Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7, as amended by Resolution VIII.13 of the Conference of the Contracting Parties.

Note for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands.* Compilers are strongly advised to read this guidance before filling in the RIS.
2. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers are strongly urged to provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of maps.

1. Name and address of the compiler of this form:

FOR OFFICE USE ONLY.

DD MM YY

Designation date | Site Reference Number

Joint Nature Conservation Committee
Monkstone House
City Road
Peterborough
Cambridgeshire PE1 1JY
UK
Telephone/Fax: +44 (0)1733 – 562 626 / +44 (0)1733 – 555 948
Email: RIS@JNCC.gov.uk

2. Date this sheet was completed/updated:

Designated: 09 March 1998 / updated 12 May 2005

3. Country:

UK (Northern Ireland)

4. Name of the Ramsar site:

Strangford Lough

5. Map of site included:

Refer to Annex III of the *Explanatory Notes and Guidelines*, for detailed guidance on provision of suitable maps.

a) hard copy (required for inclusion of site in the Ramsar List): *yes* ✓ -or- *no* □

b) digital (electronic) format (optional): Yes

6. Geographical coordinates (latitude/longitude)**:**

54 26 40 N 05 35 40 W

7. General location:

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

Nearest town/city: Belfast

Strangford Lough is a large marine inlet on the east coast of County Down. Its northern end lies some 15 km east of Central Belfast (6 km from the outskirts). Downpatrick lies 5 km west of the south-west corner. Strangford, Killyleagh, Whiterock, Comber, Newtownards, Greyabbey, Kircubbin and Portaferry are situated on the edge of the Lough.

Administrative region: Ards; Down

8. Elevation (average and/or max. & min.) (metres)**:** **9. Area** (hectares)**:** 15581.3

Min. 0
Max. 10
Mean 0

10. Overview:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

A shallow sea lough with an indented shoreline and a wide variety of marine and intertidal habitats. The west shore has numerous islands typical of flooded drumlin topography. The Lough contains extensive areas of mudflat, saltmarsh and rocky coastline.

11. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

1, 2, 5, 6

Secretariat comment: The RIS provides information requiring the application of Criterion 4. This needs to be included in the next update.

12. Justification for the application of each Criterion listed in 11. above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Ramsar criterion 1

This site supports a variety of important wetland features. Areas of fringing saltmarsh and freshwater habitats support a diversity of wetland plant species. Strangford Lough supports one of the most extensive saltmarsh areas in Northern Ireland.

Ramsar criterion 2

This site supports an important assemblage of vulnerable and endangered wetland plants and animal species. These include a number of marine sponges, marine hydroids, marine mollusc and sea urchins which are restricted to Strangford Lough in Northern Ireland or, in some cases unknown or very rare elsewhere in the British Isles. The mudflats support luxuriant beds of eelgrass; *Zostera noltei*, *Zostera angustifolia*, *Zostera marina* and *Ruppia maritima* are all present, with the latter widespread but quite local in its distribution. Such extensive 'beds' are rare in the British Isles.

Ramsar criterion 5

Assemblages of international importance:

Species with peak counts in winter:
74876 waterfowl (5 year peak mean 1998/99-2002/2003)

Ramsar criterion 6 – species/populations occurring at levels of international importance.

Qualifying Species/populations (as identified at designation):

Species regularly supported during the breeding season:

Sandwich tern , *Sterna (Thalasseus) sandvicensis sandvicensis*, W Europe	894 apparently occupied nests, representing an average of 1% of the breeding population (Seabird 2000 Census)
Common tern , *Sterna hirundo hirundo*, N & E Europe	554 apparently occupied nests, representing an average of 17.8% of the all-Ireland population (Seabird 2000 Census)

Species with peak counts in spring/autumn:

Light-bellied brent goose, *Branta bernicla hrota*, East Canada/Ireland	10863 individuals, representing an average of 54.3% of the population (5 year peak mean 1998/9-2002/3)
Common redshank , *Tringa totanus totanus*,	4145 individuals, representing an average of 1.2% of the population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Red knot , *Calidris canutus islandica*, W & Southern Africa (wintering)	4796 individuals, representing an average of 1% of the population (5 year peak mean 1998/9-2002/3)

