The Story of Loch Fleet National Nature Reserve

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The Story of Loch Fleet National Nature Reserve

Foreword

Loch Fleet National Nature Reserve (NNR) lies on the east coast of Scotland, 3km south of Golspie and 8km north of Dornoch. Loch Fleet is an impressive tidal basin connected to the sea by a narrow channel through which the sea races on a rising tide and the River Fleet flows out on a falling tide. When the tide is in the basin is flooded with salt water. When the tide is out it leaves an extensive area of sandbanks and mudflats cut by flowing channels of freshwater.

As the tide ebbs and flows it carries rich materials into the loch creating an important feeding area for waders and wildfowl. Along with other nearby coastal sites Loch Fleet supports internationally important numbers of these birds in the autumn and winter months. In the summer many birds breed around the loch including terns and osprey. The sandbanks within the basin are favoured as a haul out site for common seals.

The north side of the loch is home to two pine woodlands known as Balblair and Ferry Woods. Although areas of the woodland are planted it is established on the site of an ancient pine forest and there are granny pines scattered through the woods. The rich understory in Balblair woods supports many rare plants specialist of the Caledonian pine forest. Within Ferry woods the forest is more open with clearings carpeted in lichen-rich dune heath. They are an extension of the open coastal habitat where the dunes grade from lichen rich dunes, through areas of marram dominated dunes, interspersed with dune slacks before reaching the bare mobile dunes of the coastline.

Loch Fleet is easily accessed by visitors and offers a range of experiences. Laybys around the loch provide ideal viewing locations for wildlife watching. Those on the south shore are great for watching the seals as they haul out on the sandbanks. Visitors can explore Balblair woods with a level path providing easy access. A number of the woodland specialities can be seen here. A short walk takes you to a hide looking over the tidal basin. From Littleferry visitors can walk out along the coast or explore the dunes.

Loch Fleet is one of a suite of NNRs in Scotland. Scotland’s NNRs are special places for nature, where some of the best examples of Scotland’s wildlife are managed. Whilst nature is always the first priority on NNRs, the reserves also provide opportunities for people to enjoy and discover more about our rich natural heritage.

This is one of a group of documents about the NNR. It gives information about the reserve and briefly describes the wildlife found on the reserve, the history of land use before the reserve was established, and management of wildlife, people and property.
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreword</td>
<td>1</td>
</tr>
<tr>
<td>Maps of Loch Fleet NNR</td>
<td>3</td>
</tr>
<tr>
<td>1 Introduction to Loch Fleet NNR</td>
<td>5</td>
</tr>
<tr>
<td>2 The Natural Heritage of Loch Fleet NNR</td>
<td>7</td>
</tr>
<tr>
<td>3 Loch Fleet NNR – a brief history</td>
<td>16</td>
</tr>
<tr>
<td>4 Management of Loch Fleet NNR</td>
<td>18</td>
</tr>
<tr>
<td>5 Document properties</td>
<td>23</td>
</tr>
</tbody>
</table>
Maps of Loch Fleet NNR

Location map
Reserve boundary
1 Introduction to Loch Fleet NNR

Loch Fleet NNR is located 3km south of Golspie on the east coast of Scotland. The NNR extends to 1,058 hectares (ha) and includes the Loch Fleet tidal basin, sand dunes, shingle ridges and pinewoods. The tidal basin, the largest habitat on the reserve, supports a rich diversity of bird life throughout the year. The basin connects to the Moray Firth through a narrow channel between Ferry Links and Coul Links. These links are botanically rich areas of sand dune, dune grassland and heath. Ferry Wood and Balblair Wood are dominated by Scots pine and contain a number of rare pinewood plants.

A popular place for informal recreation visitors to the reserve can follow a trail through Balblair Woods or less formal paths through the coastal areas. Within Balblair a bird hide provides good opportunities for viewing wildlife. There are viewing points with interpretive panels on the south shore of the basin and at the end of the Littleferry peninsula.

The land within the NNR is owned by Sutherland Estates. From 1970 to 1998 the Scottish Wildlife Trust managed Loch Fleet as a nature reserve in partnership with the estate. In 1998 the land was declared as a National Nature Reserve and has been managed since then by a partnership between Sutherland Estates (SE), Scottish Natural Heritage (SNH) and the Scottish Wildlife Trust (SWT).

