rush pasture vegetation. The saltmarsh is also of note for it has one of the most extensive developments of saltmarsh pans in Northern Ireland.

On either side of the Bar Mouth are extensive sandy beaches, which stretch westwards to the rocky shore at Castlerock and eastwards to Portstewart. These latter beaches are backed by extensive dunes. The dunes of Portstewart Strand form a long series of dissected and wind-sculptured dune ridges lying parallel to the coast. The vegetation here is dominated by dune grassland and shows an interesting sequence of plant communities from high dune to saltmarsh, where the dunes are adjacent to the main estuary channel.

Wildlife features

Coastal habitats

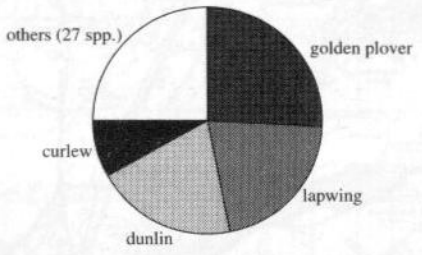
	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	●	●	●	●	●	◉				
Area (ha)	153	128								

● = major habitat ◉ = minor habitat

Birds

Wintering birds 1990/91 – 1994/95 data

Total waterfowl: 4,200



Wintering species assemblage
(Spp. forming >5% assemblage shown separately)

Breeding birds: a small colony of black guillemots breed within the estuary.

Aquatic estuarine communities

Soft substrate

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		●	●					●	●					●	

Hard substrate

17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33

Additional wildlife features

Several Red Data Book plants grow on or adjacent to the estuary: dwarf spike-rush *Eleocharis parvula,* dwarf spring vetch *Vicia lathyroides,* shepherd's cress *Teesdalia nudicaulis,* Scottish lovage *Ligusticum scoticum,* green figwort *Scrophularia umbrosa,* seaside centaury *Centaurium littorale* and smooth cat's-ear *Hypochaeris glabra.*

The River Bann is an important river for salmon and eels. Otters are also present on the estuary.

Conservation status

● = designated ◉ = proposed/meets criteria for

	NNR	ASSI (B)	ASSI (G)	ASSI (M)	ASI	LNR	Ramsar	SPA	SAC	AONB	CWT	RSPB	WWT	NT	HC	Other
														●		
No.														4		

The National Trust own large areas of the estuary, including Bar Mouth (16 ha), Grangemore (58 ha) and Portstewart (74 ha), and they also lease the foreshore of the estuary.

Human activities

Present	Proposed	
		Coast protection & sea defences
●		Linear defences
●		Training walls
●		Groynes
●		Brushwood fences
		Spartina planting
●		Marram grass planting
		Barrage schemes
●		Weirs & barrages for river management
		Storm surge barrages
		Water storage barrages & bunds
		Leisure barrages
		Tidal power barrages
		Power generation
		Thermal power stations
		Import/export jetties (power generation)
		Wind-power generation
		Industrial, port & related development
●		Dock, port & harbour facilities
		Manufacturing industries
		Chemical industries
●		Ship & boat building/repair
		Others
		Extraction & processing of natural gas & oil
		Exploration
		Production
		Rig & platform construction
		Pipeline construction
		Pipeline installation
		Import/export jetties & single-point moorings
		Oil refineries
		Mothballing of rigs & tankers
		Military activities
		Overflying by military aircraft
		Others
		Waste discharge
●		Domestic waste disposal
●		Sewage discharge & outfalls
		Sewage treatment works
		Rubbish tips
	●	Industrial & agricultural waste discharge
		Thermal discharges (power stations)
		Dredge spoil
●		Accidental discharges
		Aerial crop spraying
		Waste incinerators
		Others
		Sediment extraction
●		Capital dredging
		Maintenance dredging
●		Commercial estuarine aggregates extraction
●		Commercial terrestrial aggregates extraction
		Non-commercial aggregates extraction
		Hard-rock quarrying
		Transport & communications
●		Airports & helipads
		Tunnels, bridges & aqueducts
		Causeways & fords
		Road schemes
		Ferries
●		Cables
		Urbanisation
		Land-claim for housing & car parks
		Education & scientific research
●		Sampling, specimen collection & observation
●		Nature trails & interpretative facilities
		Seismic studies & geological test drilling
●		Marine & terrestrial archaeology
		Fossil collecting

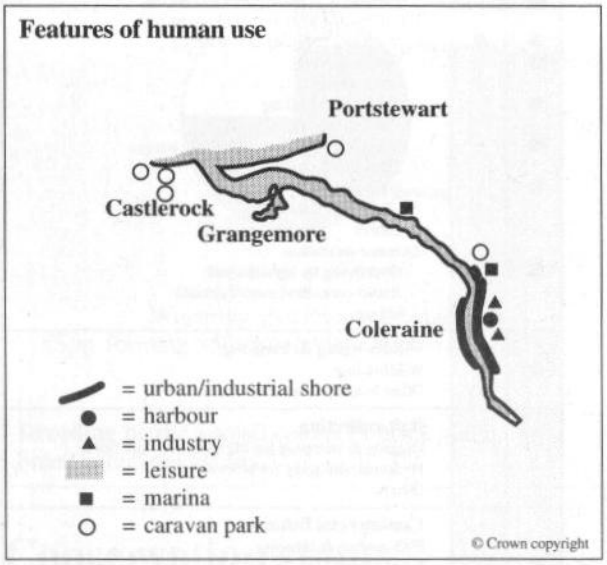
Present	Proposed	
		Tourism & recreation
		Infrastructure developments
●		Marinas
		Non-marina moorings
		Dinghy & boat parks
●		Caravan parks & chalets
		Leisure centres, complexes & piers
		Aquatic-based recreation
●		Power-boating & water-skiing
●		Jet-skiing
●		Sailing
●		Sailboarding & wind-surfing
●		SCUBA & snorkelling
●		Canoeing
●		Surfing
●		Rowing
●		Tourist boat trips/leisure barges
●		Angling
		Other non-commercial fishing
●		Bathing & general beach recreation
		Terrestrial & intertidal-based recreation
●	●	Walking, including dog walking
●		Bird-watching
		Sand-yachting
●		4WD & trial-biking
		Car sand-racing
●		Horse-riding
		Rock-climbing
●		Golf courses
		Clay-pigeon shooting
		Others
		Airborne recreation
●		Overflying by light aircraft
		Radio-controlled model aircraft
		Others
		Wildfowling & hunting
●		Wildfowling
		Other hunting-related activities
		Bait-collecting
		Digging & pumping for lugworms & ragworms
		Hydraulic dredging for worms
		Others
		Commercial fisheries
		Fish-netting & trawling
●		Fyke-netting for eels
●		Fish traps & other fixed devices & nets
●		Crustacea
●		Molluscs – Hand-gathering
●		Dredging
		Hydraulic dredging
		Cultivation of living resource
●		Saltmarsh grazing
●		Sand dune grazing
		Agricultural land-claim
		Fish-farming
		Shellfish farming
		Bottom & tray cultivation
		Suspended cultivation
		Crustacea farming
		Reeds for roofing
		Salicornia picking
●		Others
		Management & killing of birds & mammals
		Killing of mammals
		Killing of birds
●		Adult fish-eating birds
		Adult shellfish-eating birds
		Gulls
		Geese
		Wildlife habitat management
		Spartina control
		Habitat creation & restoration
		Marine
		Intertidal
		Terrestrial
●		Habitat management
		Others

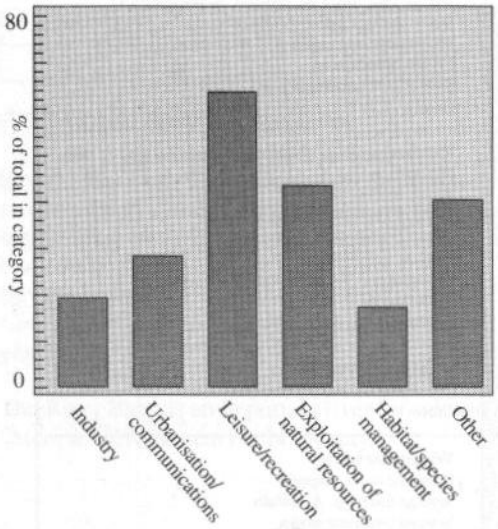
Features of human use

Leisure and recreation is a major feature of the Bann Estuary. There are two marinas on the estuary which are a focus for power-boating, water-skiing, rowing, jet-skiing and sailing; boats are able to sail upstream to Lough Neagh or downstream to the sea. Windsurfing occurs over a small area near Portstewart and occasionally SCUBA diving occurs between the piers at the mouth of the estuary. Bird-watching occurs over most of the estuary. Beach recreation takes place along the beaches on either side of the estuary mouth and this can be intensive in summer; trial-biking occurs on the dunes at Portstewart. There are golf courses to the west of the estuary mouth and at Portstewart, which covers a large area of dunes, and horse-riding takes place on the beaches.

Exploitation of the natural resources includes grazing the saltmarsh, small-scale turf-cutting for horticulture and occasional bait-digging which all occur at Grangemore. Fyke-netting for eels, fixed traps for salmon, lobster and crab-potting all occur and hand-gathering of molluscs is very limited. Very occasionally wildfowlers shoot over the estuary.

There is very little heavy industry on the Bann Estuary. Coleraine Harbour is used for bulk cargo but most cargo now goes to Belfast, and there are two small boat repair centres at Coleraine. Sediment extraction involves maintenance dredging in the main channel and at the mouth of the estuary, and sand is taken from Castlerock and Portstewart by farmers.





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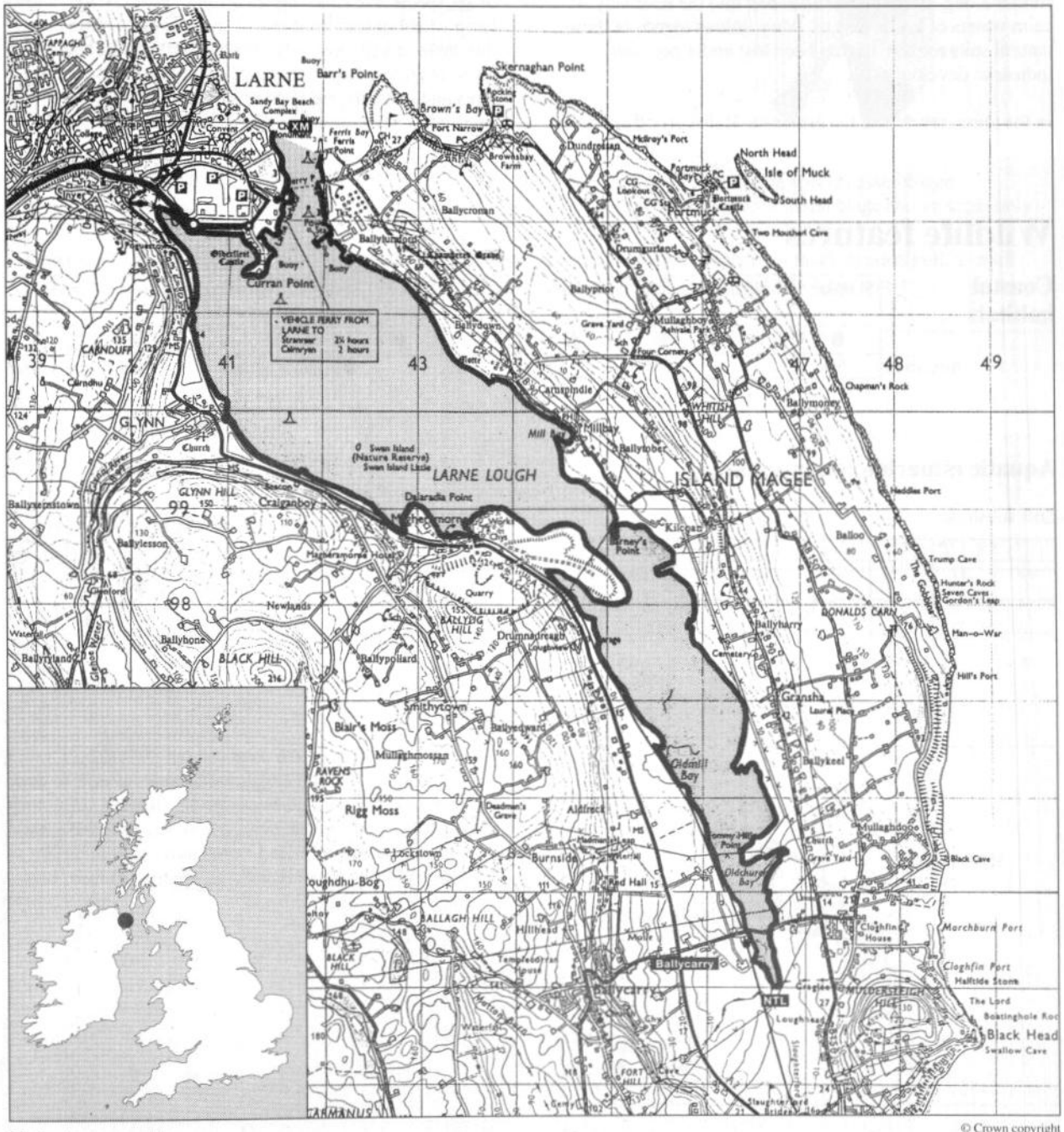
158 Larne Lough

Centre grid: D4300
County: Antrim

Districts: Larne, Carrickfergus

Review site location



XM = Across mouth

NTL = Normal tidal limit

= Core site

Total area (ha)	Intertidal area (ha)	Shore length (km)	Channel length (km)	Tidal range (m)	Geomorph. type	Human population
1,189	393	34.0	11.3	2.4	Coastal plain	18,000

Description

Larne Lough is a sea lough enclosed to the east by the peninsula of Island Magee. Much of the estuary is shallow, having become extensively infilled with sediments of fine muddy sand, and at low water the largest areas of intertidal flats are exposed in the south of the estuary.

The northern parts of the estuary are wider and relatively deep, especially at the mouth where dredging is regularly carried out to maintain the shipping channel to the port of Larne. Previously, a complex spit system existed at the mouth of the estuary, formed where sediments from further along the shore were washed into the relatively calm waters of Larne Lough. Very little evidence of these natural spits remain, having been lost under port and industrial developments.