Species/populations identified as internationally important subsequent to designation

Species with peak counts in winter:

Common shelduck , *Tadorna tadorna*, NW Europe (br)	3504 individuals, representing an average of 1.1% of the population (5 year peak mean 1998/9-2002/3)

Contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey report, which is updated annually. See www.bto.org/survey/webs/webs-alerts-index.htm.
Details of bird species occuring at levels of National importance are given in Section 20

---

13. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:

Atlantic

b) biogeographic regionalisation scheme (include reference citation):

Council Directive 92/43/EEC

---

14. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

Soil & geology	shingle, sand, mud, nutrient-rich, slate/shale, limestone/chalk, biogenic reef
Geomorphology and landscape	island, coastal, subtidal rock (including rocky reefs), shingle bar, subtidal sediments (including sandbank/mudbank), intertidal sediments (including sandflat/mudflat), enclosed coast (including embayment), estuary, islands, tidal rapids, lagoon, ob (fjard)
Nutrient status	no information
pH	no information
Salinity	brackish / mixosaline, fresh, saline / euhaline
Soil	mainly mineral
Water permanence	usually permanent

Summary of main climatic features	Annual averages (Aldergrove, 1971–2000) (www.metoffice.com/climate/uk/averages/19712000/sites/aldergrove.html) Max. daily temperature: 12.5° C Min. daily temperature: 5.8° C Days of air frost: 39.1 Rainfall: 862.4 mm Hrs. of sunshine: 1313.7

General description of the Physical Features:

Strangford Lough is a shallow sea lough with an indented shoreline and a wide variety of marine and intertidal habitats. The west shore has numerous islands typical of flooded drumlin topography. The lough contains extensive areas of mudflat, saltmarsh and rocky coastline.

15. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

Strangford Lough is a shallow sea lough with an indented shoreline and a wide variety of marine and intertidal habitats. The west shore has numerous islands typical of flooded drumlin topography. The lough contains extensive areas of mudflat, saltmarsh and rocky coastline.

16. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

Shoreline stabilisation and dissipation of erosive forces

17. Wetland types

Marine/coastal wetland

Code	Name	% Area
A	Shallow marine waters	61
D	Rocky shores	15
G	Tidal flats	20
H	Salt marshes	1
Tp	Freshwater marshes / pools: permanent	1
U	Peatlands (including peat bogs swamps, fens)	1
6	Reservoirs / barrages / dams	1

18. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site.

The main ecological feature of the Ramsar site is the sea inlet of Strangford Lough itself. This sea inlet emerged from under the melting ice-sheets of the Ice Age and is for the most part less than 10 m in depth. There is a deeper Y-shaped channel (possibly an old river-valley or geological fault-line) which is up to 66 m deep which extends from the Narrows up the central portion of the Lough. The underlying rock is largely Silurian. The surface of the bed and shore of the Lough ranges from bedrock in areas with strong currents to fine mud in sheltered waters. The narrow entrance channel is an important feature with extremely strong tidal streams of up to 8 knots (4 m/sec).

The water is virtually fully saline except at the mouths of two moderate-sized rivers and where several streams drain into it from the catchment of about 900 km2 where it may be somewhat brackish. The area enjoys an equable climate with low rainfall, infrequent frosts and prevailing westerly to south-

westerly winds. The primarily freshwater Quoile Pondage Basin Nature Reserve is included in the Ramsar site.

The site supports an impressive range of marine habitats and communities with over 2,000 recorded species. It is important for marine invertebrates, algae and saltmarsh plants, for wintering and breeding wetland birds, and for marine mammals.

19. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Nationally important species occurring on the site.

Higher Plants.

