

Northern Ireland Habitat Action Plan
Mudflats
Final Draft – April 2003

1. Current Status

1.1 Physical and biological status

- 1.1.1 Mudflats are intertidal habitats created by sedimentary deposition in low energy coastal environments, particularly in estuaries and other sheltered areas such as sea loughs. The substrate is formed mainly from silts and clays and has a high organic content. In higher energy environments, such as the mouths of estuaries, the proportion of sand in the substrate increases. Physical processes link mudflats to many other coastal habitats such as soft cliffs and saltmarshes. They often form the transitional habitat between subtidal channels and vegetated saltmarshes. In larger estuaries they can reach several kilometres in width and are commonly the most extensive part of the estuarine intertidal area.
- 1.1.2 Mudflats play an important role in dissipating wave energy, thus reducing the risk of erosion of saltmarshes, damaging coastal defences and flooding low-lying land. The surface of mudflats plays an important role in intertidal nutrient chemistry. In polluted environments, organic sediments may sequester contaminants and may contain high concentrations of heavy metals.
- 1.1.3 Mudflats are typified and characterised by high biological productivity (based on detritus) and they support an abundance of organisms, but have low macrofaunal diversity with few rare species. The mudflat biota reflects the prevailing physical conditions. When salinity is low, large numbers of oligochaetes occur. A wider diversity of polychaete worms are found in areas with increased proportions of sand. Coarser substrates provide habitat for seagrasses *Zostera* spp. and mussel beds in particularly stony areas. Occasionally these stony areas can provide attachment for stands of fucoid macroalgae such as *Fucus spiralis* and *F. vesiculosus*.
- 1.1.4 Mudflats may appear to be devoid of vegetation, but mats of benthic microalgae are common. These communities produce mucopolysaccharide mucilage that binds the sediment together. In nutrient rich environments, mats of *Enteromorpha* spp. or *Ulva* spp. may be present particularly where salinity is reduced.
- 1.1.5 Mudflats are highly productive areas which, together with other intertidal habitats, are of great importance to large numbers of birds and fish. They provide vital feeding and resting areas for internationally important populations of migratory, overwintering and breeding waterfowl and Annex I species, specially protected under the EC Birds Directive.
- 1.1.6 Within Northern Ireland, all the larger areas of mudflats are situated within the sea loughs and estuaries. In addition, some muddy bays are present on the sheltered outer Ards coast.
- 1.1.7 Lough Foyle is a large shallow sea lough, which is estuarine in nature and contains large expanses of mud and sand flats. The mudflats primarily occur in the lower

littoral zone and are covered at half tide. The extensive mudflats support large beds of both common mussel *Mytilus edulis* and eelgrass *Zostera* sp. The biological community of the mudflats include oligochaetes, polychaetes, *Macoma balthica*, *Corophium volutator* and *Ampharete acutifrons* (Wilkinson *et al*, 1988). The lough supports large numbers of wildfowl, with peak numbers averaging 36,599 birds (Ramsar citation). It supports internationally important numbers of Whooper Swan *Cygnus cygnus*, Light-bellied Brent Geese *Branta bernicla hrota*, Wigeon *Anas penelope* and Bar-tailed Godwit *Limosa lipponica*. A number of other species occur in nationally important numbers.