The diverse habitats and species of the reserve have led to Loch Fleet being designated for its wildlife interest under a range of UK, EU and international legislation and conventions – Site of Special Scientific Interest (SSSI), Special Protection Area (SPA) and RAMSAR site. The features at Loch Fleet that qualify for these designations are listed in Table 1 and are described in more detail in the next chapter. We have to pay special attention to these features when managing the NNR.
<table>
<thead>
<tr>
<th>Feature</th>
<th>Protected Area</th>
</tr>
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<tbody>
<tr>
<td>Osprey (<em>Pandion haliaetus</em>), breeding</td>
<td>Dornoch Firth and Loch Fleet SPA</td>
</tr>
</tbody>
</table>
| Bar-tailed godwit (*Limosa lapponica*), non-breeding | Dornoch Firth and Loch Fleet RAMSAR  
Dornoch Firth and Loch Fleet SPA |
| Curlew (*Numenius arquata*), non-breeding    | Dornoch Firth and Loch Fleet SPA                    |
| Dunlin (*Calidris alpina alpina*), non-breeding | Dornoch Firth and Loch Fleet SPA                    |
| Eider (*Somateria mollissima*), non-breeding  | Loch Fleet SSSI                                      |
| Greylag goose (*Anser anser*), non-breeding  | Dornoch Firth and Loch Fleet RAMSAR  
Dornoch Firth and Loch Fleet SPA |
| Oystercatcher (*Haematopus ostralegus*), non-breeding | Dornoch Firth and Loch Fleet SPA                    |
| Teal (*Anas crecca*), non-breeding           | Dornoch Firth and Loch Fleet SPA                    |
| Waterfowl assemblage, non-breeding           | Dornoch Firth and Loch Fleet RAMSAR  
Dornoch Firth and Loch Fleet SPA |
| Wigeon (*Anas penelope*), non-breeding       | Dornoch Firth and Loch Fleet RAMSAR  
Dornoch Firth and Loch Fleet SPA |
| Breeding bird assemblage                     | Loch Fleet SSSI                                      |
| Saltmarsh                                    | Dornoch Firth and Loch Fleet RAMSAR  
Loch Fleet SSSI                               |
| Sand dune                                    | Dornoch Firth and Loch Fleet RAMSAR  
Loch Fleet SSSI                               |
| Eelgrass beds                                | Loch Fleet SSSI                                      |
| Sandflats                                    | Loch Fleet SSSI                                      |
| Vascular plant assemblage                   | Loch Fleet SSSI                                      |
| Native pinewood                              | Loch Fleet SSSI                                      |
2 The Natural Heritage of Loch Fleet NNR

Geology

Beneath the blown sand and alluvial deposits of the dunes, lies a bedrock of Old Red Sandstone. This is a sedimentary rock, formed in the Devonian period, between 417 and 354 million years ago. Shingle ridges have been deposited on top of the sandstone; these ridges extend from the Mound Rock at the western boundary of the NNR to the current coastline, and north from Littleferry to Golspie.

As the ice retreated at the end of the last glaciation Loch Fleet became a tidal delta. At this time Loch Fleet was a wide-open bay, embracing a sea loch reaching inland as far as Rogart. Currents sweeping outward gradually dragged shingle across the entrance to the loch, reducing the mouth to a narrow channel through which the tidal current races in and out.

The loch used to extend 6km inland towards Rogart but the building of the Mound causeway between 1814 and 1818 truncated the loch. The causeway, nearly 1km in length, was constructed to carry the main road north, removing the need for one of many ferry crossings on the route between Inverness and Wick. It acts as a tidal barrier, stopping the sea some 2.5km short of its natural tidal limit. The structure, designed by Thomas Telford, allows the River Fleet to continue to flow into the basin and sluices allow salmon and sea-trout to migrate upstream to spawning areas.

Loch Fleet as depicted in Roy’s Military Survey of the Highlands 1747 – 1755, c. 60 years before the Mound causeway was built, showing woodland west of the Culmally burn.
Habitats

The tidal basin

The largest habitat on the reserve is the tidal basin known as Loch Fleet, which extends to over 630ha. At high water the basin is full, but at low tide extensive intertidal mud and sand flats are exposed with the River Fleet cutting a channel through the sediments. Mapping has shown that the sediments in the tidal basin rarely move, with islands and channels staying in the same position year on year. This suggests that there is little change in the quantity of sediment within the basin from year to year.

The sand and mudflats found in the sheltered intertidal areas are very productive, supporting a rich marine fauna of razor shells, cockles and many species of marine worms. There are large mussel beds on the north side of the river channel. These provide rich feeding grounds for waders and wildfowl throughout the year but are especially important during the winter months when they provide undisturbed feeding for migratory birds.