In the upper reaches of the estuary at Ballycarry there is an area of saltmarsh. As the effects of salinity and differing tidal inundations are not greatly felt at these upper parts of Larne Lough, the saltmarsh zonation patterns are not distinct and the main vegetational interest lies in the transition to non-saltmarsh plant communities. The vegetation is dominated by mid-upper saltmarsh communities and a *Phragmites* reedbed, with some saltmarsh pans.

In recent years Larne Lough has regularly supported an internationally important population of wintering light-bellied brent goose and nationally important populations of six species of wintering waterfowl. Swan Island, a low-lying island of stabilised gravel and stones overlain by a thin layer of soil, regularly supports a colony of breeding terns, including important numbers of Sandwich, common terns and, recently, roseate terns. Blue Circle Island nearby has been recently colonised by common terns.

Wildlife features

Coastal habitats

	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	●	●	●	●		●	●	●	●	
Area (ha)	796	393								

● = major habitat ● = minor habitat

Aquatic estuarine communities

Soft substrate

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
												●			

Hard substrate

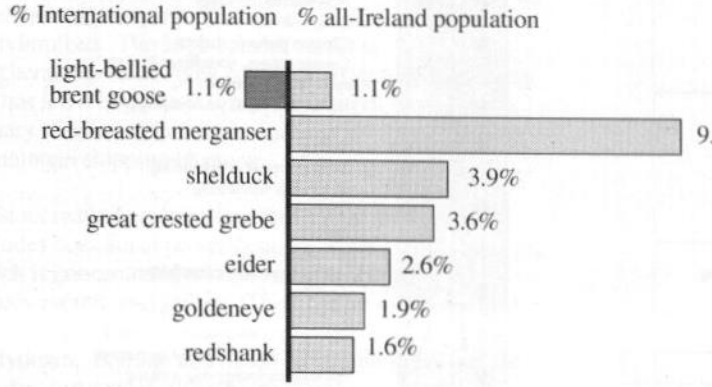
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
		●					●					●				

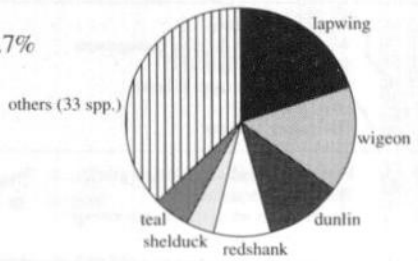
Birds

Wintering birds

1990/91 – 1994/95 data

Total waterfowl: 4,470





Wintering species assemblage
(Spp. forming >5% assemblage shown separately)

Breeding birds: important numbers of Sandwich and common terns, moderate numbers of black-headed gull, a small population of roseate tern and small numbers of herring gull, great black-backed gull and black guillemot breed within the estuary.

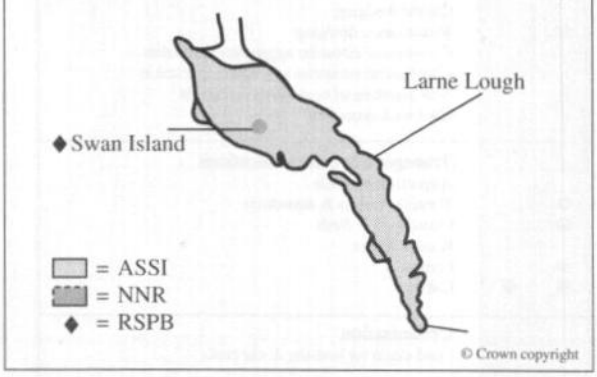
Conservation status

● = designated ● = proposed/meets criteria for

	NNR	ASSI (B)	ASSI (G)	ASSI (M)	ASI	LNR	Ramsar	SPA	SAC	AONB	CWT	RSPB	WWT	NT	HC	Other
	●			●			●	●				●				
No.	1			1			1	1				1				

Larne Lough (398 ha) has been designated as an Area of Special Scientific Interest for its biological and geological interest. Swan Island (0.1 ha) is a National Nature Reserve, a RSPB reserve and has been designated as a Special Protection Area. Larne Lough and Swan Island meet the criteria for classification as a SPA and Ramsar site.

Conservation status



Human activities

Present	Proposed	
		Coast protection & sea defences
●		Linear defences
		Training walls
		Groynes
		Brushwood fences
		Spartina planting
		Marram grass planting
		Barrage schemes
		Weirs & barrages for river management
		Storm surge barrages
		Water storage barrages & bunds
		Leisure barrages
		Tidal power barrages
		Power generation
●		Thermal power stations
●		Import/export jetties (power generation)
		Wind-power generation
		Industrial, port & related development
●		Dock, port & harbour facilities
●		Manufacturing industries
		Chemical industries
●		Ship & boat building/repair
		Others
		Extraction & processing of natural gas & oil
		Exploration
		Production
●	●	Rig & platform construction
●	●	Pipeline construction
		Pipeline installation
		Import/export jetties & single-point moorings
		Oil refineries
		Mothballing of rigs & tankers
		Military activities
●		Overflying by military aircraft
		Others
		Waste discharge
●		Domestic waste disposal
●	●	Sewage discharge & outfalls
	●	Sewage treatment works
●		Rubbish tips
●		Industrial & agricultural waste discharge
		Thermal discharges (power stations)
●		Dredge spoil
		Accidental discharges
		Aerial crop spraying
		Waste incinerators
		Others
		Sediment extraction
●		Capital dredging
		Maintenance dredging
		Commercial estuarine aggregates extraction
		Commercial terrestrial aggregates extraction
		Non-commercial aggregates extraction
		Hard-rock quarrying
		Transport & communications
●		Airports & helipads
●		Tunnels, bridges & aqueducts
		Causeways & fords
●		Road schemes
●	●	Ferries
		Cables
		Urbanisation
		Land-claim for housing & car parks
		Education & scientific research
●		Sampling, specimen collection & observation
●		Nature trails & interpretative facilities
	●	Seismic studies & geological test drilling
●		Marine & terrestrial archaeology
●		Fossil collecting

Present	Proposed	
		Tourism & recreation
		Infrastructure developments
●	●	Marinas
●		Non-marina moorings
●		Dinghy & boat parks
		Caravan parks & chalets
		Leisure centres, complexes & piers
		Aquatic-based recreation
●		Power-boating & water-skiing
		Jet-skiing
●		Sailing
		Sailboarding & wind-surfing
		SCUBA & snorkelling
●		Canoeing
		Surfing
		Rowing
		Tourist boat trips/leisure barges
●		Angling
		Other non-commercial fishing
●		Bathing & general beach recreation
		Terrestrial & intertidal-based recreation
●		Walking, including dog walking
●		Bird-watching
		Sand-yachting
		4WD & trial-biking
		Car sand-racing
		Horse-riding
		Rock-climbing
●		Golf courses
		Clay-pigeon shooting
		Others
		Airborne recreation
		Overflying by light aircraft
		Radio-controlled model aircraft
		Others
		Wildfowling & hunting
●		Wildfowling
●		Other hunting-related activities
		Bait-collecting
●		Digging & pumping for lugworms & ragworms
		Hydraulic dredging for worms
		Others
		Commercial fisheries
●		Fish-netting & trawling
		Fyke-netting for eels
		Fish traps & other fixed devices & nets
●		Crustacea
●		Molluscs – Hand-gathering
		Dredging
		Hydraulic dredging
		Cultivation of living resource
●		Saltmarsh grazing
		Sand dune grazing
		Agricultural land-claim
		Fish-farming
		Shellfish farming
●	●	Bottom & tray cultivation
●	●	Suspended cultivation
		Crustacea farming
		Reeds for roofing
●		*Salicornia* picking
		Others
		Management & killing of birds & mammals
		Killing of mammals
●		Killing of birds
		Adult fish-eating birds
		Adult shellfish-eating birds
●		Gulls
		Geese
		Wildlife habitat management
		Spartina control
		Habitat creation & restoration
		Marine
		Intertidal
●		Terrestrial
●		Habitat management
		Others

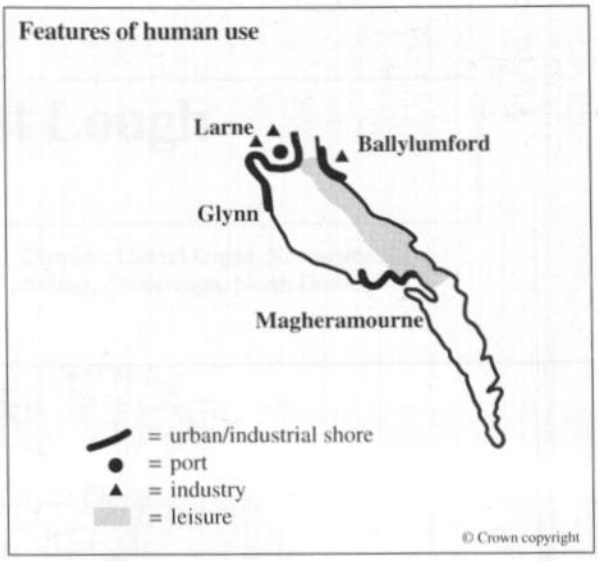
Features of human use

Most activities on the estuary occur around Larne, where industrial activities are concentrated. These include the container port and harbour, a paper mill which discharges into a lagoon adjacent to the estuary, oil storage and a very small boat repair yard. There is an oil power station at Ballylumford. The large cement works at Magheramourne has now ceased quarrying and treatment but has left a large spoil tip on the western shores of the estuary. Sediment extraction includes dredging at Larne to maintain shipping channels.

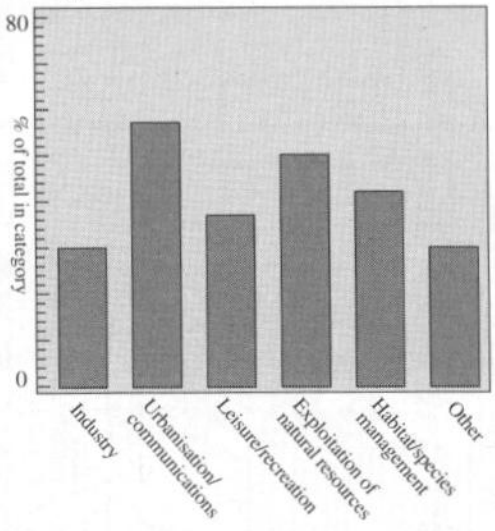
Most recreation occurs along the eastern shore and includes occasional power-boating, water-skiing, canoeing which is concentrated around Larne and outside the estuary mouth, and sailing. There are no marinas within the estuary but there are moorings at Larne and at Ballydown. Bathing and beach recreation occurs on the beaches just outside the estuary mouth.

Exploitation of the natural resources includes grazing the saltmarsh, lobster-potting around Ballylumford and Magheramourne, winkle-picking and occasional bait-digging at Glynn. Wildfowling also occurs over Larne Lough but there is an agreed refuge area in the extreme south of the estuary.

In 1993 there were proposals for a new sewage treatment works at Larne, for a submarine power cable to come into Brown's Bay and Ferris Bay just outside the estuary mouth, and there have been occasional proposals for road schemes across the spoil tip at Magheramourne. In 1995 there was a proposal for a major waste disposal area within the old quarry at Magheramourne. By 1996 the submarine power cable had been laid and a gas pipeline from Scotland had been laid. The pipeline comes ashore at Castlerobin on the outer shore of Island Magee and crosses the north of Island Magee, to a pressure reduction station beside the Ballylumford Power Station. In 1996 there was a proposal to extend the existing shellfish farming and two proposals to begin shellfish farming anew.



Categories of human use



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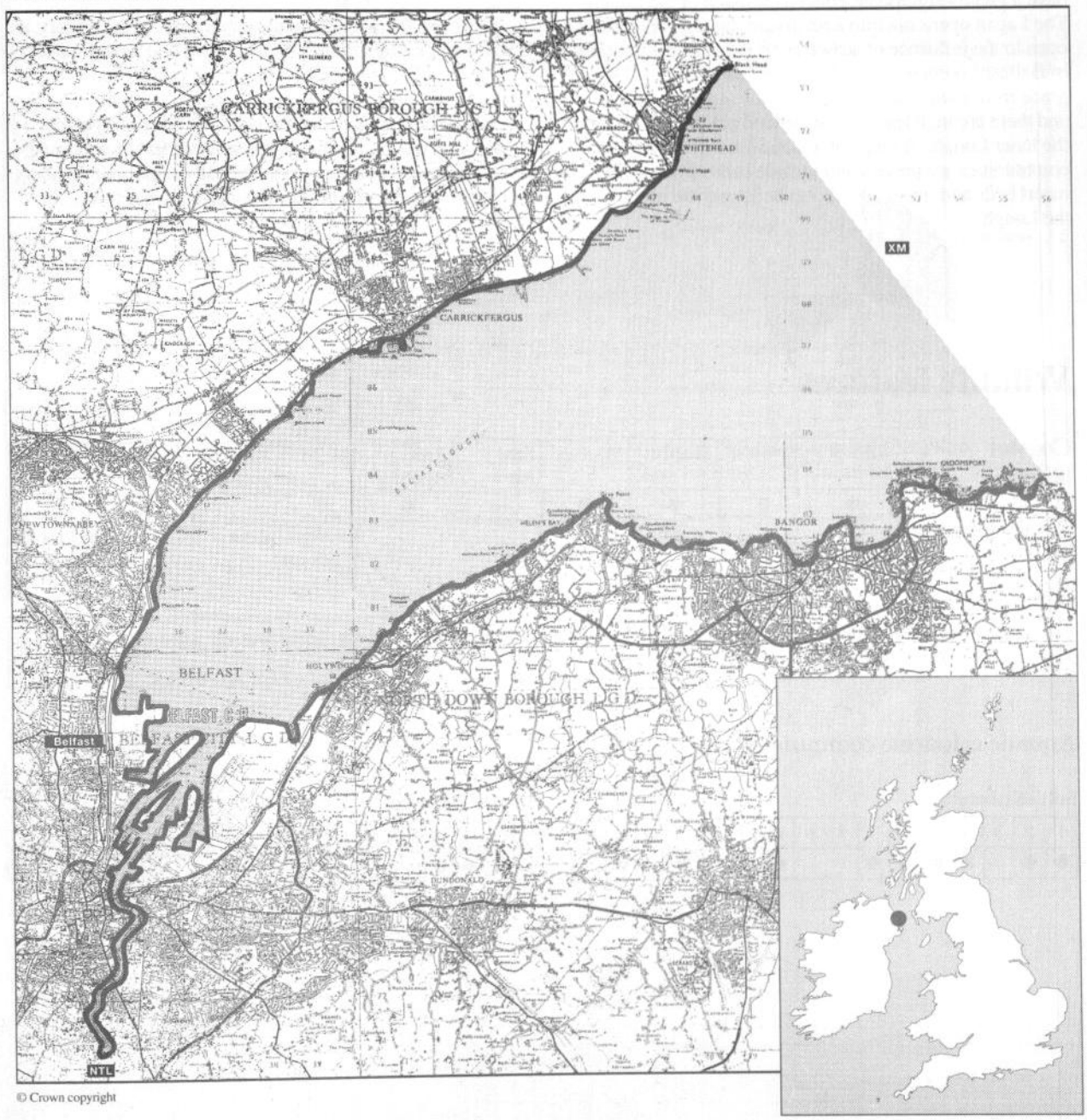
159 Belfast Lough

Centre grid: J3982
Counties: Antrim, Down

Districts: Carrickfergus, Newtownabbey, Belfast, Castlereagh, North Down

Review site location



Total area (ha)	Intertidal area (ha)	Shore length (km)	Channel length (km)	Tidal range (m)	Geomorph. type	Human population
13,480	554	100.0	28.4	2.9	Coastal plain	425,000

XM = Across mouth

NTL = Normal tidal limit

= Core site

Description

Historically, Belfast Lough has been substantially altered by the growth of the city of Belfast and the development of its extensive dock system and associated industries. This has occurred mainly in the last 150 years and has caused the loss of large areas of estuarine intertidal flats through land-claim. Parts of the inner Lough have been impacted by gross pollution.