- 1.1.8 The mouth of the Bann Estuary contains small areas of mudflat habitat dominated by *Hediste diversicolor* and *Corophium volutator*. It is important for winter feeding migratory birds and part of the estuary is an Area of Special Scientific Interest (ASSI).
- 1.1.9 Larne Lough, a sheltered enclosed lough, is dominated by mud flats with areas of boulders. The southern end of the lough (Old Church Bay) has extensive mudflats, containing characteristic species *Exogone naidina*, *Ophyrotrocha* sp., *Sphaerosyllis* sp., *Mellina palmata*, *Corophium volutator* and the bivalve *Macoma balthica*. Larne Lough supports internationally important numbers of Light-bellied Brent Geese *Branta bernicla hrota* in winter (five-year peak mean of 227). Nationally important numbers of the Roseate Tern *Sterna dougallii* and the Common Tern *Sterna hirundo* are also found.
- 1.1.10 Belfast Lough is a large intertidal sea lough, situated at the mouth of the River Lagan. The inner part of the lough comprises a series of mudflats and man-made lagoons, the majority of former extensive mudflats having been claimed for industry and landfill, whereas the outer lough is mainly rocky shore with some small sandy bays. The site supports internationally important numbers of Redshank *Tringa totanus* and nationally important numbers of the Shelduck *Tadorna tadorna*, Oystercatcher *Haematopus ostralegus*, Purple Sandpiper *Calidris maritima*, Dunlin *Calidris alpina*, Black-tailed Godwit *Limosa limosa*, Bar-tailed Godwit *Limosa lapponica*, Curlew *Numenius arquata* and Turnstone *Arenaria interpres*.
- 1.1.11 Strangford Lough contains large expanses of mudflat habitat, mainly in the south-west or in sheltered bays along the west coast e.g. Quarterland Bay, Ballymorra Bay and Castle Island Bay. In these locations, fine silt and glutinous mud is present, which supports relatively poor macrofaunal species diversity with species such as *Manayunkia aestuarina*, *Fabricia sabella*, polychaetes and oligochaetes. Small areas of mud are also present on the northern and eastern shore, where they merge into muddy gravel or muddy sand, e.g. Doctors Bay and Greyabbey Bay. Strangford Lough is the most important sea lough in Northern Ireland for waterfowl with a five-year peak mean of 70,200 birds. Internationally important numbers of Light-bellied Brent Geese *Branta bernicla hrota*, Knot *Calidris canutus*, Redshank *Tringa totanus* and other species are found. The lough also supports nationally important populations of over 25 waterfowl species.
- 1.1.12 Inner Dundrum Bay is a tidal lagoon area fed by four small rivers and which is dominated by muddy substrates. The upper part of the northern leg is muddy in

nature, as is the area south west of Ballykinler Point. It supports internationally important numbers of Light-bellied Brent Geese *Branta bernicla hrota*.

- 1.1.13 Mud is the main sedimentary habitat present towards the western end of Carlingford Lough around Carriganean. The lough supports internationally important breeding populations of the Sandwich Tern *Sterna sandvicensis* and nationally important numbers of the Common Tern *Sterna hirundo* and the Arctic Tern *Sterna paradisica*.

1.2 Links with other action plans

- 1.2.1 This mudflats habitat action plan identifies specific targets and actions required to deliver Northern Ireland's contribution to the UK action plan. (UK Biodiversity Steering Group, 1999).
- 1.2.2 The actions proposed in this plan should be combined with efforts to implement the actions of other habitat action plans closely linked with mudflats, for example, saltmarsh, sheltered muddy gravels and seagrass beds.
- 1.2.3 The Northern Ireland Species of Conservation Concern (SoCC) list is currently under review. This review will identify local priority species and those which may require action plans.

2 Current factors affecting the habitat

- 2.1 Direct physical disturbance. Capital or maintenance dredging for navigation can have a negative effect on sediment biota and on sediment supply and transport. It can result in direct removal of the benthos in the footprint of the dredge and may have an indirect impact elsewhere through causing an increase in erosion and sedimentation rates.
- 2.2 Land claim. Mudflats are vulnerable to land claim because they are usually found in sheltered areas near existing developments, rendering them economically attractive. Significant areas of mudflat in Belfast Lough have historically been lost to land claim for harbour development. An ongoing proposal exists for reclamation of mudflats in Lough Foyle to extend the runway of Derry Airport. The plan is currently subject to a judicial review (B. Brown, *pers. comm.*).
- 2.3 Coastal defences. The construction of causeways and hard coastal defences can have an impact on adjacent mudflats through altering sediment transport patterns and increasing wave reflection, which can result in erosion of soft shores and will also prevent the landward migration of intertidal habitats.
- 2.4 Pollution. Mudflats can be sensitive to nutrient enrichment. At nutrient enriched sites, the green ephemeral seaweed *Enteromorpha* spp. can form a dense mat, sometimes floating with the tide and known as macroalgal blooms. The algae prevents light reaching the mud surface below. It may also form anoxic mats and can replace *Zostera* spp., which is of vital importance to birds.