The tidal waters support a range of fish species which in turn provide a food source for other wildlife. Ospreys take flounder and sea trout and otters will take common eel. Coal fish, nine-spined stickleback and pipe fish are also found here. Atlantic salmon and trout pass through the estuary on their way to the River Fleet.
The beds of eelgrass are an important intertidal and shallow sub-tidal habitat. The extensive root systems of the eelgrass help stabilise the shore and seabed, and the beds shelter a range of juvenile fish and provide a source of food for several wildfowl species in winter.

**Saltmarsh**

Saltmarsh has developed around the sheltered shores of Loch Fleet. The largest area is at the head of the bay at Balblair, there is a small patch around three tidal pools at Creag Beag and another area at Skelbo where there is fringing saltmarsh close to the public road. At the head of the loch, the saltmarsh vegetation grades into drier grassland. Characteristic saltmarsh plants include thrift, sea poa grass, sea spurrey, glasswort, mud rush and sea milkwort. The saltmarsh here is unusual in having only been lightly grazed, mainly by rabbits.

**The dunes**

From the mouth of the river northwards along the coast towards Golspie there are raised shingle ridges, separated from the sea by a narrow band of building fore dunes. Fore dunes form where the sands are constantly moved by the action of the sea and winds. Under such harsh conditions only a few plant species are able to survive, the most common being the sand-binding marram grass.

Behind the fore dunes, where the build-up of sand has slowed and erosion is less common, the covering of marram grass increases, its roots and runners stabilising the dunes allowing other species of grass to root. Hollows or 'slacks' behind the foredunes
are damper and cooler, giving prime sites for small pioneers such as sea-milkwort, purple milk-vetch and bird's-foot-trefoil. On Ferry Links the older, more stable dunes and shingle ridges support a mosaic of dune grassland communities.

Three types of grassland community are found here: lichen rich heath fixed dune grasslands with red fescue and lady’s bedstraw; dune grassland with marram grass and lyme grass, and dune grassland with sand sedge, sheep’s fescue grass and common bent grass. Several interesting vascular plants grow amongst the dunes, including variegated horsetail, sea centaury, purple milk vetch, rue leaved saxifrage, moonwort and frog orchid.

On more acidic ground dune grassland is replaced by dune heath with heather and sand sedge. In some places lichens dominate creating lichen-rich dune heath, here carpets of Cladonia lichens, with cushions of Cladonia portentosa and Cladonia ciliata, are found amongst crowberry, bell heather and ling. This lichen-rich dune heath is of particular importance at Loch Fleet. This habitat is sometimes called grey dunes due to the colour of the lichens.

The woodland

There are two areas of woodland in the reserve, each with its own character and interest. Both Ferry Wood and Balblair Wood are plantations of Scots pine but the pinewood flora found in parts of the woods suggest that native Caledonian pine forest may have grown here in the past.

Balblair Wood

Balblair is the older of the two woods and we know that this area was planted sometime between 1781 and 1823. We have evidence of pinewood, possibly of plantation origin, in the vicinity of the NNR, from before 1750. Roy’s Military Survey of 1750 shows a rectangular area of woodland in the general area, but the John Home Survey of Golspie from 1781 shows a rectangular area, clearly labelled ‘Fir Wood (i.e. pine wood) 146 acres’ in the position of the present plantation immediately west of Balblair Cottage. This lies just outside the NNR boundary. John Thomson’s Atlas of Scotland, 1823, shows woodland stretching from the Littleferry road west to the present A9, covering all the present plantation area. While Ordnance Survey maps from the early 1900s show extensive tree cover with occasional unplanted ride or glades. The estate records show an earlier wood was destroyed by a storm in the early 1900s. This was replaced by the current plantation which dates from 1905.
Most of Balblair Wood is now very uniform in appearance, with even-aged trees and limited natural regeneration, however, a trio of unusual pinewood plants is found here – one-flowered wintergreen, creeping lady’s-tresses and twinflower. All three are native to the Caledonian pine forest that once covered large tracts of Scotland, and their presence here may be a legacy of earlier forest in this location. The wood is now managed to benefit these pinewood plants. Ongoing management aims to restructure the woodland to increase the age range of the trees and encourage natural regeneration of pine, birch and other species.