Zostera noltei, Zostera angustifolia, Zostera marina, Ruppia maritima

20. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Birds

Species currently occurring at levels of national importance:

Species regularly supported during the breeding season:

Great cormorant , *Phalacrocorax carbo carbo*, NW Europe	278 apparently occupied nests, representing an average of 5.9% of the all-Ireland population (Seabird 2000 Census)
Black-headed gull , *Larus ridibundus*, N & C Europe	1706 apparently occupied nests, representing an average of 3.1% of the all-Ireland population (Seabird 2000 Census)
Mew gull , *Larus canus canus*, Europe to N Africa	82 apparently occupied nests, representing an average of 2.2% of the all-Ireland population (Seabird 2000 Census)
Lesser black-backed gull , *Larus fuscus graellsii*, W Europe/Mediterranean/W Africa	128 apparently occupied nests, representing an average of 2.4% of the all-Ireland population (Seabird 2000 Census)
Arctic tern , *Sterna paradisaea*, Europe/N Atlantic	54 apparently occupied nests, representing an average of 2.1% of the all-Ireland population (Seabird 2000 Census)

Species with peak counts in spring/autumn:

Great cormorant , *Phalacrocorax carbo carbo*, NW Europe	268 individuals, representing an average of 5.3% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Barnacle goose , *Branta leucopsis*, Greenland/Ireland, UK	170 individuals, representing an average of 2.2% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Gadwall , *Anas strepera strepera*, NW Europe	62 individuals, representing an average of 10.3% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Mallard , *Anas platyrhynchos platyrhynchos*, NW Europe	1719 individuals, representing an average of 3.4% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Common coot , *Fulica atra atra*, NW Europe	440 individuals, representing an average of 1.7% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

Ringed plover , *Charadrius hiaticula*, Europe/Northwest Africa	199 individuals, representing an average of 1.5% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Common greenshank , *Tringa nebularia*, Europe/W Africa	64 individuals, representing an average of 7.1% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Species with peak counts in winter:	
Little grebe , *Tachybaptus ruficollis ruficollis*, Europe to E Urals, NW Africa	95 individuals, representing an average of 1.9% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Great crested grebe , *Podiceps cristatus cristatus*, NW Europe	142 individuals, representing an average of 4% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Whooper swan , *Cygnus cygnus*, Iceland/UK/Ireland	172 individuals, representing an average of 1.6% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Greylag goose , *Anser anser anser*, Iceland/UK, Ireland	420 individuals, representing an average of 11% of the all-Ireland population (5 year peak mean 1992/3-1996/7)
Eurasian wigeon , *Anas penelope*, NW Europe	2544 individuals, representing an average of 2% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Eurasian teal , *Anas crecca*, NW Europe	1866 individuals, representing an average of 2.8% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Northern pintail , *Anas acuta*, NW Europe	318 individuals, representing an average of 5.3% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Northern shoveler , *Anas clypeata*, NW & C Europe	167 individuals, representing an average of 2.5% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Common eider , *Somateria mollissima mollissima*, NW Europe	144 individuals, representing an average of 7.2% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Common goldeneye , *Bucephala clangula clangula*, NW & C Europe	239 individuals, representing an average of 2.1% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Red-breasted merganser , *Mergus serrator*, NW & C Europe	205 individuals, representing an average of 10.2% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Eurasian oystercatcher , *Haematopus ostralegus ostralegus*, Europe & NW Africa -wintering	7382 individuals, representing an average of 14.7% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
European golden plover , *Pluvialis apricaria apricaria*, P. a. altifrons Iceland & Faroes/E Atlantic	7063 individuals, representing an average of 3.5% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Grey plover , *Pluvialis squatarola*, E Atlantic/W Africa -wintering	284 individuals, representing an average of 7.1% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Northern lapwing , *Vanellus vanellus*, Europe -breeding	7390 individuals, representing an average of 2.9% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

Dunlin , *Calidris alpina alpina*, W Siberia/W Europe	4119 individuals, representing an average of 3.2% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Black-tailed godwit , *Limosa limosa islandica*, Iceland/W Europe	165 individuals, representing an average of 1.8% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Bar-tailed godwit , *Limosa lapponica lapponica*, W Palearctic	1155 individuals, representing an average of 7.2% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Eurasian curlew , *Numenius arquata arquata*, N. a. arquata Europe (breeding)	1673 individuals, representing an average of 1.9% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Ruddy turnstone , *Arenaria interpres interpres*, NE Canada, Greenland/W Europe & NW Africa	235 individuals, representing an average of 1% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

Species Information

Nationally important species occurring on the site.