The freshwater inflow from the River Lagan does not have a greatly significant effect over much of the Lough. The Lagan opens out into a relatively sheltered inlet that is open to the influence of seawater. A very large proportion of Belfast Lough is subtidal. Sediments within the Lough grade from mud or heavily silted gravel to clean sands, and there are high levels of suspended matter in parts of the inner Lough. A range of aquatic estuarine communities are present and include beds of brittlestars, maerl beds and mussel *Modiolus* beds near the mouth of the Lough.

The largest remaining areas of intertidal flats within Belfast Lough occur in its uppermost parts, where they are predominantly muddy. The outer shores of the Lough are more exposed and very rocky, with small beaches of sand and shingle in the more sheltered bays between headlands and outcrops. There are no substantial areas of saltmarsh within the Lough but saltmarsh and strandline vegetation occur along parts of more sheltered shores of the outer Lough.

The intertidal mudflats in the upper parts of the estuary are used as feeding grounds by waterfowl and a man-made lagoon adjacent to the Lough is an important roost for wildfowl and waders. Belfast Lough is a site of international importance for waterfowl, for it regularly supports internationally important numbers of wintering redshank and turnstone and nationally important numbers of a further fifteen species of wintering waterfowl.

Wildlife features

Coastal habitats

	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	●	◍	◍	●		●	◍		◍	
Area (ha)	12,926	554								

● = major habitat ◍ = minor habitat

Aquatic estuarine communities

Soft substrate

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
●	●		●	●	●	●			●	●		●		●	

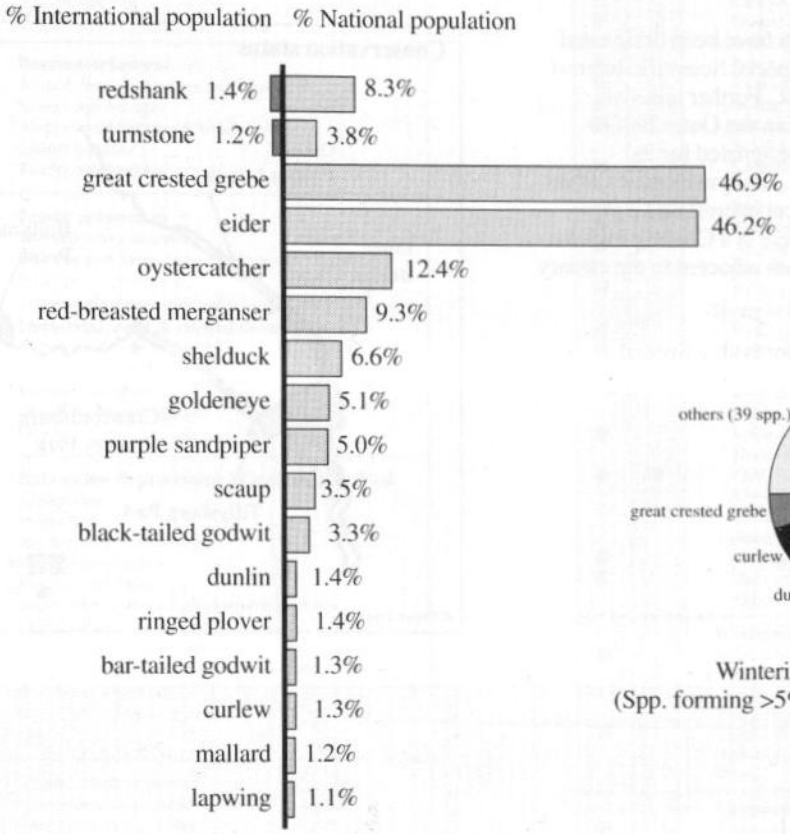
Hard substrate

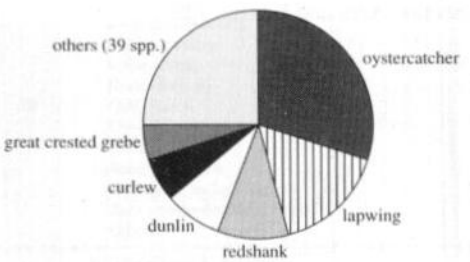
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
●	●	●										●				

Birds

Wintering birds 1990/91 – 1994/95 data

Total waterfowl: 21,200





Wintering species assemblage
(Spp. forming >5% assemblage shown separately)

Breeding birds: important numbers of Sandwich and common terns, moderate numbers of black-headed gull, a small population of roseate tern and small numbers of herring gull, great black-backed gull and black guillemot breed within the estuary.

Additional wildlife features

A small group of common seals that breed just outside the mouth of Belfast Lough feed within the outer parts of the estuary. Grey seals also use the outer parts of the Lough.

Conservation status

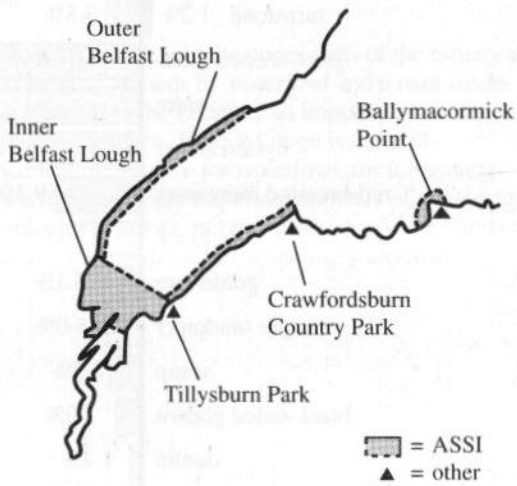
● = designated ● = proposed/meets criteria for

	NNR	ASSI (B)	ASSI (G)	ASSI (M)	ASI	LNR	Ramsar	SPA	SAC	AONB	CWT	RSPB	WWT	NT	HC	Other
		●		●			●	●						●		●
No.		2		1			1	1						1		2

The innermost parts of the estuary have been designated as Inner Belfast Lough Area of Special Scientific Interest (240 ha), for its biological interest. Further areas of intertidal land and islands lie within the Outer Belfast Lough ASSI (229 ha), which is designated for its biological and geological interest. Ballymacormick Point (39 ha) is an ASSI for its biological interest and it is owned by the National Trust. There is a Country Park at Crawfordsburn and Tillysburn Park adjacent to the estuary is an Urban Nature Reserve.

Belfast Lough meets the criteria for both a Special Protection Area and Ramsar site.

Conservation status



The marina at Bangor, on the outer reaches of the Belfast Lough. (Nick Davidson)

Human activities

Present	Proposed	
		Coast protection & sea defences
●		Linear defences
		Training walls
●		Groynes
		Brushwood fences
		Spartina planting
		Marram grass planting
		Barrage schemes
●		Weirs & barrages for river management
		Storm surge barrages
		Water storage barrages & bunds
		Leisure barrages
		Tidal power barrages
		Power generation
●		Thermal power stations
●	●	Import/export jetties (power generation)
		Wind-power generation
		Industrial, port & related development
●	●	Dock, port & harbour facilities
●		Manufacturing industries
●		Chemical industries
●		Ship & boat building/repair
		Others
		Extraction & processing of natural gas & oil
		Exploration
		Production
	●	Rig & platform construction
		Pipeline construction
●		Pipeline installation
●		Import/export jetties & single-point moorings
●		Oil refineries
		Mothballing of rigs & tankers
		Military activities
●		Overflying by military aircraft
		Others
		Waste discharge
●		Domestic waste disposal
●		Sewage discharge & outfalls
●	●	Sewage treatment works
●		Rubbish tips
●		Industrial & agricultural waste discharge
●		Thermal discharges (power stations)
●		Dredge spoil
●		Accidental discharges
		Aerial crop spraying
	●	Waste incinerators
		Others
		Sediment extraction
●		Capital dredging
●		Maintenance dredging
		Commercial estuarine aggregates extraction
		Commercial terrestrial aggregates extraction
		Non-commercial aggregates extraction
		Hard-rock quarrying
		Transport & communications
●		Airports & helipads
●		Tunnels, bridges & aqueducts
		Causeways & fords
●	●	Road schemes
●		Ferries
●		Cables
		Urbanisation
●		Land-claim for housing & car parks
		Education & scientific research
●		Sampling, specimen collection & observation
●		Nature trails & interpretative facilities
		Seismic studies & geological test drilling
		Marine & terrestrial archaeology
		Fossil collecting

Present	Proposed	
		Tourism & recreation
		Infrastructure developments
●		Marinas
●		Non-marina moorings
●		Dinghy & boat parks
●		Caravan parks & chalets
●		Leisure centres, complexes & piers
		Aquatic-based recreation
●		Power-boating & water-skiing
●		Jet-skiing
●		Sailing
●		Sailboarding & wind-surfing
		SCUBA & snorkelling
●		Canoeing
		Surfing
●		Rowing
●		Tourist boat trips/leisure barges
●		Angling
		Other non-commercial fishing
●		Bathing & general beach recreation
		Terrestrial & intertidal-based recreation
●		Walking, including dog walking
●		Bird-watching
		Sand-yachting
		4WD & trial-biking
		Car sand-racing
●		Horse-riding
		Rock-climbing
●	●	Golf courses
		Clay-pigeon shooting
		Others
		Airborne recreation
●		Overflying by light aircraft
●		Radio-controlled model aircraft
		Others
		Wildfowling & hunting
●		Wildfowling
		Other hunting-related activities
		Bait-collecting
●		Digging & pumping for lugworms & ragworms
		Hydraulic dredging for worms
		Others
		Commercial fisheries
●		Fish-netting & trawling
		Fyke-netting for eels
●		Fish traps & other fixed devices & nets
		Crustacea
●		Molluscs – Hand-gathering
●		Dredging
		Hydraulic dredging
		Cultivation of living resource
●		Saltmarsh grazing
		Sand dune grazing
		Agricultural land-claim
		Fish-farming
		Shellfish farming
●		Bottom & tray cultivation
		Suspended cultivation
		Crustacea farming
		Reeds for roofing
		Salicornia picking
		Others
		Management & killing of birds & mammals
		Killing of mammals
		Killing of birds
		Adult fish-eating birds
		Adult shellfish-eating birds
		Gulls
		Geese
		Wildlife habitat management
		Spartina control
		Habitat creation & restoration
		Marine
●	●	Intertidal
	●	Terrestrial
	●	Habitat management
		Others

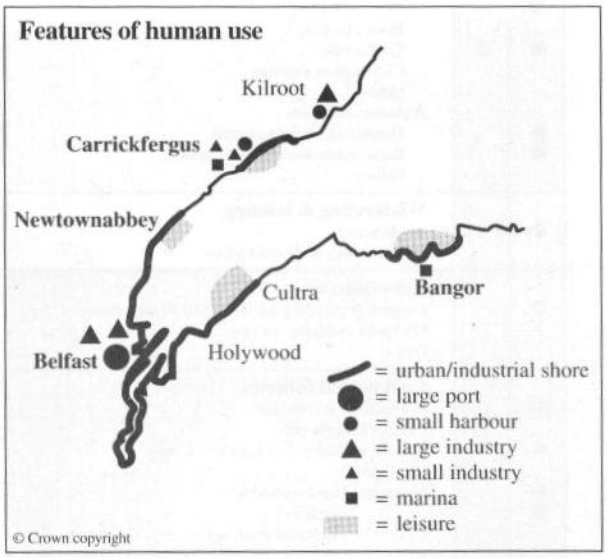
Features of human use

The Lough is dominated by the industrial and urban shores of Belfast, and has been subject to considerable land-claim in the past. The innermost parts of the Lough are dominated by the port of Belfast and its large shipbuilding and aeroplane industry, together with a power station, many small businesses and light engineering works. The harbour is dredged regularly to maintain shipping channels. There are further industries around the Lough which include a jetty and oil storage facility at Kilroot that service the power station there; an engineering works and chemical works at Jointure Bay; and a light industrial estate and boatbuilding/repair yards at Carrickfergus.

Recreation occurs over relatively small areas of Belfast Lough. There are several yacht clubs which are a basis for sailing throughout the Lough, particularly around Carrickfergus where there is a marina, and around Newtownabbey and Holywood. There is also a marina at Bangor. Other aquatic sports include windsurfing, water-skiing, jet-skiing and canoeing which occur mainly at Carrickfergus and Cultra. Rowing occurs in the upper reaches of the Lagan although a recently constructed tidal barrage has reduced the tidal influence up the river.

