
Freshwater Habitats



This statement considers a suite of lowland water and wetland habitats including rivers and burns, lochs and ponds, fens, bogs, reedbeds, and wet grasslands. These habitats are often found together, and most wetland sites support a mosaic or succession of habitats.

An inventory of existing and potential lowland wetlands was completed in 2007 (Biggins and Francis 2007) and this provides the baseline data for this description of wetland habitats. The North East Scotland Wetland Inventory examined the current wetland resources of Moray, Aberdeenshire and Aberdeen City by collating information from a range of surveys. A comprehensive national inventory of wetland habitat types is provided and mapped on [Scottish Environment Web](#). These inventories also provide information on the restoration potential for degraded wetland sites



Importance

Lowland wetland habitats are a priority for nature conservation. They support a myriad of highly specialised plants and animals and have undergone a dramatic decline in area during the last century. For example, it is estimated that in the UK we have lost 90% of wetland habitat over the last 100 years and only 20% of UK peatlands are undamaged. Consequently, they are amongst the rarest and most threatened habitats in the UK.

Water is a necessary resource for all wildlife and many species are dependent on it for at least part of their life cycle. Key factors affecting these wetlands are the quantity and quality of water present. Much has been done in recent years to improve the water quality and the status of many of our rivers, with recent data demonstrating that more than 85% of rivers in Scotland were unpolluted by 2016, and their associated wildlife has recovered in response to this. However, the pollution and nutrient enrichment of wetland habitats remains a significant problem. As well as their importance for wildlife, freshwater habitats provide us with clean water for drinking and help to moderate the flow of water through the environment and so potentially playing a key role in natural flood management.

A wide range of plants and animals of conservation importance are associated with wetland habitats in North East Scotland. These include species of higher plants, bryophytes, fungi, invertebrates, breeding birds, bats and amphibians.

Some important species associated with freshwater habitats

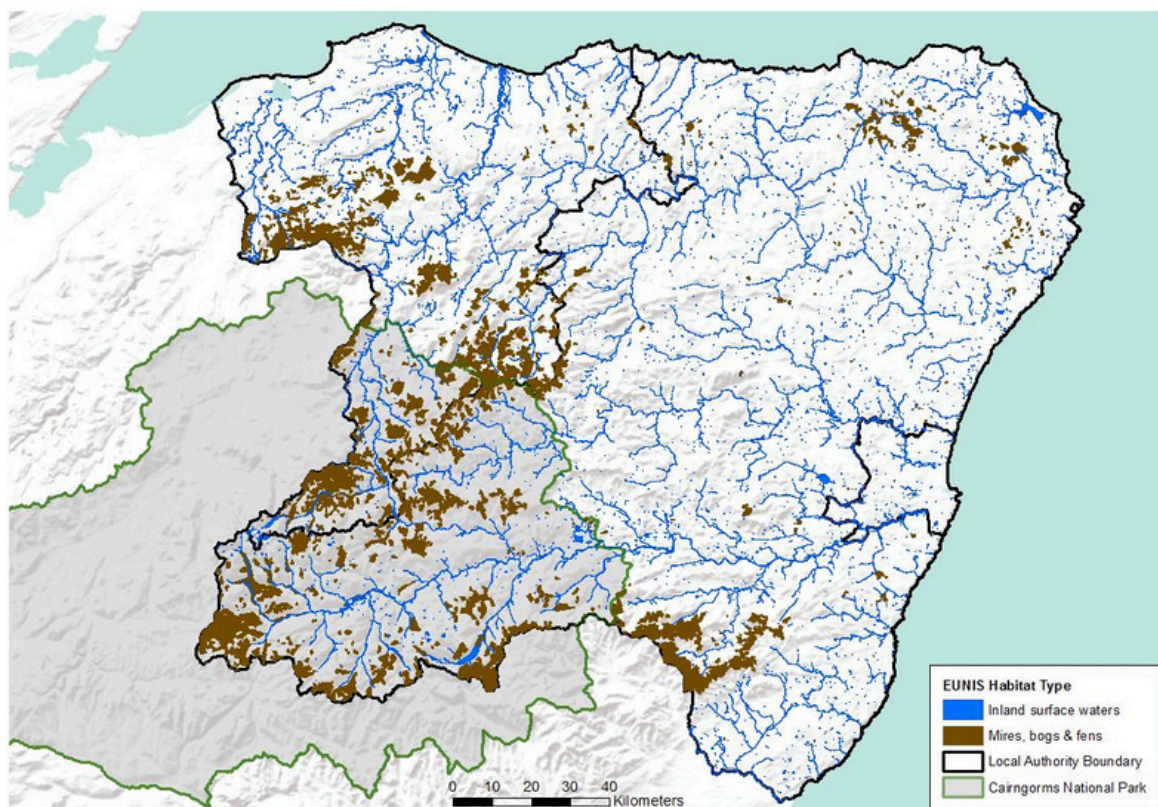
Whooper Swan
Pink-footed Goose
Osprey
Common Crane
Water Rail
Northern Blue Damselfly
Five-spot Ladybird
Freshwater Pearl Mussel
Water Vole
Water Shrew
Daubenton's Bat
River Lamprey
Brook Lamprey