Ferry Wood

The present Ferry Wood is mainly Scots pine planted in the 1960s. Maps from the 18th century do not show woodland here and John Home’s survey (1781) clearly labels the ground as open links and heath. John Thomson’s Atlas of Scotland (1823) shows no trees in the area. The earliest indication is in the 1st edition of the Ordnance Survey map (6-inch scale 1873), which shows scattered trees across part of the area. A revised 1-inch edition of 1896 shows two patches of woodland but by the 2nd edition of the 6-inch (1906), conifer plantation is shown covering more or less the same area as today. The first plantings must therefore be dated between 1823 and 1896 with the possibility that planting had started in 1873.

Most of the present wood, replanted in the 1960s, has a uniform structure typical of a plantation but the central section is more natural. Here the trees range from seedlings to old ‘granny’ pines and the understory is more typical of native pinewood. These trees are presumably the last remnants of the first planting. The woodland is intermingled with patches of lichen-rich heath similar to that found on Ferry Links. Aerial photographs from 1946 show a scattered cover of trees of different ages with large gaps in the tree cover. There is little change evident in the aerial photos taken in the 1960s, suggesting the wood may have been grazed during the intervening years. Today no livestock graze the woodland and there is vigorous regeneration in the open areas at the centre of Ferry Woods.
The wood is now managed to protect the lichen-rich heath and pinewood habitats.

**The species on Loch Fleet NNR**

**Birds**

Throughout the year an interesting bird assemblage can be found at Loch Fleet. The intertidal flats are an important feeding and roosting ground for waders and wildfowl, with the highest numbers during the spring and autumn migrations. Some species stay throughout the winter and others breed in the vicinity. Birds like shelduck, wigeon, teal, curlew and redshank, are all easily seen as they search the mud and seaweed for food.

Greylag goose, wigeon, teal, bar-tailed godwit and dunlin are all part of the assemblage of wintering waterfowl that migrate from their northern breeding grounds either to spend the winter in the relative shelter of the Dornoch Firth and Loch Fleet or to pass through on route to wintering areas further south. Loch Fleet is particularly important for greylag geese in the autumn, for in winter the birds spread further out into the Dornoch Firth. A significant proportion of the greylag geese roosting on Loch Fleet are thought to be from the population breeding in Caithness and Sutherland, these mix with birds from the Icelandic population. Approximately 2% of the UK population of greylags use the Dornoch Firth and Loch Fleet SPA.

Osepreys occasionally nest on the reserve and Loch Fleet is a good place to watch them fishing. Ospreys are one of the success stories amongst Scottish birds, having disappeared from Scotland in the early 1900s but returning regularly to breed in the 1950s. The Dornoch Firth and Loch Fleet SPA supports approximately 10% of the UK breeding population.

In contrast some birds have declined at Loch Fleet for reasons that are not fully understood. The wintering population of long-tailed duck has decreased since Loch Fleet became an SSSI in 1975 to the extent that this species is now unusual here. Similarly the site once supported nationally important numbers of non-breeding eider duck, but numbers are now much lower than they used to be. Little terns used to breed in the reserve but no longer do so, although they can occasionally be seen feeding at the mouth of Loch Fleet.
Over 100 species of bird have been recorded on the reserve, with 49 species having bred since records were started. Arctic and common terns, oystercatchers, ringed plovers, wheatears, stonechats, cuckoos, meadow pipits and skylarks favour the Links.

The pinewoods support birds typical of coniferous forest, including crossbills, siskin, redstart, treecreeper, great spotted woodpecker, buzzard and sparrowhawk. Crested tits have been recorded, but do not appear to be resident.

**Mammals**

Common seals are the most conspicuous mammals at Loch Fleet. They can be seen from the public road at Skelbo where there are usually between 40 and 60 although numbers can rise to 80 in the winter months. Grey seals are rarely seen in summer but small numbers can appear during the winter.

Two European Protected Species, otter and common pipistrelle bats, occur on the reserve. It is likely that other bat species will occur here but this has not been confirmed. Roe deer, red squirrel, fox, pine marten, and weasel have all been noted although there have been no records of red squirrel for a few years now. Wildcat was formerly recorded between Golspie and Littleferry, but anecdotal evidence suggests it is less common now than it was in the 1960s and 1970s.

**Invertebrates**

A variety of butterflies are found on Ferry Links, including green hairstreak, small heath and healthy populations of dark green fritillary and grayling. The rich flowers of the dunes provide a source of nectar for both butterflies and day flying moths. Sightings of day flying coastal moths include the six-spot burnet moth and mother shipton.

Small numbers of speckled wood have been seen in Balblair Wood in recent summers and the colourful painted lady has been observed here too.