- 2.5** Bait digging. This is carried out at various locations in estuaries across Northern Ireland. Digging is normally focussed on particular spots, and although bait digging may have a significant effect on community structure and substratum, the impact is normally very localised.
- 2.6** Shellfish harvesting. Mechanical cockle harvesting on mudflats may have an effect on the substratum and community structure. The effects of cockle harvesting have been studied by The Queens University of Belfast on behalf of Environment and Heritage Service (EHS), in response to the introduction of mechanical harvesters in Strangford Lough. The study found that tractor dredging creates temporary hollows and drainage channels and may cause an increase in mean sediment grain size. Tractor dredging also imposes a significant increase in the mortality of faunal benthos although recovery is usually rapid (2-3 months) (Kelso & Service, undated).
- 2.7** Tidal regime. The construction of barrage schemes for water storage, amenity, tidal power and tidal defence continue to pose a threat to the integrity and ecological value of mudflats in estuaries and enclosed bays.
- 2.8** Alien species. Invasion by alien plant species can modify the habitat. The introduced hybrid cordgrasses *Spartina anglica* and *S. townsendii* can form a continuous meadow across the upper third of the shore, rendering this area of almost no value for feeding waders and waterfowl.
- 2.9** Climate change. Summary predictions for temperature and sea level rise as a result of global warming have been modelled by the 'MONARCH' project (Harrison *et al.* 2001). The prediction of increased summer temperatures, may lead to an increased level of desiccation in the intertidal area, restricting the distribution of the intertidal species. The decline of overall storminess predicted, is more than likely to be offset by the increased incidence of extreme events which could also affect mudflats by increasing the level of wave energy in the water column, thereby preventing the settlement of fine organic and inorganic materials.
- 2.10** Sea level changes. Sea level changes will have a key impact on littoral communities which are adapted to certain amounts of desiccation and immersion and to certain tidal regimes. A net mean sea level rise in the region of 10 – 15cm is predicted for Northern Ireland by 2020 and 65 – 70cm by 2050 (Harrison *et al.*, 2001).

3 Current Action

3.1 Legal status

- 3.1.1** Major areas of mudflats in Lough Foyle, Larne Lough, Belfast Lough, Strangford Lough, and Carlingford Lough are designated as Ramsar sites under the *Convention on Wetlands of International Importance especially as Waterfowl habitat* (the Ramsar Convention). They are also classified as Special Protection Areas (SPAs) under the *EC Birds Directive (79/409)* and designated as Areas of Special Scientific Interest (ASSIs) under the *Nature Conservation and Amenity Land (Northern Ireland) Order 1985*. Areas of mudflats at the Bann estuary and in Inner Dundrum bay are also designated as ASSIs.

3.1.2 Strangford Lough is included in the UK's list of candidate Special Areas of Conservation (cSAC) which has been submitted to Europe under the terms of the European Community (EC) Habitats Directive. The selection features for the candidate SAC include the Annex I habitat *Mudflats and sandflats not covered by the tide at low water*. A management scheme has been drawn up for the European marine site, which includes provisions to maintain specified habitats at favourable conservation status.

3.1.3 Water quality is essential to the maintenance and conservation of functional mudflat habitats. In Northern Ireland, water quality is governed by a number of EC Directives including the *Dangerous Substances Directive*, *Shellfish (Waters)*, *Integrated Pollution Prevention and Control*, *Urban Waste Waters* and *Bathing Waters Directives*. The *Water Framework Directive* further strengthens UK water quality legislation. International measures such as the OSPAR Convention and MARPOL are also relevant.

3.2 Management, research and guidance

3.2.1 In Strangford Lough, a study on mud/sand flats at the northern end, on behalf of the Rivers Agency, has been carried out prior to and during a major upgrade of the seawall between Comber and Newtownards (Malvarez *et al*, 2000).

3.2.2 The Royal Society for the Protection of Birds (RSPB) manage several areas of mudflats within their reserves. These include areas within Lough Foyle and Belfast Lough.

3.2.3 In Strangford Lough, the National Trust (NT) manages the northern tidal flats as a National Nature Reserve (NNR). Formerly much more muddy, part of this area remains muddy. The national trust also owns or leases from the Crown Estate Commissioners extensive areas of mudflats on the west and south shores of the Lough and some sheltered bays on the east shore.

3.2.4 EHS manages the muddy inlets at Ardkeen and at Bishops Mills as part of the Dorn NNR as well as some muddy shore at Cloghy Rocks and Granagh Bay Nature Reserves in the Strangford Narrows.

3.2.5 An intertidal biotope mapping exercise of Strangford Lough is being carried out by Queens University Belfast on behalf of EHS. Currently, approximately 50% of the lough shore has been covered, including most of the sedimentary areas at the northern end of the Lough.

3.2.6 Bird counts on mudflats in NI are carried out as part of a UK scheme - the Wetland Bird Survey (WeBS). WeBS is a joint partnership between the British Trust for Ornithology (BTO), Wildfowl and Wetland Trust (WWT), the RSPB and the Joint Nature Conservation Committee (JNCC). Bird counts are carried out at regular intervals and allow monitoring of trends of populations and the identification of internationally and nationally important sites.