Exploitation of natural resources within the Lough includes mussel collecting along the northern shores and at Cultra; bait-digging, and wildfowling which occurs over small areas within the Lough. Dredging for mussels occurs within the Lough.

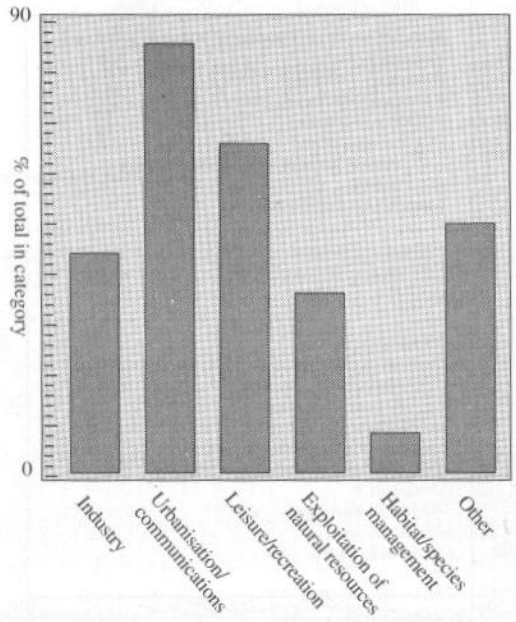
In 1993 there were proposals to upgrade an existing sewage treatment works and for a new road. Since 1995 there have been proposals to extend the airport facilities and in 1996 the upgrade of the sewage treatment works was almost complete.

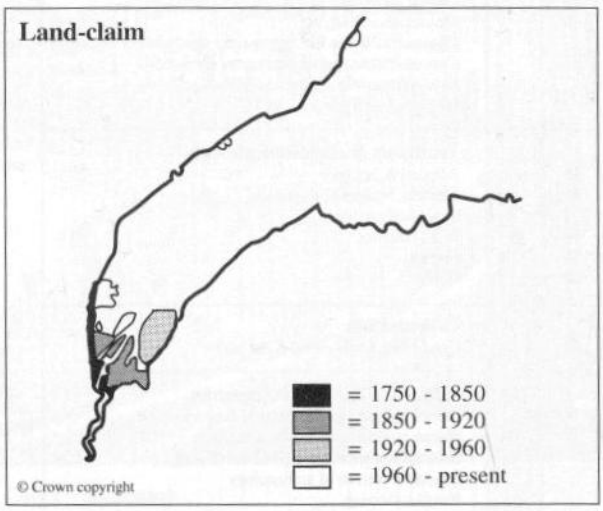


Land-claim

During the last 150 years large areas of Belfast Lough have undergone successive land-claim, which has greatly reduced the total area of intertidal flats within the Lough. Over 1,100 ha of former estuarine intertidal area have been claimed since 1750. The largest areas were lost between 1850 and 1960, mainly for industrial and port development. Land-claim is continuing in the Lough, for small areas around Carrickfergus and Cloghan Point have been been lost recently and an area of former intertidal flat is presently used as a landfill site.

Categories of human use





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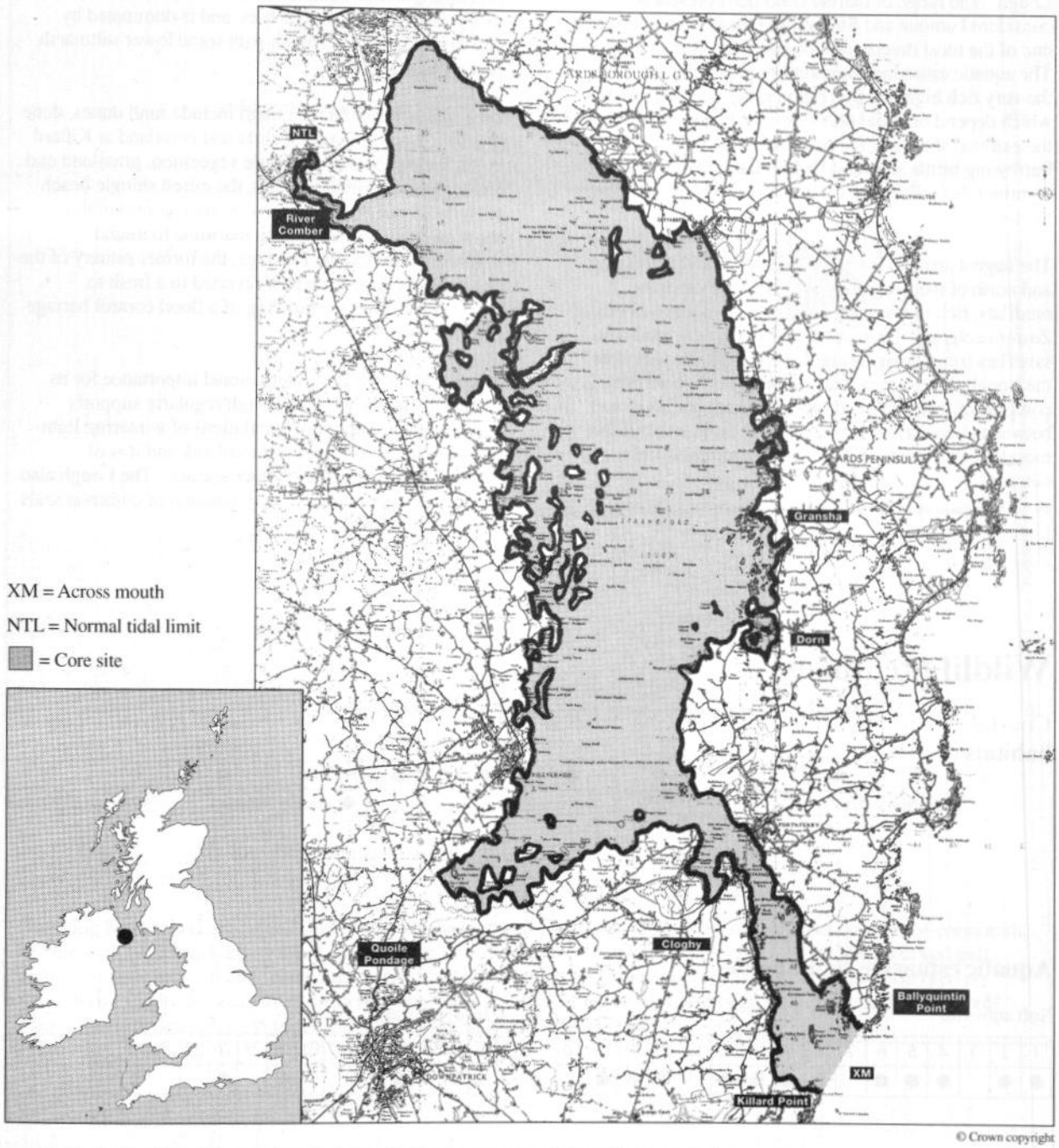
160 Strangford Lough

Centre grid: J5660
County: Down

Districts: Ards, Down

Review site location



XM = Across mouth

NTL = Normal tidal limit

= Core site

Total area (ha)	Intertidal area (ha)	Shore length (km)	Channel length (km)	Tidal range (m)	Geomorph. type	Human population
14,513	3,930	242.7	35.8	3.2	Complex	39,000

Description

Strangford Lough is a large, enclosed sea lough separated from the Irish Sea by the Ards peninsula. Seawater enters the Lough through a narrow entrance into a broad, mostly shallow basin (< 10m), with a central deeper channel (30-60 metres deep) carrying rapid currents and causing great turbulence in some parts, particularly the Narrows.

With a wide range of tidal stream strengths and depths there is an outstanding marine fauna within Strangford Lough. The range of marine conditions present is considered unique and Strangford Lough is recognised as one of the most diverse sea loughs in the British Isles. The aquatic estuarine communities present range from the very rich high-energy communities near the mouth which depend on rapid tidal currents, to communities in the extreme shelter of the fine muds that support burrowing brittle stars and Dublin Bay prawns, and communities influenced by freshwater where rivers enter the loch.

The largest areas of intertidal flats are found in the west and north of the Lough. Here there are extensive mudflats, rich in invertebrates and with extensive beds of *Zostera* eelgrass. Narrow bands of intertidal mud- and sandflats fringe many of the west and eastern shores of the Lough, for example at Cloghy Rocks, where there is a complex of intertidal mudflats and rocky outcrops, and between Gransha and Dorn, where there is an extensive mosaic of soft mud, pladdies (relict drumlins) and rocky outcrops.

Much of Strangford Lough is fringed with a narrow strip of saltmarsh, for the highly indented coastline has a multitude of creeks and bays suitable for saltmarsh development. The most extensive saltmarshes occur around the Comber Estuary, which supports a range of saltmarsh communities that show the zonation from lower saltmarsh vegetation through to *Phragmites* reedbeds, and at Gransha Point and the Dorn where there is a wide variety of saltmarsh communities. At Ballyquintin Point saltmarsh lies within a mosaic of rocky outcrops and shingle bars, and is dominated by mid-upper marsh vegetation with some lower saltmarsh communities.

Other habitats within the Lough include sand dunes, dune grassland, maritime heath, cliffs and grassland at Killard Point; the patchwork of shingle vegetation, grassland and coastal heath at Gransha Point; the raised shingle beach of Ballyquintin Point whose vegetation communities show an intact transition from maritime to inland vegetation; and Quoile Pondage, the former estuary of the Quoile River which has now reverted to a fresh to brackish lake after the building of a flood control barrage in 1957.

Strangford Lough is of international importance for its wintering waterfowl. The Lough regularly supports internationally important populations of wintering light-bellied brent goose, knot and redshank and it is of national importance for 22 other species. The Lough also supports the largest breeding population of common seals in Northern Ireland.

Wildlife features

Coastal habitats

	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	●	●	●	●	●	●	◉	●	◉	◉
Area (ha)	10,583	3,930								

● = major habitat ◉ = minor habitat

Aquatic estuarine communities

Soft substrate

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
●	●		●	●	●		●	●	●	●		●	●	●	

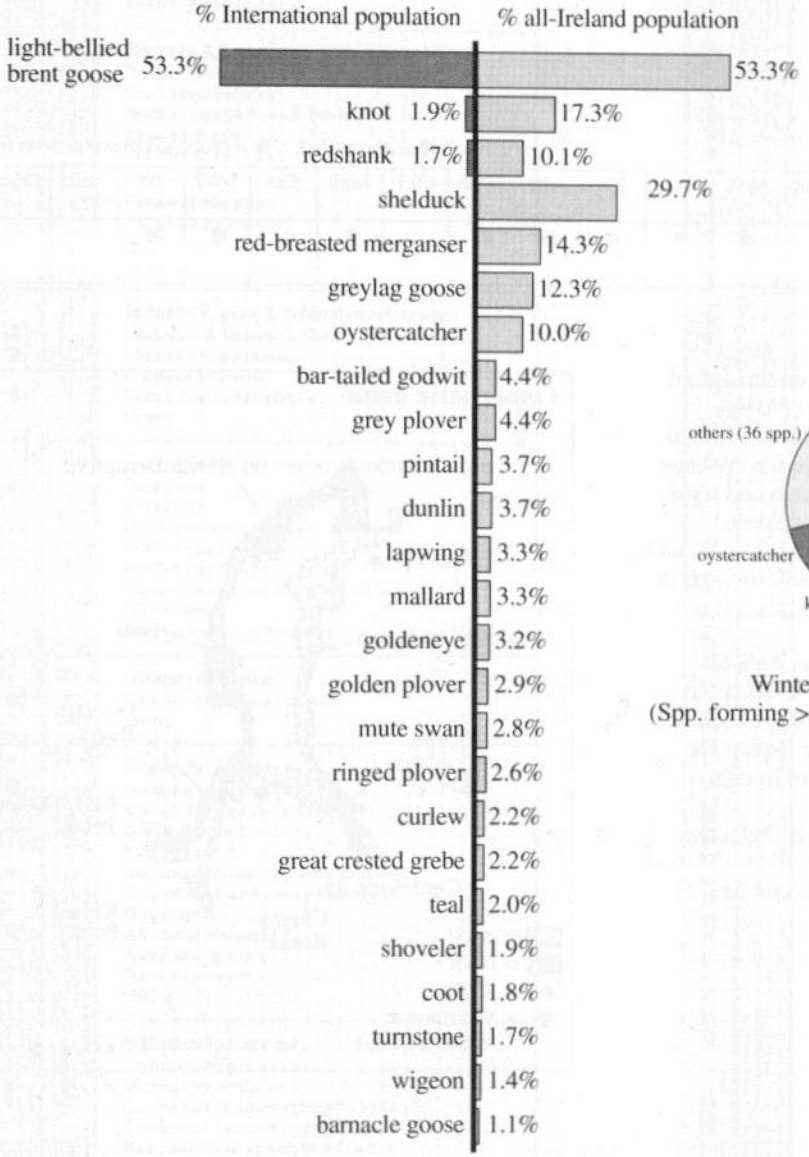
Hard substrate

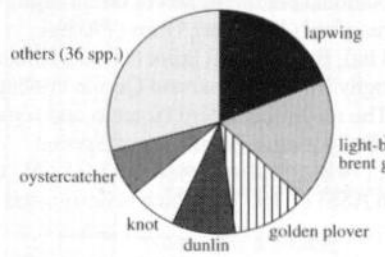
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
	●	●	●				●		●			●				

Birds

Wintering birds 1990/91 – 1994/95 data

Total waterfowl: 57,200





Wintering species assemblage
(Spp. forming >5% assemblage shown separately)

Breeding birds: there are large colonies of black-headed gull and Sandwich tern, moderate sized colonies of cormorant, herring gull, great black-backed gull and common tern and small colonies of common gull, lesser black-backed gull, arctic tern and black guillemot breeding within Strangford Lough. Small numbers of roseate tern have also bred on Strangford Lough. Ringed plover, oystercatcher, small numbers of redshank and grey plover, mallard, shelduck, red-breasted merganser, eider and tufted duck are known to breed within the Lough.