Butterflies are monitored as part of the UK Butterfly Monitoring Scheme.
The flora

A total of 265 species of vascular plants have been recorded on the reserve. The plants in Balblair Wood are the most noteworthy; here the three most important species are one-flowered wintergreen, twinflower and creeping lady's-tresses. But there are other uncommon species including common wintergreen and lesser twayblade. These species are more typically found in native pine forests.

One-flowered wintergreen is listed as vulnerable in the Red Data Book. There are only 17 populations in Scotland and the population of over 1,000 plants in Balblair Wood is considered the largest in Britain. Most populations are found within pine forest, usually in pine plantations, so we work closely with forest managers to protect this species. Balblair Wood is an ideal place to monitor the response of this species to different types of woodland management.

Twinflower is a nationally scarce plant usually found in native pine woods. It is the subject of a Biodiversity Action Plan (BAP) because the estimated total UK population of twinflower has declined considerably with a 64% reduction between pre-1970 and post-1970 records. It is now confined to Scotland where it is found in about 50 locations from Caithness to the Borders, with a concentration around the Cairngorms.

Creeping lady's-tresses is one of the few British orchids that is almost exclusive to Scotland, where it is found in remnants of Caledonian Forest mainly in the Highlands in Glen Affric, Strathspey and the Cairngorms. It is a Nationally Scarce plant but it can be locally abundant in the northeast of Scotland. Its national distribution has declined since 1970 and it is no longer found in southwest Scotland or Orkney.

The other habitats at Loch Fleet support a range of important species. The less common species include seaside centaury, a nationally scarce species, purple milk vetch, rue leaved saxifrage, frog orchid, felwort and moonwort. The species found on
the saltmarsh typically include sea poa grass, sea spurrey, glasswort and milkwort, with more unusual species including long bracted sedge, sea pearlwort and grass-leaved orache. Two nationally scarce species have been recorded on the intertidal flats in recent years – narrow-leaved eelgrass and dwarf eelgrass.

Over 110 species of lichen have been recorded, with important areas of lichen-rich heath on both Ferry Links and within Ferry Woods. The lichen flora of Ferry Links is regarded as outstanding because it includes a large number of montane (high upland) rarities. Eight nationally scarce or rare species of lichen have been recorded within Ferry Wood and a further three species on the dunes. Cladonia species are dominant; however Peltigera and Lecanora species are also well represented.

Over 50 species of fungi have been recorded on the reserve. There are three rare species of tooth fungi, the drab tooth fungus, the brown coryk spine fungus and the scaly tooth fungus; all three are Red Data Book species with their own BAP.

Summary

Loch Fleet NNR has an unusual combination of habitats with the tidal basin, sand dunes and pine woodlands supporting a diverse flora and fauna. Of particular note are the unusual pinewood plants, including the largest population of one-flowered wintergreen in Scotland and several rare fungi and lichens. The reserve is also important for wintering birds with large numbers gathering to feed and roost on this rich coastal site.
The following short overview lists evidence found near Loch Fleet during different eras.

**Neolithic (4000–2000 BC)**

Hunter-gatherers first exploited the abundant natural resources of the Moray Firth about 8,000 years ago. The presence of shell middens, burial mounds, a rough-cut stone axe and flint implements from this era have been discovered near Littleferry.

**Bronze Age (2000–750 BC)**

Stone cists dating from the Bronze Age were found at Cambusmore and Skelbo on the southern shore. Further evidence of settlement from this era has been discovered at Culmaily in the form of hut circles and field systems with clearance cairns. A Bronze Age axe was discovered at Cambusmore.

**Iron Age at (750 BC–AD 43)**

The remains of a souterrain (an earth-house) were excavated at Kirkton just north of the Reserve. On the south shore within Skelbo woods are the remains of an Iron Age Broch. A more intact broch, Carn Liath, can be found just north of Dunrobin Castle.

**Romans in Scotland (AD80–399)**

Beginning of Carved symbol stones from the Pictish era, with rod and crescent Scotland symbols, have been discovered at both Ferry Links and Littleferry. The stones can be seen in Dunrobin Castle Museum.

**Wars of independence (1286–1370)**

On a rise to the south of Loch Fleet stand the remains of Skelbo Castle. The original buildings, a keep and barmkin, are thought date from the 14th Century. The remains show evidence of a fine example of an early Norman fortress of motte and bailey type. (The buildings are signed as dangerous and access is not advised).