- 3.2.7 EHS and the NT are pursuing an active programme of *Spartina* spp. control using herbicide along with the smothering and weeding of seedlings.
- 3.2.8 Biological records are currently stored at the Museum and Galleries of Northern Ireland (MAGNI), at the Centre for Environmental Data and Recording (CEDaR). CEDaR was established in 1995 in partnership with EHS, MAGNI and the biological recording community. There are currently over 1.4 million records held by CEDaR and there are developments underway to make these records more accessible through the Internet. This will be achieved through the National Biodiversity Network, a union of organisations throughout the UK working together to create an information network of biological data to provide an accessible data source for biodiversity information.

4 Action plan targets

- 4.1 Maintain the extent of mudflats and associated plant and animal communities in Northern Ireland.
- 4.2 Maintain the condition of mudflats and associated plant and animal communities in Northern Ireland.
- 4.3 Where appropriate, enhance the extent and condition of mudflats in Northern Ireland.

5 Proposed action with lead agencies

5.1 Policy and legislation

- 5.1.1 Ensure that development schemes, dredging operations, fishing activities or other activities do not adversely affect the integrity or the conservation interest of mudflats. (ACTION: Planning Service, DARD, Rivers Agency, EHS, DETI, Harbour Authorities, DAACL, DRD)
- 5.1.2 By 2004, review *Planning Policy Statement 2 (PPS2) – Planning and Nature Conservation* taking cognisance of the experience gained in the rest of the UK, the Republic of Ireland and where appropriate, other leading countries in environmentally sensitive planning. (ACTION: Planning Service, EHS)
- 5.1.3 By 2005, produce Planning Policy Statements (PPSs) on the countryside and the coast to incorporate the conservation of Mudflats. (ACTION: DRD)
- 5.1.4 Ensure that the importance of mudflats is recognised and, where appropriate, site protection policies are included in Development Plans and other strategies including Local Biodiversity Action Plans (LBAPs). (ACTION: Planning Service, EHS, DARD, District Councils)

5.1.5 By 2006, explore options for using statutory measures, aside from those specifically designed for nature conservation, to protect mudflats. Particular consideration should be given to fisheries legislation, and port and harbour regulations.
(ACTION: EHS, DARD, DACL, DRD)

5.1.6 By 2009 ensure that the *Water Framework Directive* (WFD) and the development of River Basin Management Plans address the conservation of sites designated for their mudflats interest.
(ACTION: EHS)

5.2 Site Safeguard and Management

5.2.1 By 2004, carry out and publish an up-to-date record of the extent, quality and distribution of mudflats in Northern Ireland.
(ACTION: EHS)

5.2.2 By 2004, identify mudflats that have been damaged or degraded by, for example, coastal defences, drainage schemes, agricultural run-off and land reclamation.
(ACTION: EHS)

5.2.3 By 2006, where feasible, initiate remedial action to restore damaged or degraded mudflats to favourable condition.
(ACTION: EHS)

5.2.4 By 2004, determine the extent and quality of the mudflats resource which falls within protected areas and notify further sites, if required, to fill significant gaps. In particular, ensure that there is adequate representation of the full range of variation in mudflats communities found around Northern Ireland.
(ACTION: EHS)

5.2.5 Ensure conservation requirements for mudflats are included in the development and implementation of coastal zone management plans and ensure that they are not managed in isolation from other habitats and communities in these areas.
(ACTION: EHS, DOE)

5.2.6 By 2006, define water quality objectives for coastal and estuarine waters that meet the requirements of healthy mudflat communities.
(ACTION: EHS)

5.3 Advisory

5.3.1 By 2004, publish guidelines on the selection and designation of intertidal ASSIs for their marine biological importance.
(ACTION: EHS)

5.3.2 Provide advice to local authorities and others on minimising impacts of plans and operations on mudflats.
(ACTION: EHS)

5.4 International

5.4.1 Further develop links with the Republic of Ireland and other European and international organisations and programmes to promote the exchange of information and experience in research, management techniques, education and conservation strategies.

(ACTION: EHS)

5.4.2 Liaise with research institutes in Europe and elsewhere to exchange data and information on the conservation of mudflats.

(ACTION: EHS)

5.5 Monitoring and Research

5.5.1 By 2005, carry out research into the factors, both natural and anthropogenic, which adversely affect mudflats to understand how these may be avoided or minimised.