Influential factors

- Wetlands are dynamic semi-natural systems and, away from running water, management is sometimes needed to maintain open communities and their associated species richness. Without appropriate management, such as grazing and scrub clearance, natural succession can lead to scrub and woodland forming.

- Drainage and/or conversion to intensive agriculture
- Water abstraction from aquifers and rivers
- Peat extraction has historically damaged many sites, though is now restricted to a single site
- Small total area of some habitats and critically small population sizes of several key species dependent on the habitat
- Deterioration in water quality due to pollution and agricultural run-off with ecological impacts on plants, birds, invertebrates, plankton and fish
- Invasive Non-native species, such as Giant Hogweed, Japanese Knotweed and Himalayan Balsam, are a particular issue along watercourses due to their means of dispersion and the available corridor along which to spread.
- Recreation pressure and the possible associated introduction of Invasive Non-native species
- Afforestation and natural woodland regeneration
- Development impacts such as compaction, loss of habitat, alterations to drainage, canalisation/culverting of watercourses
- Disconnection of habitats from their source of ground or surface water
- Climate change, including increasing water temperature and hydrological impacts





Rivers and Burns

The running waters of North East Scotland vary from major river systems to small upland and coastal burns, all draining towards the North Sea. Rivers and burns are made up of a variety of physical habitats such as gravel bars, eroding earth cliffs, silt deposits, cobbles and riffles. These varied physical features within the watercourse, together with their riparian zones, provide a wide diversity of physical conditions which in turn support a variety of habitats and species. Typical species closely associated with rivers and burns in the North East, include Otter, Water Vole, Dipper, Kingfisher, Salmon, Brown Trout and three species of lamprey. More specialised species include Freshwater Pearl Mussel, Northern February Red Stonefly, Five-spot Ladybird and aquatic plants such as River Water-crowfoot.

Rivers and burns form important wildlife corridors, enabling dispersion and migration of species, the joining up of fragmented areas of habitat for use by mobile species, and the connection of fragmented populations.

The entire catchments of the Rivers Lossie, Dee, Don, Deveron, Ugie and Ythan lie within Aberdeenshire, Aberdeen City and Moray, together with the lower reaches of the River Spey, its tributary the Avon, and the Findhorn. Many of the rivers in the North East have typically low levels of pollution and eutrophication, with those in upland areas being particularly pristine. In lowland areas, where land use is more intensive, pollution and eutrophication tend to be more significant issues. Indeed, much of the lowland area north of Aberdeen has been identified as being especially vulnerable to nitrate pollution from farmland and designated as Nitrate Vulnerable Zones under EU legislation. Many of our rivers have been physically modified by man to a greater or lesser extent, with realignment and modification of the river channel for water supply, agricultural drainage, power generation and flood protection. All these interventions can impact on the ecology of the river.

Lowland Raised Bogs

Intact lowland raised bogs are and amongst Europe's rarest and most threatened habitats. Raised bogs are peatlands fed exclusively by rainfall, rather than ground water or streams. 'Active' raised bogs are those where peat is accumulating, due to the growth of *Sphagnum* moss, or other peat forming vegetation and are of primary importance for conservation. On degraded bogs, active peat formation has been halted, at least temporarily, but these secondary bogs are also considered to be of conservation importance. Some bogs in North East Scotland have been damaged or destroyed in the past by extraction of peat, though consent to do so is currently only active at one site.



The typical vegetation of lowland raised bogs is dominated by *Sphagnum* mosses with key species being *Sphagnum magellanicum* and *Sphagnum papillosum*. Other typical plants include Heather, Hare's-tail Cottongrass, Bog Myrtle, Bog Asphodel and Cross-leaved Heath. Less common species of this habitat in North East Scotland include Small Cranberry and Great Sundew. Bogs which have been cut over have impoverished vegetation and generally lack significant cover of *Sphagnum* mosses.