**The Stewarts (1371–1487)**

From Viking times the main north/south route was along the coast, and the main way to cross Loch Fleet was by ferry. The hamlet of Littleferry grew up on the north side of the Loch and became a focal point for local fishermen and ferry users. In its heyday, as well as Littleferry House, there was a ferryman’s house, a pilot’s house, a customhouse, three stores for fish and other produce, an icehouse (still in existence), a pier store and an inn.

**Stuarts (1603–1713)**

The parish of Golspie was originally named Kilmalie and had its church and burial ground at what is now Kirkton Farm a short distance north of the Reserve. Sir Robert

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1 Timeline dates taken from BBC History website.
Gordon had the church transferred to Golspie in 1619 when St. Andrew’s became the parish church.

**North Britons and Jacobites (1714–1836)**

In 1812 the Mound Causeway was started as a way of shortening the north south route along the east coast. It was completed in 1818 after numerous failed attempts to bridge the final section of approximately 100m. This final section contains a series of gates to allow the River Fleet to flow into Loch Fleet and to allow salmon to reach their spawning grounds up river. The importance of Littleferry declined when the causeway was completed because it shifted the main route for goods going north.

**Modern Scotland (1901–1944)**

In 1902 a short section of railway line was built along the south shore of Loch Fleet from the main line at the Mound to Dornoch. There were stations at Embo, Skelbo and Cambusavie. The last train ran in 1960. The line is marked on the 1:50 000 OS maps as dismantled railway.
Management of Loch Fleet NNR

Key events

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>1970</td>
<td>Loch Fleet became a Scottish Wildlife Trust Reserve under agreement with Sutherland and Cambusmore Estates</td>
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<tr>
<td>1975</td>
<td>Notified as a Site of Special Scientific Interest (SSSI)</td>
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<td>1984</td>
<td>SSSI renotified</td>
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<td>1995</td>
<td>Nature Conservation Order served on all intertidal land to protect marine invertebrates from exploitation</td>
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<td>1996</td>
<td>100 year Management Agreement concluded over Balblair Wood</td>
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<td>1997</td>
<td>Dornoch Firth and Loch Fleet Special Protection Area proposed</td>
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<td>1997</td>
<td>Dornoch Firth and Loch Fleet RAMSAR site proposed</td>
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<tr>
<td>1997</td>
<td>25 year Management Agreement concluded over Loch Fleet, Ferry Links and Ferry Wood</td>
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<tr>
<td>1998</td>
<td>25-year partnership concluded between SNH and SWT in agreement with Sutherland Estates for the future management of the Reserve</td>
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<tr>
<td>1998</td>
<td>Loch Fleet declared a NNR</td>
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Management of Loch Fleet NNR

Loch Fleet NNR is managed by a partnership of Sutherland Estates, Scottish Natural Heritage and the Scottish Wildlife Trust.

Management of the natural heritage

We do not actively manage the tidal basin but keep it as a quiet area, left to nature with minimal disturbance. In the mid-1990s we became concerned that shellfish collection and bait digging could have a detrimental impact on food supplies of the birds, so in 1995 we obtained a Nature Conservation Order (NCO) to prevent collection and removal of marine invertebrates from the intertidal areas. The NCO remains active and signs are put out each year to inform people about it.

The dunes and dune heath are vulnerable to colonisation by trees and scrub. The plantations are a constant source of seed and the open heath offers a good habitat for the seed to germinate. To prevent the dunes and heath turning into scrub woodland we remove young trees and clear gorse scrub. Much of this work is done by the Scottish Wildlife Trust working with volunteers.

The dune and heath communities are fragile and susceptible to erosion. The main threats are motorcycles, quad bikes and other motorised vehicles. Access by these vehicles is against the law. Vehicle tracking damages the ground cover and opens up
bare sand where the impact is exacerbated by wind erosion. To prevent further
damage we have erected low-level barriers to restrict off-road access and temporary
signs to explain the restrictions on vehicular access.

Since 1997 management for nature conservation has been the priority in both Balblair
and Ferry Woods. Balblair is important for its rare pinewood plants, so the woodland
management is designed to ensure continuity of habitat for the rare species. The
woodland is divided into compartments and we have agreed the management for each
compartment with the estate. The focus is to restructure the plantation to create more
natural woodland with a wider age range of trees and open glades, so the wood is being
thinned, and exotic species, such as rhododendron are being removed. We monitor the
rare plants and ground vegetation to check the success of woodland management
operations.

Ferry Wood was replanted in the 1950s but the soils are thin and nutrient poor so
growth has been limited. The central area of the wood was not planted and is more
open with a well-developed ground flora rich in lichens, which is closer in composition to
the flora of the open dunes than woodland. The management here is designed to
increase the conservation value by improving the structure within the plantation areas
while maintaining the areas of lichen rich heath. The wood is being thinned selectively
to maintain the open structure preferred by the lichens.