Mammals.

Lutra lutra

21. Social and cultural values:

e.g. fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

Aesthetic
Archaeological/historical site
Environmental education/ interpretation
Fisheries production
Non-consumptive recreation
Scientific research
Sport fishing
Sport hunting
Tourism
Traditional cultural
Transportation/navigation

22. Land tenure/ownership:

Ownership category	On-site	Off-site
Non-governmental organisation (NGO)	+	
Local authority, municipality etc.	+	
National/Crown Estate	+	
Private	+	
Public/communal	+	

23. Current land (including water) use:

Activity	On-site	Off-site
Nature conservation	+	+
Tourism	+	+
Recreation	+	+
Current scientific research	+	
Collection of non-timber natural products: commercial	+	

Fishing: commercial	+	
Fishing: recreational/sport	+	
Marine/saltwater aquaculture	+	
Gathering of shellfish	+	
Bait collection	+	
Grazing (unspecified)	+	
Hunting: commercial	+	
Hunting: recreational/sport	+	
Harbour/port	+	
Urban development		+

24. Factors adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

Explanation of reporting category:

1. *Those factors that are still operating, but it is unclear if they are under control, as there is a lag in showing the management or regulatory regime to be successful.*
2. *Those factors that are not currently being managed, or where the regulatory regime appears to have been ineffective so far.*

NA = Not Applicable because no factors have been reported.

Adverse Factor Category	Reporting Category	Description of the problem (Newly reported Factors only)	On-Site	Off-Site	Major Impact?
Introduction/invasion of non-native plant species	2	*Spartina* encroachment extent increasing. Monitoring of extent ongoing.	+		+

For category 2 factors only.
What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors?
Introduction/invasion of non-native plant species - Spartina encroachment extent increasing. Consevation Objectives for the site have been developed. These highlight the need for addressing the Spartina issue. Extent of *Spartina* extent being monitored. Future trials of selective herbicides to be undertaken ASAP.

Is the site subject to adverse ecological change? YES

25. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

Conservation measure	On-site	Off-site
Site/ Area of Special Scientific Interest (SSSI/ASSI)	+	
National Nature Reserve (NNR)	+	
Marine Nature Reserve (MNR)	+	
Special Protection Area (SPA)	+	

Land owned by a non-governmental organisation for nature conservation	+	
Management agreement	+	
Site management statement/plan implemented	+	
Area of Outstanding National Beauty (AONB)	+	
Special Area of Conservation (SAC)	+	

26. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

No information available

27. Current scientific research and facilities:

e.g. details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Miscellaneous.

For its size, Strangford Lough contains a remarkably wide range of habitats and species, many of which are representative of types not found elsewhere in Northern Ireland. The importance of the Lough as a natural laboratory for carrying out marine biological and oceanographic research is unsurpassed in Northern Ireland.

Much is known as to the species present in the Lough and their distribution.

Flora and Fauna.

In addition to invertebrate studies, research has been carried out on many other topics including plankton, mullet, seals, eelgrass *Zostera*, common cord-grass *Spartina anglica*, seabirds, wildfowl, waders, currents, sediment transfer, wave power, geomorphology and human impact to name but a few.

The acquisition of further scientific information about Strangford Lough is, however, a high priority. This information will be essential as a basis for understanding the Lough's ecology, drawing up management proposals and determining their effectiveness. Information is needed on numbers necessary for populations to be sustained and on the effects of man's activities, including harvesting, on wildlife.

Benthic surveys of the Lough have been conducted in 1990 and 1993. Much of the technology (Roxann/side-scan sonar etc) is now available in NI.

A number of CAST studentships have looked at brent/wigeon interactions, bird disturbance, *Spartina* control. A detailed examination of the northern mudflats: sedimentology/flora/fauna has been completed ahead of some major sea-defence works scheduled for the area. It is hoped that this work will progress to include 'construction' and 'post-construction' monitoring.