Lowland raised bogs are now increasingly valued in terms of their current and future carbon sequestration potential and their role in regulating the flow and quality of water. Healthy peatlands can potentially play a role in mitigating flooding downstream through their varied surface topology and complex drainage networks.

Lowland raised bogs within this area have been relatively well surveyed. A 1995/6 survey within Aberdeenshire identified 2,125 ha of bog that was considered to be of particular conservation interest, comprising both uncut bog and cut bog where bog vegetation had re-established. It also identified a further 1,004 ha of more damaged bog, with 827 ha being covered in woodland or scrub and 177 ha being bare peat.

Habitat surveys of the majority of lowland raised bogs were carried out in 2010-2016 by NESBReC. Several habitat categories describe lowland raised bogs, so careful ecological surveying is always recommended, but these data provide a baseline for measuring future trends in the region. Many areas of lowland raised bog in Aberdeenshire and Aberdeen City have been identified as Special Areas of Conservation, Sites of Special Scientific Interest or Local Nature Conservation Sites. Some better-known such locations include Wartle Moss, Rora Moss, Lochlundie Moss, Reidside Moss and Red Moss of Netherley.



Fens

Fens are wetlands that receive water and nutrients from the soil, rock and ground water as well as from rainfall. Fens, where found to have strong connectivity to groundwater, often require special protection and management. These sites are generally found in lowland areas, often along river banks and loch shores, on floodplains or in waterlogged hollows and valley bottoms. They can be acid or calcareous. The UK is thought to host a large proportion of the fen surviving in Western Europe, but it is a rare habitat in North East Scotland and as in other parts of Europe, this habitat has declined dramatically in the past century. There are approximately 1,600 ha of this habitat type in North East Scotland, but much is likely to be in unfavourable condition.

A number of fen sites are designated as being of national importance including Wartle Moss, Loch of Lumgair and parts of Loch of Strathbeg, whilst at some bogs, areas of fen provide a natural “buffer” from surrounding farmland.

Reedbeds

Reedbeds are wetlands dominated by the common reed, growing on ground which is waterlogged for all or most of the year. They support a distinctive breeding bird assemblage including Sedge Warbler and Water Rail and are one of the main breeding habitats of the Reed Bunting. Bearded Tits have bred occasionally in reedbeds in the region whilst Bitterns appear in small number most winters. Reedbeds also provide roosting and feeding sites for migratory species and can be used as roost sites for several raptor species in winter.

There are approximately 153 ha of this habitat type in North East Scotland within 32 sites representing 13.5% of the Scottish and 3% of the UK totals respectively. Most sites are small (less than 2 ha).

Loch Spynie and Loch of Strathbeg are identified through statutory designations as being of international importance.

Lowland wet grasslands

These are grassland habitats, often found on floodplains, which are subject to periodic inundation. Some wet grasslands have groundwater influence and considered especially important for conservation. Wet grasslands can consist of improved or semi-improved grassland, which is often in agricultural use. Wet soils mean that there is an association with breeding wading birds, such as Redshank, Snipe and Curlew, with Lapwings also featuring. In winter, such areas (either grassland or arable) may hold concentrations of geese, ducks or waders, especially if there is recurrent standing water. In North East Scotland, over 5,000 ha of actual or potential lowland wet grassland has been identified in the Wetland Inventory. The important issue in connection with this habitat is that many such areas in the North East were once naturally much wetter. What we see now is a largely ‘converted’ set of lowland inundation habitats, such that natural wetlands are extremely scarce, and former lochs and marshes have disappeared. The exact extent of this habitat in the north east is unknown, but it is likely to be only a small proportion of the national total.

Lochs and Ponds

Standing open water habitats include natural features together with man-made reservoirs and ponds. They are generally classified according to their nutrient status (oligotrophic – nutrient poor), mesotrophic (intermediate nutrient status) and eutrophic (nutrient rich) and dystrophic (acidic). Mesotrophic and naturally eutrophic water bodies generally support a high biomass of vegetation, abundant plankton and a variety of coarse fish.

In North East Scotland, 932 lochs and ponds were identified on the OS Landranger 1:50 000 maps, representing only a small proportion of the total resource in Scotland. In terms of land area, the Land Cover Scotland 1988 identified an area of 2,400 ha of standing water, but this only covered water bodies over 2 ha in size and would therefore exclude many smaller water bodies and ponds and also bog pools as the majority of lochs in



the region are small (<1.0 ha). In recent times there has been a resurgence of pond creation on farms and private properties as the benefits of small water bodies has been promoted. This has, in some locations, impacted negatively on existing wetland habitats, such as through removal of wetland vegetation. However, well-designed projects have the potential to improve habitat quality, for example through blocking ditches and drains to permit more natural re-wetting.