Selected coups in Balblair wood were thinned in 2014 to encourage natural
regeneration of the Scots pine and the resulting brash was carefully placed to suppress
heather to create artificially create natural expansion areas for one-flowered
wintergreen. Selective thinning of Ferry Wood started in late 2014 and will be phased
over the next two winters to improve the age structure and resilience of the wood. In
early 2015, work began to remove non-native species, notably Sitka spruce, lodgepole
pine and rhododendron, from Balblair wood.

For the birds we focus our management effort on limiting disturbance. In years when
terns have nested in or close to the NNR, we have erected signs to keep people a safe
distance from nesting colonies. After ospreys tried but failed to breed within the
reserve, we built an artificial nest platform in a quieter area of the reserve. This special
platform was used in its first year (2004) with young ospreys fledging successfully, and
has since been a great success.

Large areas of the reserve are low lying and close to the high tide mark. Should sea
levels continue to rise it is likely that some parts of the site will be flooded more
frequently than at present. We have recently noted changes in the profile of the dune
system between Golspie and Littleferry with a notable reduction in embryo dune within
the reserve. SNH were involved in a research project to identify the causes of these
coastal changes to the immediate north of the reserve. A proposed beach
replenishment project designed to protect the area adjacent to the kart track, caravan
park and golf course should also bring benefits to the reserve.

Such changes are not a new phenomenon and have been occurring for millennia, so
where these do not conflict with other objectives, we will allow coastal processes to
continue to develop naturally. In the short term this could, for example, result in the
formation of saltmarsh vegetation on part of Ferry Links in place of coastal grassland.
Research

The main emphasis of research has been data collection. A survey of the invertebrate fauna was conducted in 1975 and a survey of the lichen flora of Ferry Wood in 1987. We have monitored the population of one-flowered wintergreen since 1988, and the Royal Botanic Garden of Edinburgh (RBGE) has included this plant in their rare plant-monitoring programme. Their work has helped inform site management for this rare pine gem. Decaying branches on the woodland floor suppress heather and helps create damp and mossy micro-habitats which the wintergreen favours. Large branch-fall occurs during notable storm events, but this can also be recreated during woodland management to benefit one-flowered wintergreen. RBGE surveys have shown that this NNR still supports the largest population of one-flowered wintergreen in the UK.

Waders and wadingfowl have been counted regularly as part of the national Birds of Estuaries Enquiry (BoEE) survey, now called the Wetland Bird Survey (WeBS). These waterfowl counts have been undertaken since the 1960s. SWT wardens’ reports from 1984–96 include records of breeding birds, mammals, plants and insects as well as more in depth surveys of particularly important communities and species. The butterflies have been monitored as part of the National Butterfly Monitoring Scheme since 1992.

The North Highland Bat Network (NHBN) erected bat boxes around the reserve in 2007 to assess bat use of the pine woodland. Their research indicates that pipistrelle bats are the most common, although brown long-eared and Daubenton’s bats have also been recorded.

The bat boxes are checked annually by the NHBN members in the autumn and so far they appear to be being used as non-breeding roosts. The 2015-2025 management plan aims to support bat research on the reserve and install new large bat boxes to attract larger bat species.

The University of Aberdeen has been conducting research into harbour seals at Loch Fleet for over 10 years covering a wide variety of topics ranging from their abundance to foraging behaviours to diseases and parasites. More recently seals have been GPS tracked to ascertain their movements within the wider Moray Firth area. All of which makes this one of the most intensively studied seal populations in the world.

Management for people

Loch Fleet NNR offers opportunities for visitors to experience wildlife throughout the year. Local people and visitors make good use of the Reserve for recreation. We estimate that over 8,000 visits to the Reserve are made every year with most people
visiting during the summer months. Visitor surveys have shown that people use NNRs to enjoy the peaceful atmosphere, scenery and wildlife watching opportunities.

Ferry Links and the adjoining beach are the most popular parts of the Reserve. A network of informal paths crosses the dunes; the most well used being the old coast road between Littleferry and Golspie. For many years a small area at the northern end of the Reserve has been used intermittently as a clay pigeon shoot, although this is now largely ceased operation.