Numbers of migratory and wintering wildfowl and waders are monitored annually as part of the national Wetland Birds Survey (WeBS) organised by the British Trust for Ornithology, Wildfowl & Wetlands Trust, the Royal Society for the Protection of Birds and the Joint Nature Conservation Committee.

28. Current conservation education:

e.g. visitor centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

Strangford Lough is much used for field studies at all levels of education, with many school groups visiting interpretive centres which have been established around the Lough. In addition residential centres use the Lough for study and recreational training by Primary and Secondary school parties. The Queen's University of Belfast Marine Biology Station at Portaferry was established in 1945 and has been used in the training in marine biology of generations of students from several higher education establishments.

Interpretive Centres: 6 interpret aspects of Strangford Lough

Residential Centres: 5 use the Lough for fieldwork

29. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Activities, Facilities provided and Seasonality.

Strangford Lough has long attracted people who enjoy outdoor recreation, in particular water sports and more recently wildlife-watching.

Boating: Strangford Lough has a number of natural assets making it particularly suitable for boat-based activities. It is sheltered from open sea waves but not from winds, allowing a prolonged sailing season. Sailing for recreation has a history of about 150 years in Strangford Lough. Yachting instruction takes place at three centres and clubs have their own cadet classes. Windsurfing (sail-boarding) has become increasingly popular over recent years. Jet-skiing has only recently appeared as a water-based recreational pursuit on the Lough. The shelter afforded by the islands and the variety of scene they afford make the western side of the Lough popular for sea canoeing.

Bathing and Diving: Bathing itself is harmless but efforts by local authorities to keep beaches pleasant for recreation often include the removal of drift seaweed along with litter here may also be a wish to provide amenities such as promenades and sandy beaches. Diving, principally scuba-diving, has greatly increased in popularity. About 10 diving clubs from the Greater Belfast area regularly use Strangford Lough, with participation by a core of about 100 divers.

Sea angling: This sport was popular in the 1970s when specimen weight Common Skate and Tope were regularly taken from the deep trenches. With the demise of the large skate and decline in Tope, the popularity of the Lough for sea angling declined, but has recently begun to revive mainly for local recreational anglers rather than serious enthusiasts, with pollack, coalfish and mackerel being targeted in the Lough with the addition of cod in the outer triangle.

Wildlife Watching: Many people enjoy watching the wildlife most from dry land above high water mark. The Lough's international reputation for waterfowl is underlined by the number of bird-watchers who are attracted to the area, many from Britain or overseas.

The National Trust has provided public hides from which the birds may be observed. Interpretive information concerning the wildlife of Strangford is provided at many of the facilities around the Lough. More and more people are enjoying not just the birds, but the wide variety of wildlife to be seen. Many are well equipped with binoculars, telescopes, cameras and field-guides.

Seal-watching from the car park at Cloghy Rocks is popular. Interpretive centres, in particular Exploris (formerly the Northern Ireland Aquarium), help the visitor both to appreciate the wildlife they see on the Lough and its shore and that which only divers are privileged to see in its waters.

Wildfowling: There is a very long tradition of wildfowling on Strangford Lough.

Currently about 250 permit-holders may shoot on areas of foreshore in accordance with a strict code of practice.

Horse-riding: Firm beaches have long been used as uninterrupted gallops for exercising horses where the sand is fairly level and not too hard. The seawater is also said to be good for the horses' hooves.

Walking: Some people use the shore for walking or exercising their dogs. However, few areas of shore within the Lough are particularly well suited for this activity, much being muddy, cobble-covered or difficult of access.

Flying: Ards Airfield lies adjacent to the Reserve. Light aircraft, gliders and small helicopters use it. Some flights are commercial, but most are for recreation.

Tourism: All of the above activities contribute to Strangford Lough's appeal as a venue for tourism. Many visitors come to take part in recreational or interpretive activities. Others come to see historic sites, wildlife and to enjoy the scenic quality and tranquility of the area. The attractions of the Strangford Lough area are beginning to be widely recognised and promoted throughout Britain and Ireland. The trend for activity-based holidays is increasing.

30. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept. of Agriculture/Dept. of Environment, etc.

Department of the Environment (Northern Ireland), Environment and Heritage Service, Commonwealth House, Castle Street, Belfast, Northern Ireland, BT1 1GU

31. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Department of the Environment (Northern Ireland), Environment and Heritage Service, Commonwealth House, Castle Street, Belfast, Northern Ireland, BT1 1GU

32. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see **13** above), list full reference citation for the scheme.

Site-relevant references

Barne, JH, Robson, CF, Kaznowska, SS, Doody, JP, Davidson, NC & Buck, AL (eds.) (1997) *Coasts and seas of the United Kingdom. Region 17. Northern Ireland.* Joint Nature Conservation Committee, Peterborough. (Coastal Directories Series.)

Boaden, PJS & Dring, MT (1980) A quantitative evaluation of the effect of *Ascophyllum* harvesting on the littoral ecosystem. *Helgoländer Meeresuntersuchungen* **22**, 700-710

Brown, RA (1989) Bottom trawling in Strangford Lough: problems and policies. In: *Proceedings of the Third North Sea Seminar, Rotterdam*

Brown, RA (1990) *Strangford Lough – The wildlife of an Irish sea lough.* Queen's University of Belfast, Institute of Irish Studies, Belfast.

Buck, AL & Donaghy, A (eds.) (1996) *An inventory of UK estuaries. Volume 7. Northern Ireland.* Joint Nature Conservation Committee, Peterborough

Cooper, EA, Crawford, I, Malloch, AJC & Rodwell, JS (1992) *Coastal vegetation survey of Northern Ireland*. (Contractor: University of Lancaster, Unit of Vegetation Science). Unpublished report to Department of the Environment (Northern Ireland), Belfast

Corbett, SL (1980) *Strangford Lough: Some aspects of conservation*. Unpublished MSc dissertation, Queens University of Belfast

Cranswick, PA, Waters, RJ, Musgrove, AJ & Pollitt, MS (1997) *The Wetland Bird Survey 1995–96: wildfowl and wader counts*. British Trust for Ornithology, Wildfowl and Wetlands Trust, Royal Society for the Protection of Birds & Joint Nature Conservation Committee, Slimbridge

Crowe, O (2005) *Ireland's wetlands and their waterbirds: status and distribution*. BirdWatch Ireland, Newcastle, Co. Wicklow

Davison AJ & Boaden PJS (1990) *The management of Strangford Lough: a study of the marine environment, its conservation and its exploitation*. Queen's University, Belfast

Davison, DM (1996) Sargassum muticum *in Strangford Lough, 1995 – 1998; a review of the introduction and colonisation of Strangford Lough MNR and cSAC by the invasive brown algae* Sargassum muticum. (Contractor: Dee Davison Associates, Dunbar.) Report to the Environment & Heritage Service, DoE (NI), Belfast. www.ehsni.gov.uk/pubs/publications/sargassum.pdf

Environment and Heritage Service (nd) *Strangford Lough Management Scheme. Public information booklet.* Environment and Heritage Service, Belfast. www.ehsni.gov.uk/pubs/publications/StrangfordLoughPubInfoBooklet_web.pdf

Environment and Heritage Service (nd) *Strangford Lough SAC/SPA Management Scheme*. Environment and Heritage Service, Belfast. www.ehsni.gov.uk/pubs/publications/StrangfordManagementScheme.pdf

Erwin, DG, Picton, BE, Connor DW, Hawson CM, Gilleece, P & Bogues, MJ (1986) *The Northern Ireland Sublittoral Survey*. Ulster Museum, Belfast

Fox, AD, Bell, MC, Brown, RA, Mackie, P & Madsen, J (1994) An analysis of the abundance and distribution of brent geese and wigeon at Strangford Lough, 1965/6–1988/9. *Irish Birds*, **5**, 139-150

Industrial Science Division (1990) *The impact of commercial trawling on the benthos of Strangford Lough*. Department of Economic Development, Co. Antrim (Interim report, No. TI/3160/90)

Irish Sea Study Group (1990) *The Irish Sea: an environmental review. Part 1 – nature conservation*. Liverpool University Press

Jepsen, PU (1990) *A review of the Strangford Lough Wildlife Scheme*. International Waterfowl and Wetlands Research Bureau, Slimbridge 1990

Kirby, R (1989) *Tidal flat instability and fine-grained sediment transport at Ardmillan Bay, Strangford Lough, in relation to* Spartina *eradication and oyster trestle burial.* Ravensrodd Consultants Ltd.