Additional wildlife features

The Red Data Book plant green-winged orchid *Orchis morio* grows adjacent to the Lough.

Strangford Lough supports the largest population of common seals in Northern Ireland (around 20% of the Irish population), together with a small population of grey seals in the outer parts of the estuary. Otters are also present on Strangford Lough. Common porpoises are frequently seen within the Lough.

Conservation status

● = designated ● = proposed/meets criteria for

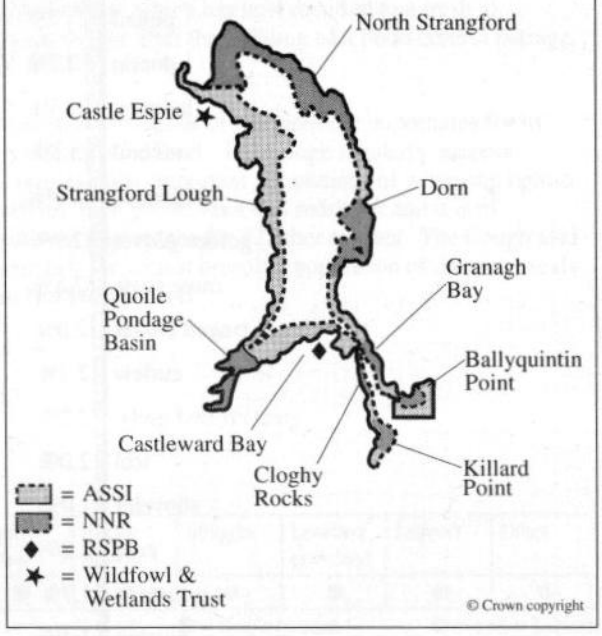
	NNR	ASSI (B)	ASSI (G)	ASSI (M)	ASI	LNR	MNR	Ramsar	SPA	SAC	AONB	CWT	RSPB	ESA	WWT	NT	HC	Other
	●			●			●	●	●	●	●		●		●	●		
No.	7			5			1	1	1	1	1		1		1	1		

There are seven National Nature Reserves on Strangford Lough: North Strangford (1,015 ha), Dorn (790 ha), Granagh Bay (24 ha), Ballyquintin Point (16 ha), Killard Point (68 ha), Cloghy Rocks (27 ha) and Quoile Pondage Basin (195 ha). The remaining intertidal areas and some islands lie within Ballyquintin Point Area of Special Scientific Interest (74 ha), Killard Point ASSI (112 ha) and Strangford Lough ASSI (4,100 ha) which is designated in three parts.

Strangford Lough has been designated as an Area of Outstanding Natural Beauty, the RSPB has a reserve at Castleward Bay and the Wildfowl and Wetlands Trust has a reserve and interpretation centre at Castle Espie. The National Trust own large areas of Strangford Lough.

Strangford Lough qualifies as both a Special Protection Area and Ramsar site and has been designated as a Marine Nature Reserve. It is also proposed as a Special Area of Conservation.

Conservation status



Human activities

Present	Proposed	
●		**Coast protection & sea defences** Linear defences Training walls Groynes Brushwood fences *Spartina* planting Marram grass planting
●		**Barrage schemes** Weirs & barrages for river management Storm surge barrages Water storage barrages & bunds Leisure barrages Tidal power barrages
		Power generation Thermal power stations Import/export jetties (power generation) Wind-power generation
● ● ●		**Industrial, port & related development** Dock, port & harbour facilities Manufacturing industries Chemical industries Ship & boat building/repair Others
		Extraction & processing of natural gas & oil Exploration Production Rig & platform construction Pipeline construction Pipeline installation Import/export jetties & single-point moorings Oil refineries Mothballing of rigs & tankers
●		**Military activities** Overflying by military aircraft Others
● ● ● ● ●	●	**Waste discharge** Domestic waste disposal Sewage discharge & outfalls Sewage treatment works Rubbish tips Industrial & agricultural waste discharge Thermal discharges (power stations) Dredge spoil Accidental discharges Aerial crop spraying Waste incinerators Others
●	● ●	**Sediment extraction** Capital dredging Maintenance dredging Commercial estuarine aggregates extraction Commercial terrestrial aggregates extraction Non-commercial aggregates extraction Hard-rock quarrying
● ● ●	●	**Transport & communications** Airports & helipads Tunnels, bridges & aqueducts Causeways & fords Road schemes Ferries Cables
●		**Urbanisation** Land-claim for housing & car parks
● ● ●	● ●	**Education & scientific research** Sampling, specimen collection & observation Nature trails & interpretative facilities Seismic studies & geological test drilling Marine & terrestrial archaeology Fossil collecting

Present	Proposed	
	●	**Tourism & recreation** Infrastructure developments Marinas
● ● ●		Non-marina moorings Dinghy & boat parks
	●	Caravan parks & chalets Leisure centres, complexes & piers
		Aquatic-based recreation
●		Power-boating & water-skiing
●		Jet-skiing
●		Sailing
●		Sailboarding & wind-surfing
●		SCUBA & snorkelling
●		Canoeing
		Surfing
		Rowing
●		Tourist boat trips/leisure barges
●		Angling
●		Other non-commercial fishing
●		Bathing & general beach recreation
		Terrestrial & intertidal-based recreation
●		Walking, including dog walking
●		Bird-watching
		Sand-yachting
●		4WD & trial-biking
		Car sand-racing
●		Horse-riding
		Rock-climbing
●		Golf courses
		Clay-pigeon shooting
		Others
		Airborne recreation
●		Overflying by light aircraft
		Radio-controlled model aircraft
		Others
● ●		**Wildfowling & hunting** Wildfowling Other hunting-related activities
●		**Bait-collecting** Digging & pumping for lugworms & ragworms Hydraulic dredging for worms Others
● ● ● ● ● ●		**Commercial fisheries** Fish-netting & trawling Fyke-netting for eels Fish traps & other fixed devices & nets Crustacea Molluscs – Hand-gathering Dredging Hydraulic dredging
● ● ●		**Cultivation of living resource** Saltmarsh grazing Sand dune grazing Agricultural land-claim Fish-farming Shellfish farming
● ●		Bottom & tray cultivation Suspended cultivation
		Crustacea farming Reeds for roofing *Salicornia* picking
●		Others
● ●		**Management & killing of birds & mammals** Killing of mammals Killing of birds Adult fish-eating birds Adult shellfish-eating birds
●		Gulls Geese
●	●	**Wildlife habitat management** *Spartina* control Habitat creation & restoration
	● ●	Marine Intertidal
● ●		Terrestrial Habitat management
		Others

Features of human use

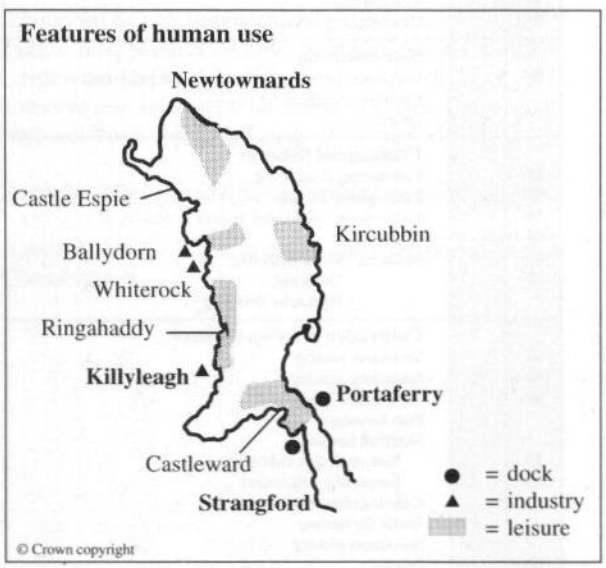
A number of recreational pursuits occur within Strangford Lough. Sailing is the most widespread and there are a number of sailing and yacht clubs which are focal points. The main areas used are around Newtownards, Kircubbin, Portaferry/Strangford, Whiterock, Quoile, Killyleagh and Ballydorn; there are moorings in most of these areas. Windsurfing occurs over only small areas near Newtownards, Kircubbin, Whiterock and Ringahaddy, jet-skiing also occurs near Ringahaddy and Ballydorn, water-skiing occurs near Whiterock, Portaferry and Strangford and most SCUBA diving and snorkelling occurs in the bays north of Portaferry. There is little land-based recreation around the Lough. Walking occurs at Portaferry and Castleward, bird-watching is widespread and horse-riding occurs over Kircubbin Bay, Castle Espie and Newtownards.

Exploitation of the natural resource is a feature of the Lough and includes trawling, dredging, potting for lobsters, prawns and crabs, and shellfish collection which occurs predominantly in the north of the site. Cultivation of Pacific oysters and manilla clams is also undertaken. There are five wildfowling clubs which shoot over parts of the Lough. The Strangford Lough Wildlife Scheme is administered by the National Trust, who have a covenant with the British Association for Shooting and Conservation regarding wildlife management. Under the scheme there are agreed wildfowling refuge areas around the Lough.

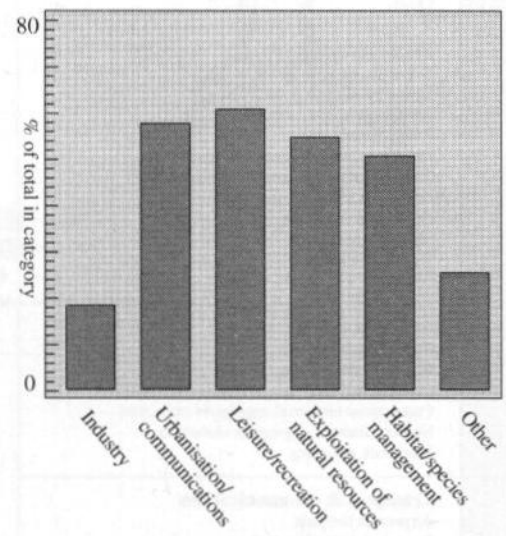
Apart from the construction of the Quoile barrage for flood prevention, Strangford Lough has undergone very little urbanisation or industrial development. The only industrial activities present on the Lough today are the docking berths for the ferry that runs between Strangford and Portaferry, and boatbuilding/repair yards at Ballydorn, Whiterock and Killyleagh.

The Strangford Lough Management Committee (SLMC), which represents the major user-groups of the Lough was set up in 1992 to advise on the management of the Lough.

In 1995 there were proposals for a new sewage treatment works adjacent to the Lough. An earlier proposal for a tidal barrage at the Narrows had been rejected on ecological grounds.



Categories of human use



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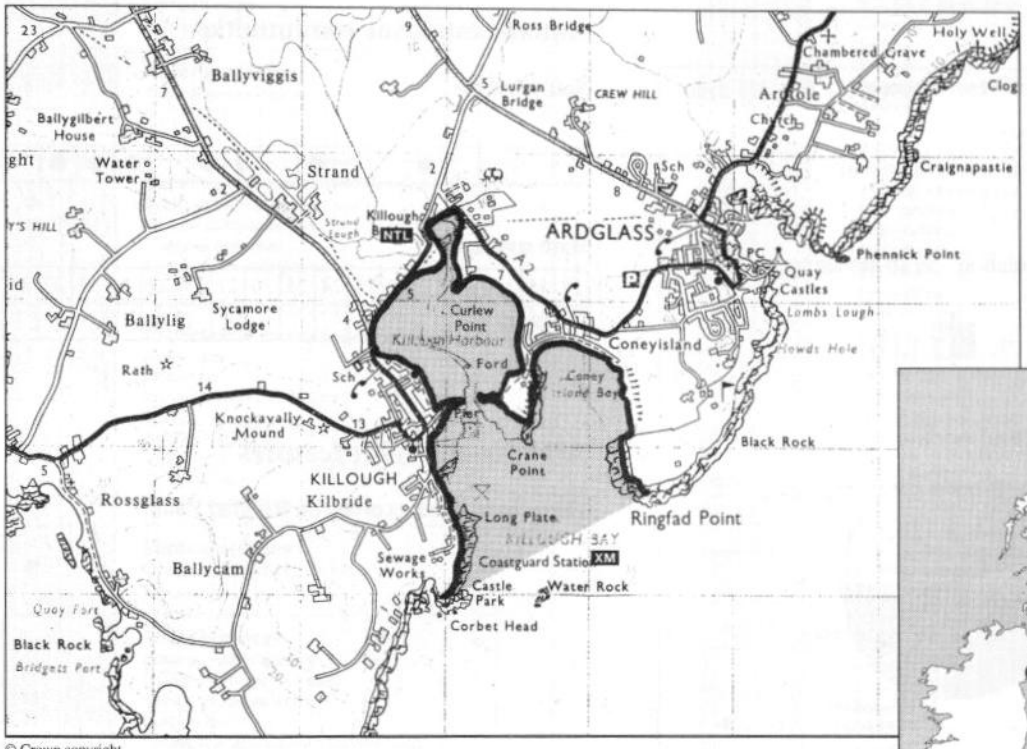
161 Killough Harbour

Centre grid: J5436
County: Down

District: Down

Review site location



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Total area (ha)	Intertidal area (ha)	Shore length (km)	Channel length (km)	Tidal range (m)	Geomorph. type	Human population
213	106	8.5	2.7	4.6	Embayment	2,500

XM = Across mouth

NTL = Normal tidal limit

= Core site

Description

This small estuary lies on the south coast of County Down in the shelter of St John's Point and Ringfad Point. The estuary is very silted and at low water an extensive area of intertidal mudflats is exposed in the innermost harbour and along the shore of Coney Island Bay. The eelgrass *Zostera* spp. is present on the tidal flats.

A habitat of note is the extensive reedbed to the west of the uppermost parts of the estuary. There are also rocky intertidal shores along the outermost parts of the Killough Bay.

Killough Harbour regularly supports a varied assemblage of wintering waterfowl which includes internationally important numbers of light-bellied brent geese.