(ACTION: EHS)

5.5.2 By 2005, carry out research into the “natural” variability of mudflats in space and time so that monitoring parameters/standards can be set.

(ACTION: EHS)

5.5.3 By 2006, carry out research into the historical variation in extent and distribution of mudflats in Northern Ireland.

(ACTION: EHS)

5.5.4 By 2006, establish standard mudflats monitoring programmes and ensure they are compatible with UK, Republic of Ireland and others.

(ACTION: EHS)

5.5.5 By 2006, establish a network of mudflats monitoring stations around Northern Ireland This should complement a network for the UK and the Republic of Ireland.

(ACTION: EHS)

5.5.6 Ensure that all relevant information gathered in surveys is passed to the Centre for Environmental Data and Recording (CEDaR) based at the Ulster Museum and to other relevant centres. Encourage access to, and exchange of these records, by contributing to the National Biodiversity Network www-based catalogue of environmental information.

(ACTION: EHS)

5.6 Communications and publicity

- 5.6.1 Promote awareness among coastal users of the conservation importance of mudflats and how to avoid impact on these habitats.
(ACTION: EHS)
- 5.6.2 By 2006 implement at appropriate venues such as the Ulster Museum, the Exploris Aquarium and coastal EHS Countryside Centres, 'flagship' programmes for achieving education, increased public awareness and appreciation of mudflats in Northern Ireland.
(ACTION: EHS)

6 Costing

- 6.1 A table showing the global costs for this and other HAPs is available on the EHS/Biodiversity web page.

7 References

- Harrison, P. A., Berry, P. M. & Dawson, T. P. (2001). *Climate Change and Nature Conservation in Britain and Ireland: Modelling natural responses to climate change* (the MONARCH project). Oxford, UKCIP Technical Report.
- Kelso, B. & Service, M., Undated. *Environmental Effects of Shellfish Cultivation and Harvesting*. Belfast: The Queen's University of Belfast and Department of Agriculture and Rural Development.
- Malvarez, G.C., Portig, A.A., Cooper, J.A.G., Montgomery, W.I., Jackson, D.W.T., Roberts, D., & Navas, F. (2000). *Baseline Monitoring of the Newtownards Intertidal Flats: Physical and Biological Processes. A report to the Rivers Agency* (Department of Agriculture and Regional Development for Northern Ireland). University of Ulster and The Queen's University of Belfast.
- Wilkinson, M., Fuller, I.A., Telfer, T.C., Moore, C.G., & Kingston, P.F. (1988). *Northern Ireland Littoral Survey*. Report to Environment and Heritage Service, Belfast.
- UK Biodiversity Steering Group (1999). *Biodiversity: The UK Steering Group Report. Tranche 2: Action Plans; Volume V: Maritime species and habitats*. HMSO. London

List of useful Acronyms

ASSI	Area of Special Scientific Interest
BTO	British Trust for Ornithology
CAP	Common Agricultural Policy
CEDaR	Centre for Environmental Data and Recording
CMD	Countryside Management Division
CMS	Countryside Management Scheme
DANI	Department of Agriculture for Northern Ireland
DARD	Department of Agriculture and Rural Development
DCAL	Department of Culture, Arts and Leisure
DETI	Department of Enterprise, Trade and Industry
DOE	Department of the Environment
DRD	Department of Rural Development
EC	European Commission
EHS	Environment and Heritage Service
EN	English Nature
ESA	Environmentally Sensitive Area
GFP	Good Farming Practice
JNCC	Joint Nature Conservation Committee
LBAP	Local Biodiversity Action Plan
LFA	Less Favoured Area
MAGNI	Museums and Galleries of Northern Ireland
MARPOL	International Convention for the Prevention of Marine Pollution from Ships
MOSS	Management of Sensitive Sites

NESA	New Environmentally Sensitive Area Scheme
NIBG	Northern Ireland Biodiversity Group
NICS	Northern Ireland Countryside Survey
NNR	National Nature Reserves
NT	National Trust
NVC	National Vegetation Classification
OSPAR	Convention for the Protection of the Marine Environment of the North East Atlantic
RSPB	Royal Society for the Protection of Birds
cSAC	candidate Special Area of Conservation
SAC	Special Area of Conservation
SLNCI	Site of Local Nature Conservation Interest
SNH	Scottish Natural Heritage
SoCC	Species of Conservation Concern
SPA	Special Protection Area
UWT	Ulster Wildlife Trust
WFD	Water Framework Directive
WWT	Wildfowl and Wetlands Trust