McLeod, CR, Yeo, M, Brown, AE, Burn, AJ, Hopkins, JJ & Way, SF (eds.) (2004) *The Habitats Directive: selection of Special Areas of Conservation in the UK.* 2nd edn. Joint Nature Conservation Committee, Peterborough. www.jncc.gov.uk/SACselection

Musgrove, AJ, Langston, RHW, Baker, H & Ward, RM (eds.) (2003) *Estuarine waterbirds at low tide. The WeBS Low Tide Counts 1992–93 to 1998–99.* WSG/BTO/WWT/RSPB/JNCC, Thetford (International Wader Studies, No. 16)

Musgrove, AJ, Pollitt, MS, Hall, C, Hearn, RD, Holloway, SJ, Marshall, PE, Robinson, JA & Cranswick, PA (2001) *The Wetland Bird Survey 1999–2000: wildfowl and wader counts*. British Trust for Ornithology, Wildfowl and Wetlands Trust, Royal Society for the Protection of Birds & Joint Nature Conservation Committee, Slimbridge. www.wwt.org.uk/publications/default.asp?PubID=14

Portig, AA (1997) *Strangford Lough: overwintering birds and variation in eelgrass (*Zostera *spp.) productivity and distribution*. Unpublished PhD thesis, Queens University of Belfast

Roberts, D, Davies, C, Mitchell, A, Moore, H, Picton, B, Portig, A, Preston, J, Service, M, Smyth, D, Strong, D & Vize, S (2004) *Strangford Lough Ecological Change Investigation (SLECI)*. Report to Environment and Heritage Service by the Queen's University, Belfast. www.ehsni.gov.uk/pubs/publications/0ExecSum.pdf

Portig, AA, Mathers, RG, Montgomery, RN & Govier, RN (1994) The distribution and utilisation of *Zostera* species in Strangford Lough, Northern Ireland. *Aquatic Botany*, **47**, 317-328

Strangford Lough Information Network (2004) *Strangford Lough online*. Strangford Lough Information Network. www.strangfordlough.org

Stroud, DA, Chambers, D, Cook, S, Buxton, N, Fraser, B, Clement, P, Lewis, P, McLean, I, Baker, H & Whitehead, S (eds.) (2001) *The UK SPA network: its scope and content*. Joint Nature Conservation Committee, Peterborough (3 vols.) www.jncc.gov.uk/UKSPA/default.htm

Way, LS, Grice, P, MacKay, A, Galbraith, CA, Stroud, DA & Pienkowski, MW (1993) *Ireland's Internationally Important Bird Sites: a review of sites for the EC Special Protection Area network*. Joint Nature Conservation Committee, Peterborough for Department of the Environment (NI), Belfast, and Irish Wildlife Service, Dublin

Weighell, AJ, Donnelly, AP & Calder, K (eds.) (2000) *Directory of the Celtic coasts and seas*. Joint Nature Conservation Committee, Peterborough

Whatmough, J (1995) Classic wildlife sites – Strangford Lough, Northern Ireland. *British Wildlife*, **7**(2), 98-109

Wilkinson, M, Fuller, IWA, Telfer, TC, Moore, CG & Kingston, PF (1988) *Northern Ireland Littoral Survey: A conservation-orientated survey of the intertidal seashore of Northern Ireland*. Institute of Offshore Engineering, Heriot-Watt University, Edinburgh

---

Please return to: **Ramsar Secretariat, Rue Mauverney 28, CH-1196 Gland, Switzerland**
Telephone**: +41 22 999 0170** • Fax: **+41 22 999 0169** • email: **ramsar@ramsar.org**