The woodland walk through Balblair Wood was way-marked in 2004 by the Highland Access Project. The track runs from the Littleferry road, through Balblair Wood, to Kirkton Farm, with a branch continuing along the edge of the woodland near the shore of Loch Fleet towards the Mound. Although the track is not surfaced it is the most suitable track on the reserve for less-abled visitors. Ferry Wood has no vehicular access or no formal paths.

In the 1980s and 1990s SWT employed a seasonal warden at Loch Fleet from April–September, but there has been no seasonal warden since 2001. The warden’s work included practical site management, monitoring of interesting species and habitats, a programme of guided walks, interpretation and education about the importance of the reserve for wildlife.

As a replacement the Highland Council Ranger Service now offers a programme of guided wildlife walks and special events on the Reserve during the summer months. These are advertised locally and are normally well attended. The site has been used by very small numbers of educational groups, and we think there may be further opportunities for educational groups and groups from the local community to use the reserve.

There are several interpretive panels around the Reserve and the NNR leaflet is widely available. In 2004 Golspie Community Council produced the Golspie Walks booklet, which includes walks on the Reserve. New orientation panels with built-in leaflet boxes were installed in 2008 for its tenth anniversary. In 2015 we will be carrying out a study to examine the benefit of the existing interpretation and to identify potential improvements which can be made to enhance the visitor experience.

The reserve has several car parks. Highland Council maintains the car park at Skelbo which provides a good view of the site and is an excellent place to watch and listen to the birds and common seals in the estuary. The car park at the Mound is maintained by both Bear Scotland and Highland Council and provides visitor information on the reserve. The car parks at Littleferry and Balblair Bay have viewpoints overlooking the reserve and access to dune links walk, while Balblair car park is the main access point to the woodland walk.
The Balblair Bay Bird hide was built in 2010 and was developed in partnership between Highland Birchwoods, SNH, Sutherland Estates and SWT. The hide was built to demonstrate innovative construction techniques using local sustainably managed Scots pine and timber and provides excellent views across Balblair Bay where visitors can experience Loch Fleet’s wildlife.

In January 2014, we replaced the Culmaily bridge in Balblair wood with a new all abilities access bridge. The bridge was funded by Sutherland Estates and SNH and the Forestry Commission Scotland designed and project managed the bridge.

Management of the property

Loch Fleet is owned by Sutherland Estates and managed through agreement with SNH. The management agreement over Balblair Woods lasts until 2096, while the agreement over Loch Fleet and Ferry Wood lasts until 2022. SNH also has a partnership agreement with SWT whereby both parties agree to work with the owners to coordinate the conservation management of the NNR. This agreement runs from 1998 until 2023.

Loch Fleet NNR has a Liaison Group, which meets biennially to share information and contribute to management decisions on the reserve. The Group consists of representatives from SNH, Sutherland Estates, SWT, the local community and other interested parties.

Summary

Loch Fleet NNR is a very important place for wildlife. The estuarine habitat is largely left to natural processes so we carry out very little management. In the dunes we are working to control tree and scrub colonisation and damage by vehicles. In the woods our management is designed to maintain suitable habitats for rare plants and lichens and control non-native species, while selectively thinning the trees to improve regeneration. We have provided facilities for visitors so that they can enjoy the Reserve and learn more about its wildlife by using the footpaths, interpretive panels, leaflets, and guided walks.

If you would like to find out more about the management of Loch Fleet NNR, please contact the SNH office in Golspie.
5 Document properties

Photography

Photography by Lorne Gill/SNH and David Patterson, SNH

Acknowledgements

The first edition (2007) of the Story of Loch Fleet Wood National Nature Reserve was written by David Patterson (Reserve Manager), edited by Susan Luurtsema (Managed Sites Officer) and approved by Lesley Cranna (Area Manager – North Highland).

The second edition of the Story of Loch Fleet National Nature Reserve (2015) has been updated by Adam Rose (Reserve Manager), edited by Susan Luurtsema (Operations Officer) and approved by Graham Neville (Operations Manager – Northern Isles and North Highland).

Links

For information about Scotland’s National Nature Reserves and further information about Loch Fleet NNR please go to http://www.nnr-scotland.org.uk/loch-fleet/

For information on the protected areas associated with Loch Fleet NNR please go to www.snh.org.uk/snhi/

Other useful links:

Scottish Natural Heritage www.snh.org.uk

Joint Nature Conservation Committee www.jncc.gov.uk

Scottish Wildlife Trust
Main site: http://scottishwildlifetrust.org.uk/
Loch Fleet: http://scottishwildlifetrust.org.uk/reserve/loch-fleet/

Butterfly Conservation Trust www.butterfly-conservation.org.uk