Wildlife features

Coastal habitats

	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	●	◉	●	●		◉		●	◉	
Area (ha)	107	106								

● = major habitat ◉ = minor habitat

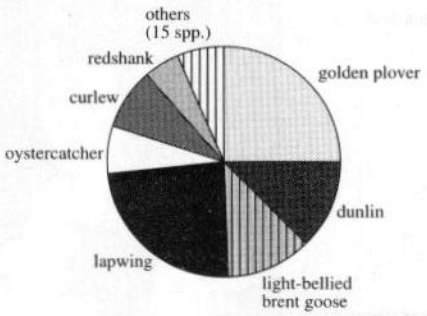
Birds

Wintering birds 1990/91 – 1994/95 data

Total waterfowl: 2,290

% International population % all-Ireland population

light-bellied brent goose 1.1% 1.1%



Wintering species assemblage
(Spp. forming >5% assemblage shown separately)

Aquatic estuarine communities

Soft substrate

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
				●			●		●	●		●	●	●	

Hard substrate

17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
	●	●										●				

Additional wildlife features

Otters have been recorded on Ringfad Point.

Conservation status

● = designated ◉ = proposed/meets criteria for

	NNR	ASSI (B)	ASSI (G)	ASSI (M)	ASI	LNR	Ramsar	SPA	SAC	AONB	CWT	RSPB	ESA	WWT	NT	HC	Other
							◉	◉									
No.							1	1									

At present there are no statutory conservation designations on Killough Harbour. However, Killough Harbour and Coney Island Bay meet the criteria as a Ramsar site and a Special Protection Area.

Human activities

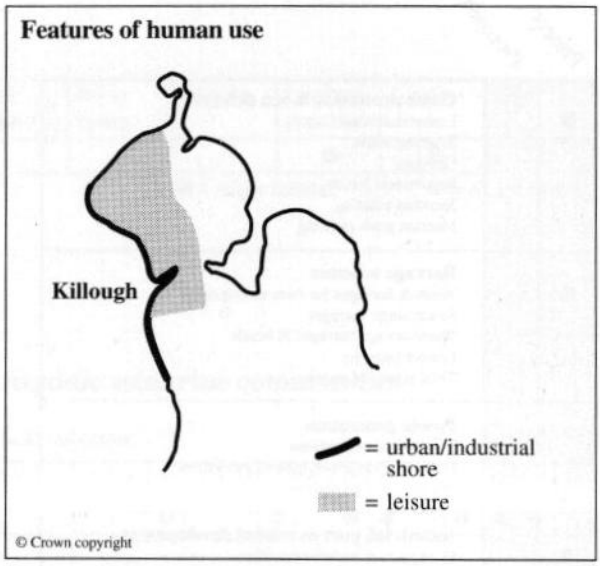
Present	Proposed	
		Coast protection & sea defences
●		Linear defences
		Training walls
		Groynes
		Brushwood fences
		Spartina planting
		Marram grass planting
		Barrage schemes
●		Weirs & barrages for river management
		Storm surge barrages
		Water storage barrages & bunds
		Leisure barrages
		Tidal power barrages
		Power generation
		Thermal power stations
		Import/export jetties (power generation)
		Wind-power generation
		Industrial, port & related development
●		Dock, port & harbour facilities
		Manufacturing industries
		Chemical industries
		Ship & boat building/repair
		Others
		Extraction & processing of natural gas & oil
		Exploration
		Production
		Rig & platform construction
		Pipeline construction
		Pipeline installation
		Import/export jetties & single-point moorings
		Oil refineries
		Mothballing of rigs & tankers
		Military activities
●		Overflying by military aircraft
		Others
		Waste discharge
●		Domestic waste disposal
●		Sewage discharge & outfalls
		Sewage treatment works
		Rubbish tips
		Industrial & agricultural waste discharge
		Thermal discharges (power stations)
	●	Dredge spoil
		Accidental discharges
		Aerial crop spraying
		Waste incinerators
		Others
		Sediment extraction
	●	Capital dredging
	●	Maintenance dredging
		Commercial estuarine aggregates extraction
		Commercial terrestrial aggregates extraction
		Non-commercial aggregates extraction
		Hard-rock quarrying
		Transport & communications
		Airports & helipads
		Tunnels, bridges & aqueducts
●		Causeways & fords
		Road schemes
		Ferries
		Cables
		Urbanisation
	●	Land-claim for housing & car parks
		Education & scientific research
●	●	Sampling, specimen collection & observation
		Nature trails & interpretative facilities
		Seismic studies & geological test drilling
		Marine & terrestrial archaeology
		Fossil collecting

Present	Proposed	
		Tourism & recreation
		Infrastructure developments
	●	Marinas
●		Non-marina moorings
	●	Dinghy & boat parks
		Caravan parks & chalets
●		Leisure centres, complexes & piers
		Aquatic-based recreation
●		Power-boating & water-skiing
●		Jet-skiing
●		Sailing
		Sailboarding & wind-surfing
		SCUBA & snorkelling
		Canoeing
		Surfing
		Rowing
		Tourist boat trips/leisure barges
		Angling
		Other non-commercial fishing
		Bathing & general beach recreation
		Terrestrial & intertidal-based recreation
●		Walking, including dog walking
●		Bird-watching
		Sand-yachting
		4WD & trial-biking
		Car sand-racing
		Horse-riding
		Rock-climbing
		Golf courses
		Clay-pigeon shooting
		Others
		Airborne recreation
		Overflying by light aircraft
		Radio-controlled model aircraft
		Others
		Wildfowling & hunting
		Wildfowling
		Other hunting-related activities
		Bait-collecting
●		Digging & pumping for lugworms & ragworms
		Hydraulic dredging for worms
●		Others
		Commercial fisheries
		Fish-netting & trawling
		Fyke-netting for eels
●		Fish traps & other fixed devices & nets
		Crustacea
		Molluscs – Hand-gathering
		Dredging
		Hydraulic dredging
		Cultivation of living resource
		Saltmarsh grazing
		Sand dune grazing
		Agricultural land-claim
		Fish-farming
		Shellfish farming
		Bottom & tray cultivation
		Suspended cultivation
		Crustacea farming
		Reeds for roofing
		Salicornia picking
		Others
		Management & killing of birds & mammals
		Killing of mammals
		Killing of birds
		Adult fish-eating birds
		Adult shellfish-eating birds
		Gulls
		Geese
		Wildlife habitat management
		Spartina control
		Habitat creation & restoration
	●	Marine
		Intertidal
	●	Terrestrial
		Habitat management
		Others

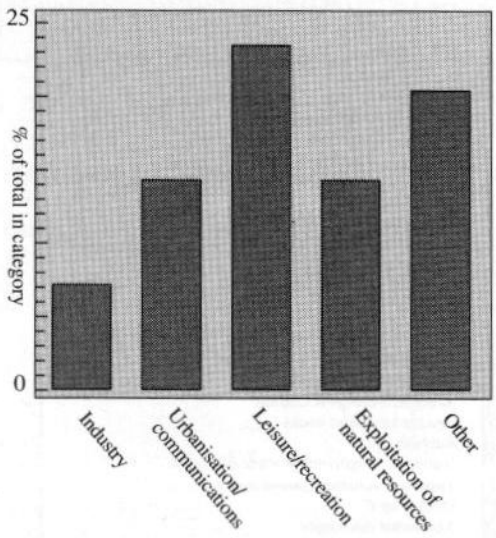
Features of human use

There are few activities occurring within Killough Harbour. Leisure pursuits are most numerous and include sailing, occasional water-skiing and jet-skiing off Killough, walking and bird-watching. There are some moorings in the harbour that are used predominantly by fishing boats. Exploitation of the natural resources includes lobster-potting off the rocky coast around the bay, bait-digging and mussel-collecting for bait.

In 1995 outline planning permission was granted for a marina at Killough. This is likely to involve capital dredging, maintenance dredging and dumping of dredge spoil.



Categories of human use

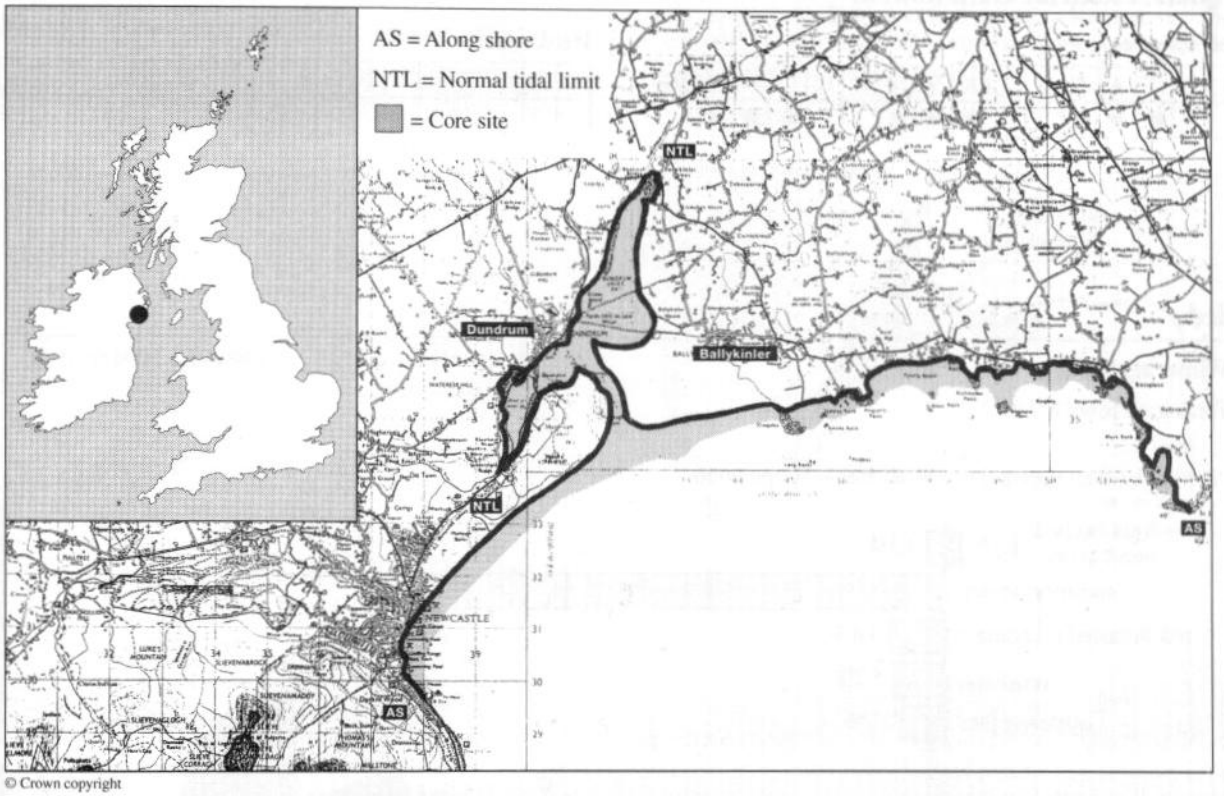


162 Dundrum Bay

Centre grid: J4137
County: Down

District: Down

Review site location



Total area (ha)	Intertidal area (ha)	Shore length (km)	Channel length (km)	Tidal range (m)	Geomorph. type	Human population
1,117	1,037	43.1	7.9	4.6	Bar built	8,000

Description

This site is the estuary of the Carrigs River and the Blackstaff River, which converge at Dundrum and flow through a narrow mouth before widening into Dundrum Bay. The innermost bays of the estuary were created when the two rivers pushed aside glacial deposits to form the arms of the inner bay, and sea currents have subsequently fashioned the sediments at the mouth of the estuary to form two large, sandy headlands. The inner bays of the estuary are shallow and muddy, with saltmarsh at the head of the eastern bay and along the western bay, where the vegetation grades into the dunes.

On either side of the estuary mouth there are large sand dune systems. To the west lies Murlough dunes, the most acidic dune system in Northern Ireland. The dunes have developed over a series of shingle ridges and the older dunes extend over 1.5 kilometres inland. Close to the sea the younger dunes have built up to over 30 metres high in places. The vegetation of Murlough dunes is dominated by heathland, with lichen-rich vegetation communities. The site is rich in plant and insect species. On the opposite headland lies Ballykinler dunes, a similar dune system with a broad expanse of embryo dune vegetation.

Dundrum Bay regularly supports an internationally important population of wintering light-bellied brent goose and nationally important populations of a further seven species of wintering waterfowl.

Wildlife features

Coastal habitats

	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	◉	●	●	●	●		◉	●	◉	
Area (ha)	80	1,037								

● = major habitat ◉ = minor habitat

Aquatic estuarine communities

Soft substrate

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		●	●	●			●	●	●			●	●	●	

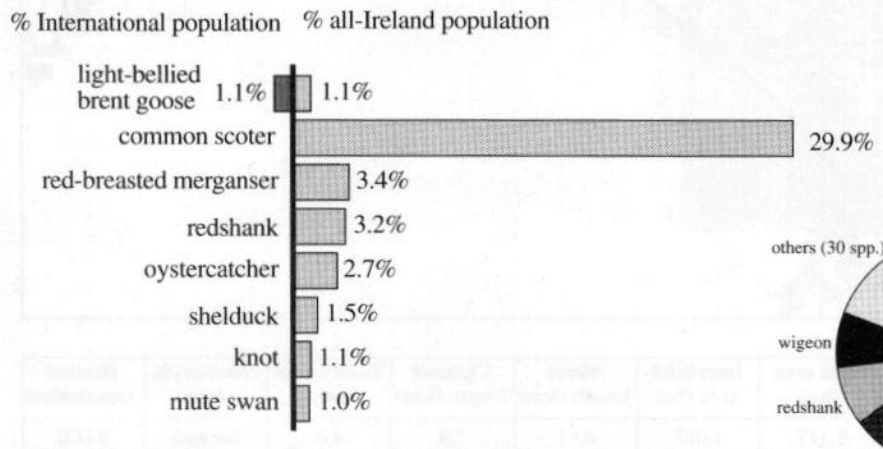
Hard substrate

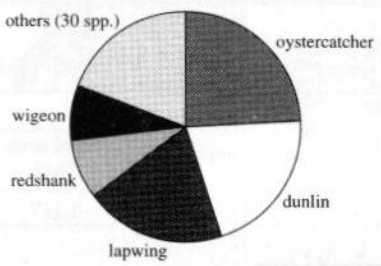
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33

Birds

Wintering birds 1990/91 – 1994/95 data

Total waterfowl: 8,740





Wintering species assemblage
(Spp. forming >5% assemblage shown separately)

Additional wildlife features

Several Red Data Book plants grow on the dunes adjacent to the estuary, including dwarf spring vetch *Vicia lathyroides,* blue fleabane *Erigeron acer* and shepherd's cress *Teesdalia nudicaulis.* The marsh fritillary butterfly *Eurodryas aurinia* also occurs on the site.