Although the number and area coverage of open water habitat is not particularly high in the north east, the area contains important examples of water bodies with different characteristics influenced by the variety of geology, soils and rainfall. In particular this area has a range of coastal loch types, including Loch Strathbeg which is the largest dune slack pool in Britain. Lochs are important feeding, breeding and roosting areas for many species of bird such as Water Rail, ducks and geese and are also used by Otter and Water Vole. Open water is important for all amphibians as well as dragonflies and damselflies, including the locally rare Northern Damselfly.

The lochs and ponds in this area are generally in good condition with the main threats being acidification in the upland areas and artificial eutrophication where the catchment includes human settlements and farmland. Where introduced fish species have become established in natural water bodies, they can pose a significant threat to native populations of plants and animals.

A number of the larger bodies of open water in the north east are identified as being of national or international conservation importance, including the RAMSAR sites of Loch Spynie, Loch of Skene and Loch of Strathbeg.



Opportunities for freshwater habitats

- Habitat enhancement/creation
- River restoration
- Catchment wide project delivery through River Catchment Partnerships and District Salmon Fisheries Boards
- Habitat restoration funds such as SNH Peatland Action Fund
- Protection of existing Natural Flood Management (NFM) features and enhancement to create new NFM features
- Buffers alongside watercourses in agricultural areas and within development sites
- Continuity of bankside habitat and retention and enhancement of riparian habitats
- Control of invasive non-native species within wetlands and riparian habitats
- Maintaining a network of wetland habitats
- Re-wetting of historic or “possible” wetlands
- Sustainable Urban Drainage Schemes (SuDS) are required as part of all new developments which provides opportunities for the creation of ponds, basins and wetlands within larger developments. Opportunities should be taken to maximise the biodiversity value of these
- Management of recreation pressure
- Promotion of wildlife recording
- River Basin Management Plans and Catchment Management Plans identify actions for the improvement of water quality and wetland habitats



Case study

Wetland management at Loch of Strathbeg RSPB Reserve

The RSPB reserve covers part of the Loch of Strathbeg, which is the largest dune loch in Britain. The loch is surrounded by wetland, grassland and woodland, which supports a wealth of wetland biodiversity.

As part of a funded project begun in 2006, RSPB undertook scrub control to recreate wetland areas, together with river restoration work on one of the main feeder burns, to recreate a more natural system with meanders that help trap sediment and nutrients before they enter the loch.

Ongoing work includes restoring and extending the reedbeds for wetland birds and aims to encourage bitterns to breed. This involves planting reeds, while cutting more reed edges and viewing channels. Wet grassland has been improved for the benefit of breeding waders, including lapwings and redshanks, by maintaining a low sward, controlling scrub and rushes, and managing seasonal flooding. Work includes grazing, upgrading sluices and clearing invasive plants.

Details of some of the management to achieve these ends have been documented and provide a useful resource to assist in planning management at other sites:

<https://www.conservationevidence.com/individual-study/6950>

Resources

North East Scotland Wetland Inventory

<https://www.nesbiodiversity.org.uk/wp-content/uploads/2024/12/NE-Scotland-wetlands-inventory.pdf>

SEPA Natural Flood Management Handbook

<https://www.sepa.org.uk/media/163560/sepa-natural-flood-management-handbook1.pdf>

SEPA Ponds, Pools and Lochans

https://www.sepa.org.uk/media/151336/ponds_pools_lochans.pdf

Scottish Natural Heritage

<https://www.nature.scot/landscapes-and-habitats/habitat-types/lochs-rivers-and-wetlands>

Fen Management Handbook

<https://digital.nls.uk/pubs/e-monographs/2020/216588188.23.pdf>

Conserving Bogs; The Management Handbook

<http://www.iucn-uk-peatlandprogramme.org/node/2223>

UK Peatland Restoration - Demonstrating Success

<http://www.iucn-uk-peatlandprogramme.org/publications/demonstrating-success/uk-peatland-restoration-demonstrating-success>

Conservation Evidence - Peatland Conservation Synopsis

https://www.conservationevidence.com/data/index?synopsis_id%5B%5D=33

For further information about how protection and enhancement of wetland habitats is supported across North East Scotland, see also Local Development Plans for Aberdeen City, Aberdeenshire and Moray Council - see Introduction for further details.