A small population of common seals breed on the outer shores of the estuary, and small numbers of grey seals feed within Dundrum Bay.

Conservation status

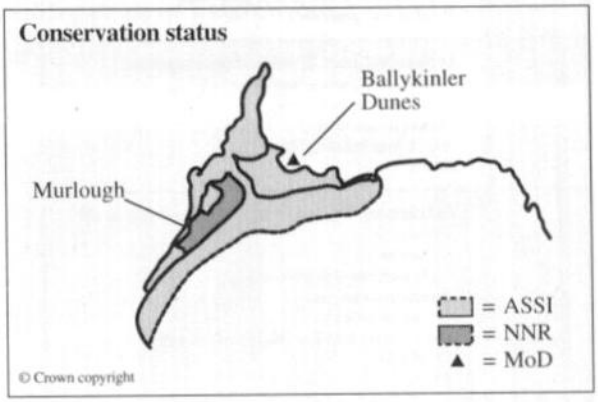
● = designated ● = proposed/meets criteria for

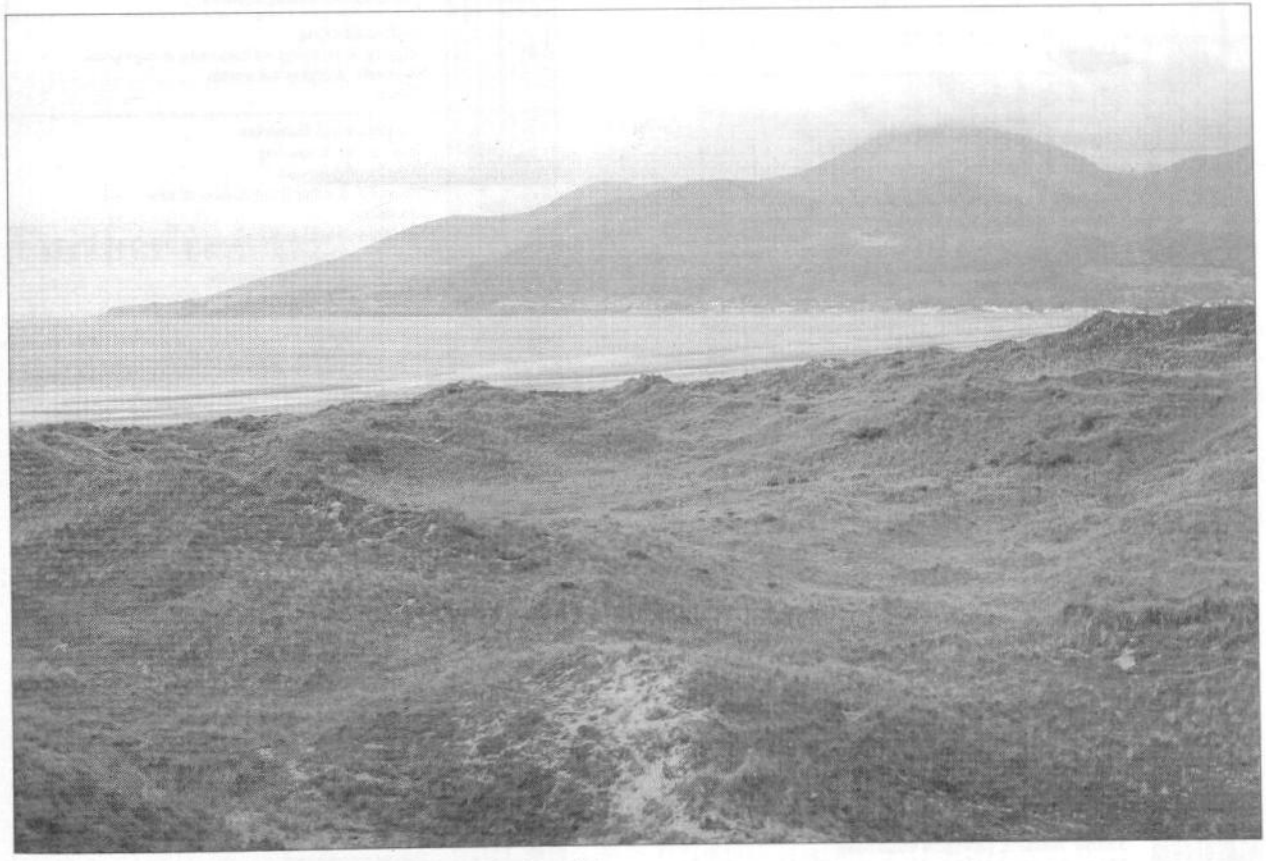
	NNR	ASSI (B)	ASSI (G)	ASSI (M)	ASI	LNR	Ramsar	SPA	SAC	AONB	CWT	RSPB	ESA	WWT	NT	HC	Other
	●			●			●	●	●	●			●		●		●
No.	1			1			1	1	1	1			1		2		1

Part of the site forms Murlough National Nature Reserve and the majority of the estuary lies within Murlough ASSI (1,453 ha) which was designated for its biological and geomorphological interest.

The National Trust own Murlough NNR and the Dundrum Coastal Path, and the MOD own Ballykinler dunes to the east of the estuary mouth. The western shore of Dundrum Bay lies within the Mourne Mountains and Slieve Croob Environmentally Sensitive Area.

Dundrum Inner Bay qualifies as both a Ramsar site and a Special Protection Area, and Murlough is proposed as a Special Area of Conservation.





Murlough Dunes, overlooking Dundrum Bay. (Pat Doody)

Human activities

Present	Proposed	
		Coast protection & sea defences
●		Linear defences
●		Training walls
●		Groynes
●		Brushwood fences
		Spartina planting
●		Marram grass planting
		Barrage schemes
		Weirs & barrages for river management
		Storm surge barrages
		Water storage barrages & bunds
		Leisure barrages
		Tidal power barrages
		Power generation
		Thermal power stations
		Import/export jetties (power generation)
		Wind-power generation
		Industrial, port & related development
●		Dock, port & harbour facilities
		Manufacturing industries
		Chemical industries
		Ship & boat building/repair
		Others
		Extraction & processing of natural gas & oil
		Exploration
		Production
		Rig & platform construction
		Pipeline construction
		Pipeline installation
		Import/export jetties & single-point moorings
		Oil refineries
		Mothballing of rigs & tankers
		Military activities
●		Overflying by military aircraft
●		Others
		Waste discharge
●		Domestic waste disposal
●		Sewage discharge & outfalls
		Sewage treatment works
●		Rubbish tips
●		Industrial & agricultural waste discharge
		Thermal discharges (power stations)
		Dredge spoil
		Accidental discharges
		Aerial crop spraying
		Waste incinerators
		Others
		Sediment extraction
		Capital dredging
		Maintenance dredging
		Commercial estuarine aggregates extraction
		Commercial terrestrial aggregates extraction
●		Non-commercial aggregates extraction
		Hard-rock quarrying
		Transport & communications
●		Airports & helipads
●		Tunnels, bridges & aqueducts
●		Causeways & fords
		Road schemes
		Ferries
●		Cables
		Urbanisation
		Land-claim for housing & car parks
		Education & scientific research
●		Sampling, specimen collection & observation
●		Nature trails & interpretative facilities
		Seismic studies & geological test drilling
●		Marine & terrestrial archaeology
		Fossil collecting

Present	Proposed	
		Tourism & recreation
		Infrastructure developments
		Marinas
●		Non-marina moorings
●		Dinghy & boat parks
●		Caravan parks & chalets
●		Leisure centres, complexes & piers
		Aquatic-based recreation
●		Power-boating & water-skiing
●		Jet-skiing
●		Sailing
●		Sailboarding & wind-surfing
		SCUBA & snorkelling
●		Canoeing
		Surfing
		Rowing
		Tourist boat trips/leisure barges
●		Angling
		Other non-commercial fishing
●		Bathing & general beach recreation
		Terrestrial & intertidal-based recreation
●		Walking, including dog walking
●		Bird-watching
		Sand-yachting
●		4WD & trial-biking
		Car sand-racing
●		Horse-riding
		Rock-climbing
●		Golf courses
●		Clay-pigeon shooting
		Others
		Airborne recreation
●		Overflying by light aircraft
		Radio-controlled model aircraft
●		Others
		Wildfowling & hunting
●		Wildfowling
		Other hunting-related activities
		Bait-collecting
●		Digging & pumping for lugworms & ragworms
		Hydraulic dredging for worms
		Others
		Commercial fisheries
		Fish-netting & trawling
		Fyke-netting for eels
		Fish traps & other fixed devices & nets
		Crustacea
●		Molluscs – Hand-gathering
		Dredging
		Hydraulic dredging
		Cultivation of living resource
●		Saltmarsh grazing
●		Sand dune grazing
		Agricultural land-claim
		Fish-farming
		Shellfish farming
●	●	Bottom & tray cultivation
		Suspended cultivation
		Crustacea farming
		Reeds for roofing
		Salicornia picking
		Others
		Management & killing of birds & mammals
		Killing of mammals
		Killing of birds
		Adult fish-eating birds
		Adult shellfish-eating birds
		Gulls
		Geese
		Wildlife habitat management
	●	*Spartina* control
		Habitat creation & restoration
		Marine
		Intertidal
●		Terrestrial
●		Habitat management
		Others

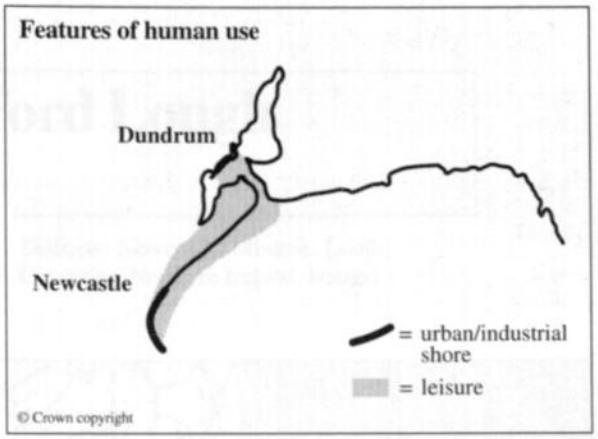
Features of human use

Leisure and recreational activities are numerous within Dundrum Bay. Newcastle is the centre for most water-based pursuits, with sailing, jet-skiing, water-skiing, windsurfing and canoeing. Sailing, jet-skiing and waterskiing also occur within the main channel of the estuary. Land-based pursuits occur along the beach and dunes to the west of the estuary mouth and include beach recreation, horse-riding, trial-biking and go-carting.

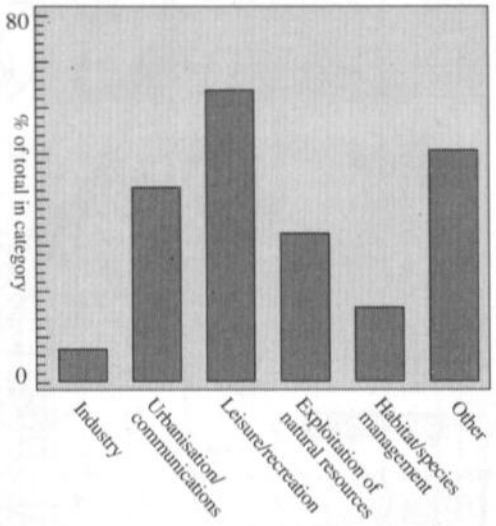
Exploitation of the natural resources are a feature of Dundrum Bay, with saltmarsh and sand dune grazing, cultivation of oysters, winkle-picking, cockling, mussel-gathering and bait-digging. Wildfowling occurs in the upper reaches of the estuary, with other intertidal areas in the bays recognised as a sanctuary area.

There is virtually no industrial development on Dundrum Bay. At Dundrum the old port and storage facilities are used for storage, and sand is taken on a non-commercial basis at Newcastle. The estuary is subject to various forms of waste discharge, including dumping of garden and domestic refuse, household rubble and hard fill, and sewage and industrial discharges.

In 1993 there were proposals to extend the area of present oyster cultivation further upstream and to begin mussel cultivation. These have subsequently been agreed.



Categories of human use



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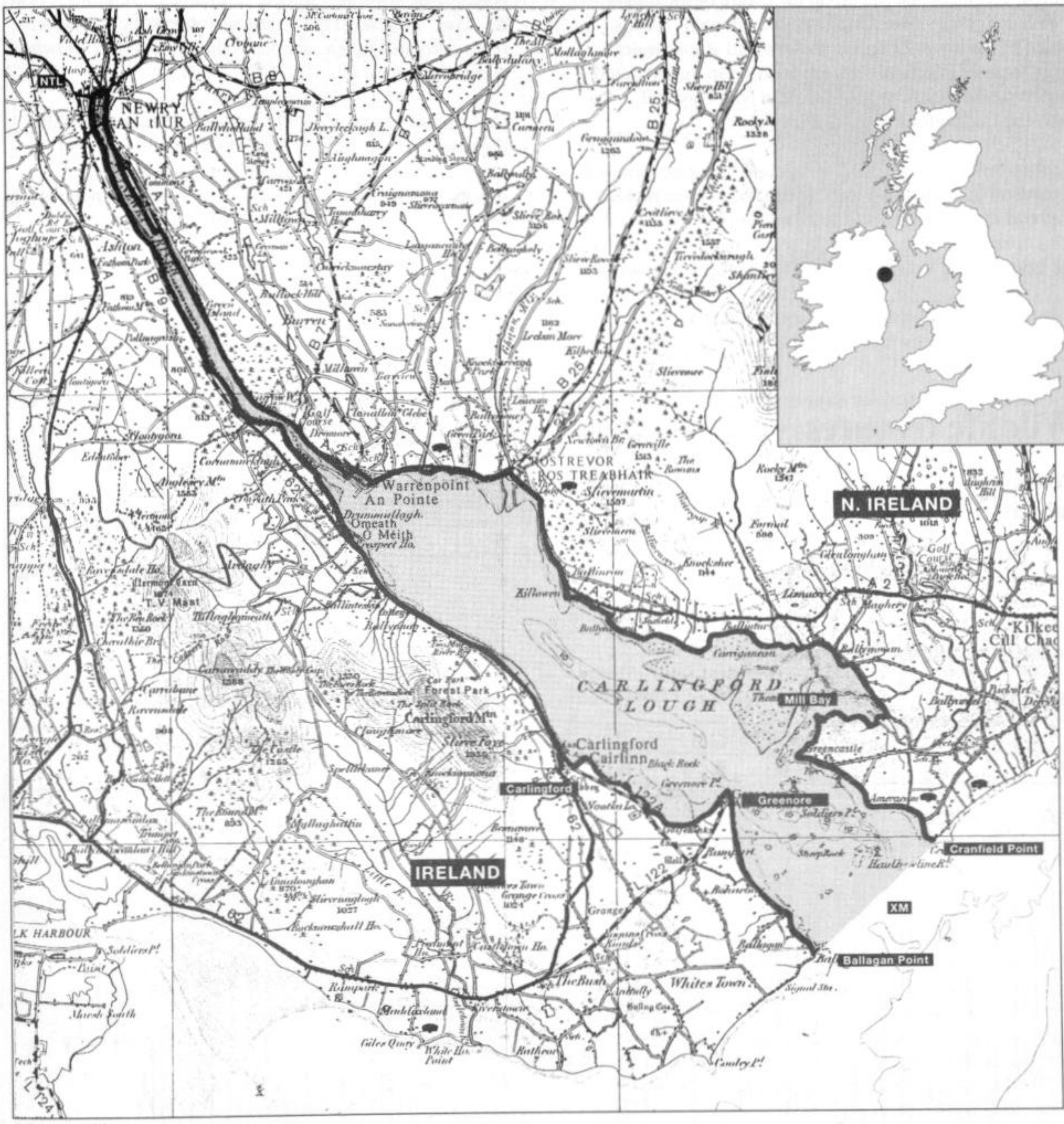
163 Carlingford Lough

Centre grid: J2013
Counties: Down, Armagh, Louth

Districts: Newry and Mourne, Louth
Countries: Northern Ireland, Ireland

Review site location



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Total area (ha)	Intertidal area (ha)	Shore length (km)	Channel length (km)	Tidal range (m)	Geomorph. type	Human population
5,135	1,490	63.4	26.7	4.1	Complex	29,000

XM = Across mouth

NTL = Normal tidal limit

= Core site

Description

Carlingford Lough straddles the border between Northern Ireland and the Republic of Ireland. The upper reaches of the estuary are very narrow, having been subject to some land-claim south of Newry. At Warrenpoint the Newry river discharges into a largely shallow lough and joins the Irish Sea between Cranfield Point and Ballagan Point.

The upper parts of the Lough are extremely sheltered from wave action. The greatest tidal movements occur in the narrow channels that run along the centre of the lough, which are greater than 25 metres deep in many places. Much of the lower Lough is shallow and at low water large areas of intertidal flats are exposed in the sheltered bays near the mouth of the Lough, at Mill Bay and between Carlingford and Greenore.

Carlingford Lough supports an aquatic estuarine fauna of considerable interest. These include beds of sea pens at the head of the lough, sand and rock reefs in the central section and fast-water communities towards the mouth of the Lough. The Lough is known to support a number of noteworthy marine species, some of which are warm-water species and in Northern Ireland are found only in Carlingford Lough.

Towards the mouth of the estuary there are small areas of saltmarsh between Carlingford and Greenore, and at Mill Bay there is a small area of saltmarsh where the White River flows into the estuary. The vegetation consists of extensive areas of mid-upper saltmarsh and a narrow zonation of lower and middle saltmarsh communities near the river. Landward the vegetation shows the transition from saltmarsh to fen. In places the saltmarsh is showing signs of erosion.

Carlingford Lough regularly supports an internationally important population of wintering light-bellied brent goose and nationally important populations of eight species of wintering waterfowl. Green Island, in the lower reaches of the Lough, supports important breeding populations of terns.

Wildlife features

Coastal habitats

	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	●	●	●	●	●	◉	◉	◉		
Area (ha)	3,645	1,490								

● = major habitat ◉ = minor habitat

Aquatic estuarine communities

Soft substrate

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
●				●			●	●	●		●	●		●	

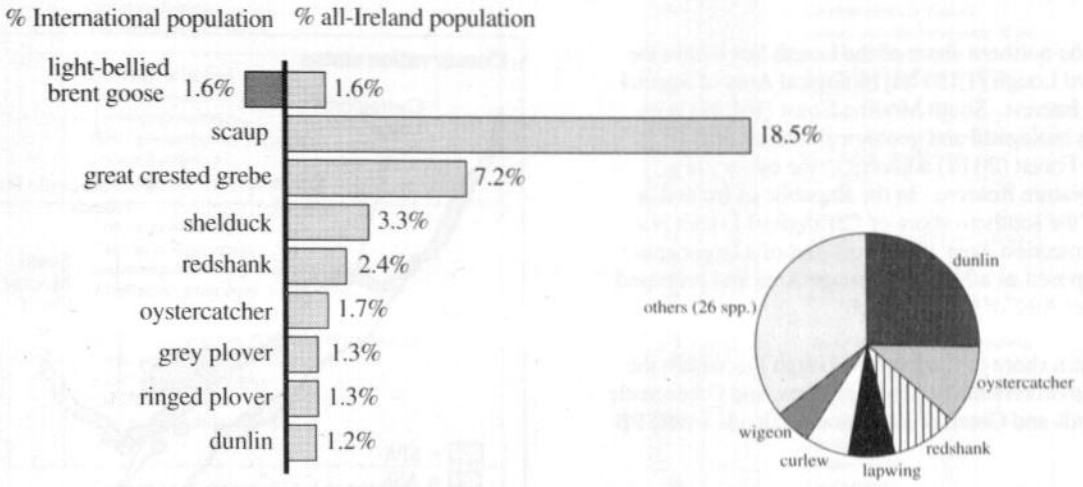
Hard substrate

17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
	●	●								●						

Birds

Wintering birds[1] 1990/91 – 1994/95 data

Total waterfowl: 6,640



Wintering species assemblage
(Spp. forming >5% assemblage shown separately)

Breeding birds: there is a significant colony of common and Sandwich terns and small colonies of shag, black-headed gull, common gull, great black-backed gull, arctic tern and black guillemot breeding within the Lough.

[1]figures presented in this section are taken from available WeBS data and counts from sites adjacent to the Republic of Ireland are not comprehensive. Data from the Irish Wetland Bird Survey 1994-95 (Delany 1995) indicate that, in their own right, areas on the Irish shore held internationally important populations of light-bellied brent geese and nationally important numbers of ringed plover.

Additional wildlife features

The Red Data Book plant oysterplant *Mertensia maritima* grow on the estuary. A small population of common seals breed within the estuary and grey seals feed within the outer parts of Carlingford Lough.

Conservation status

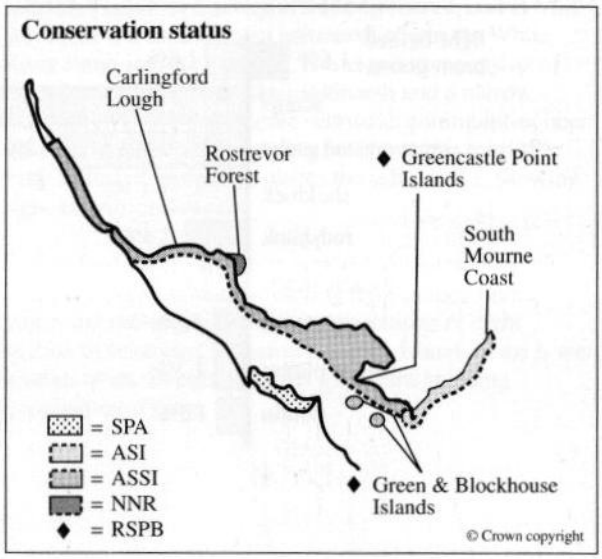
● = designated ● = proposed/meets criteria for

	NNR	ASSI (B)	ASSI (G)	ASSI (M)	ASI	LNR	Ramsar	SPA	SAC	AONB	CWT	RSPB	ESA	WWT	NT	HC	Other
	●	●			●		●	●	●	●		●	●				●
No.	1	1			1		1	1	1	1		2	1				1

Much of the northern shore of the Lough lies within the Carlingford Lough (1,105 ha) biological Area of Special Scientific Interest. South Mourne Coast (161 ha) is an ASI for its biological and geological interest and Rostrevor Forest (20 ha) adjacent to the estuary is a National Nature Reserve. In the Republic of Ireland, a section of the southern shore of Carlingford Lough is a Special Protection Area; this forms part of a larger area that is proposed as a Natural Heritage Area and proposed as a Special Area of Conservation.

The northern shore of Carlingford Lough lies within the Mourne Environmentally Sensitive Area, and Greencastle Point Islands and Green & Blockhouse Islands are RSPB reserves.

Carlingford Lough (including Green Island) qualifies as a Ramsar site and as a Special Protection Area.



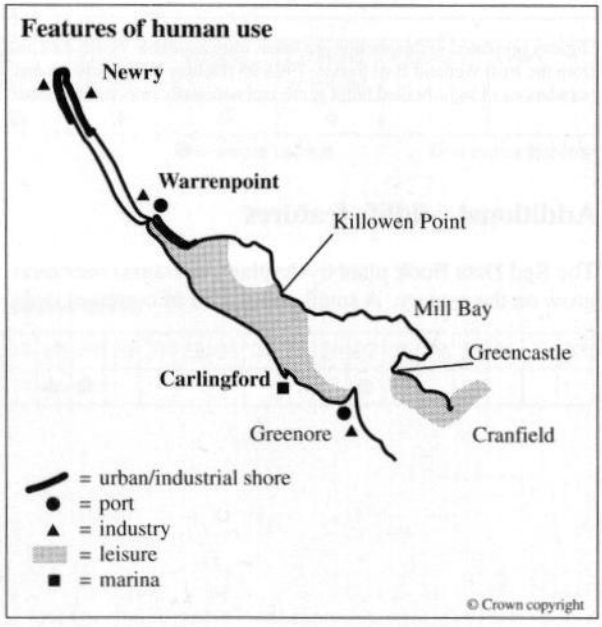
Features of human use

Recreational pursuits are numerous on Carlingford Lough. Sailing is widespread and occurs from Carlingford, Cranfield, Killowen Point, Greencastle and Warrenpoint where there are moorings, and at Carlingford there is a small marina that was under development in 1993. Windsurfing and canoeing occur from Killowen Point, Warrenpoint and Carlingford, and jet-skiing occurs at Warrenpoint. Bathing and beach recreation occurs in the outer reaches of the estuary at Cranfield Bay and Warrenpoint and some car sand-racing takes place at Cranfield.

Exploitation of the natural resources is a feature of Carlingford Lough, and includes grazing parts of the saltmarsh at Mill Bay, cultivation of oysters, mussels and clams, and lobster and crab-potting. Mussels are both dredged and gathered by hand and bait-digging occurs along parts of the southern shore of the Lough. Wildfowlers shoot over parts of the Lough.

Industrial activity is limited around the estuary. There are ports at Warrenpoint and Greenore, light industry estates at Newry and Warrenpoint and a coal storage facility at Greenore. Parts of the Lough are dredged regularly to maintain shipping channels, especially the main channel and around the quays at Warrenpoint and Cranfield, and in 1992 capital dredging occurred in addition to this.

In 1993 there were proposals for new sewage treatment works at Newry and Cranfield, for a marina at Warrenpoint and for cultivation of clams.



Human activities

Present	Proposed	
		Coast protection & sea defences
●		Linear defences
		Training walls
		Groynes
		Brushwood fences
●		*Spartina* planting
		Marram grass planting
		Barrage schemes
●		Weirs & barrages for river management
		Storm surge barrages
		Water storage barrages & bunds
		Leisure barrages
		Tidal power barrages
		Power generation
		Thermal power stations
		Import/export jetties (power generation)
		Wind-power generation
		Industrial, port & related development
●		Dock, port & harbour facilities
●		Manufacturing industries
		Chemical industries
		Ship & boat building/repair
		Others
		Extraction & processing of natural gas & oil
		Exploration
		Production
		Rig & platform construction
		Pipeline construction
		Pipeline installation
		Import/export jetties & single-point moorings
		Oil refineries
		Mothballing of rigs & tankers
		Military activities
●		Overflying by military aircraft
●		Others
		Waste discharge
●		Domestic waste disposal
●	●	Sewage discharge & outfalls
		Sewage treatment works
		Rubbish tips
		Industrial & agricultural waste discharge
		Thermal discharges (power stations)
		Dredge spoil
		Accidental discharges
		Aerial crop spraying
		Waste incinerators
		Others
		Sediment extraction
●		Capital dredging
●		Maintenance dredging
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		Shellfish farming
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●	●	Suspended cultivation
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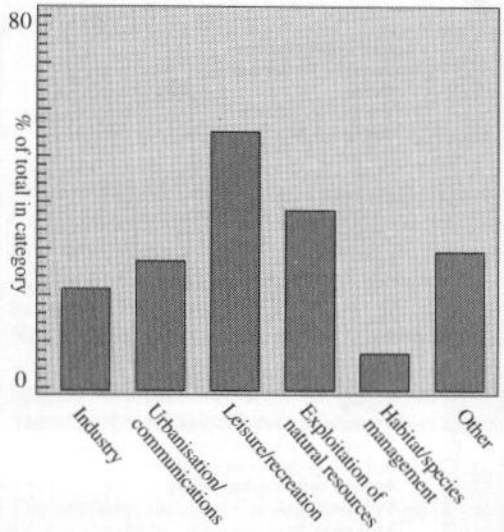
		Salicornia picking
		Others
		Management & killing of birds & mammals
		Killing of mammals
		Killing of birds
		Adult fish-eating birds
		Adult shellfish-eating birds
		Gulls
		Geese
		Wildlife habitat management
●	●	*Spartina* control
		Habitat creation & restoration
		Marine
		Intertidal
		Terrestrial
		Habitat management
		Others

Categories of human use



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