



Scottish Natural Heritage

**FIRTH OF FORTH
Site of Special Scientific Interest**

SITE MANAGEMENT STATEMENT

Site code: 8163

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Purpose



This is a public statement prepared by SNH for owners and occupiers of the SSSI. It outlines the reasons it is designated as an SSSI and provides guidance on how its special natural features should be conserved or enhanced. This Statement does not affect or form part of the statutory notification and does not remove the need to apply for consent for operations requiring consent.

We welcome your views on this statement.

Description of the site

The Firth of Forth Site of Special Scientific Interest (SSSI) covers the coastline stretching from Alloa along the Fife coast as far as Crail and along the Falkirk and Lothian coast to Dunbar.

The site is important for the variety of coastal habitats which are found. The estuary west of the Forth Bridges contains extensive invertebrate-rich intertidal mudflats which provide feeding grounds for nationally and internationally important numbers of wintering and migratory birds. Most of these are waders but there are also large numbers of wildfowl, particularly shelduck and pink-footed geese. Behind these mudflats are often saltmarshes which, as well as supporting scarce plants and providing feeding and roosting grounds for birds, are also a natural coastal defence, absorbing the impact of waves.

The 2003 site condition monitoring (SCM) assessment of the saltmarsh found the feature to be in an unfavourable condition; however, this was largely due to the survey methodology used as the vast majority of the feature is actually in favourable condition. Of the eleven wader species listed on the citation, ten are currently in favourable condition with one unfavourable (knot). Pink-footed goose, shelduck and wigeon are all in favourable condition while mallard are currently unfavourable. For all the bird species on the Forth, the reasons for declines and increases are generally unknown; some may be due to changes in migration destination (birds staying further north and east due to milder winters) and some may be because of changes in their food supplies.

The estuary area also has a few areas of reedbeds (transition grassland) and some

saline lagoons, the latter being uncommon in south east Scotland. The transition grasslands and saline lagoons were found to be in favourable condition during SCM assessments in 2004 and 2008 respectively, with the latter showing a gradual decline in condition due to the presence of an active culvert which was affecting the fresh/saline water ingress/egress.

In the Firth east of the bridges, the mudflats become sandier but still support many feeding birds. Here, rocky shorelines are also more prevalent, home for a slightly different mix of birds compared to the mud and sand flats. Shingle beaches are also found in this area. Offshore, the deeper waters of the Forth attract large numbers of sea ducks, grebes and divers. These include flocks of eider for which the Forth is an important moulting area. Recently, the populations of these seagoing species have been in decline and of the seven sea duck species, four are currently in unfavourable condition, two are favourable and one is favourable but declining. Red-throated diver and Slavonian grebe are in favourable condition although the latter is declining. Great crested grebe are also unfavourable while cormorant are currently favourable.

The Firth of Forth supports an important post-breeding passage population of Sandwich terns which while currently in favourable condition is declining.

Sand dunes have developed behind many of the beaches of the Firth. These areas support several uncommon and fragile plant communities, including grasslands and specialised lichen habitats. Several bird species also nest amongst the sand dunes. The sand dunes are currently considered to be in unfavourable-declining condition due to a variety of habitat issues including overgrazing, scrub encroachment and the presence of undesirable species. Of the three notified bird species that breed there (and on some other areas), eider and ringed plover are currently unfavourable while shelduck, are in favourable condition.

Botanically rich grasslands containing both nationally and locally rare plant species can be found all around the Forth. These grasslands vary from those on and behind sand dunes to those found on clifftops and between neutral and calcium-rich soil types. Maritime cliff grassland and lowland neutral grassland are notified features; both are currently considered to be in unfavourable condition, as is the vascular plant assemblage feature. These grasslands are in poor condition for a number of reasons, including lack of grazing, scrub encroachment, and a lack of certain desirable indicator species present. Some of the coastal grasslands in Fife have small populations of the nationally scarce northern brown argus butterfly (which feeds on the regionally scarce rock rose); this species is currently considered to be in favourable condition. A number of rare beetles are also found along the coastline, unfortunately in unfavourable condition as the habitats that support them are in poor condition.

While not being notified features of the SSSI, other interesting birds found include the only mainland kittiwake colony on the Forth at Dunbar, and cliff-nesting house martins around Tantallon Castle near North Berwick (most birds now nesting on buildings).

As well as the biological interest, the Firth of Forth is important for the wide range of geology that can be found, especially in the Firth west of the Bridges where the coastline is rockier. This geological and geomorphological diversity includes many features which have aided in the understanding of the Earth's history and, as such, are extremely important. These features include fossil deposits, volcanic rocks, minerals, strata exposures and raised beaches. Of the nine geological or geomorphological features, six are in favourable condition, with three being unfavourable. All three unfavourable features are obscured in some way, either by graffiti or dumped material.

Much of the intertidal area of the Firth of Forth SSSI is also classified as a special protection area (SPA) under the European Wild Birds Directive and also designated as a Ramsar Wetland of International Importance. The SPA was classified to give greater protection to the internationally important numbers of waders and wildfowl which visit the area during winter and on migration.

Natural features of Firth of Forth SSSI	Condition of feature (and date monitored)	Other relevant designations
Lower Carboniferous [Dinantian – Namurian (part)]	Unfavourable – no change (March 2008)	
Upper Carboniferous [Namurian (part) -Westphalian]	Favourable - maintained (October 2002)	
Carboniferous – Permian Igneous	Unfavourable – no change (November 2008)	
Mineralogy of Scotland	Favourable - maintained (October 2002)	
Arthropoda (excluding insects & trilobites)	Unfavourable – no change (January 2009)	
Palaeozoic Palaeobotany	Favourable - maintained (November 2008)	
Permian - Carboniferous Fish/Amphibia	Favourable - maintained (March 2008)	
Quaternary of Scotland	Favourable - maintained (October 2002)	
Coastal Geomorphology of Scotland	Favourable - maintained (August 2002)	
Maritime cliff	Unfavourable - declining (October 2002)	
Saltmarsh	Unfavourable - declining (July 2003)	
Sand dunes	Unfavourable - declining (October 2000)	
Saline lagoon	Favourable – declining (September 2008)	
Lowland neutral grassland	Unfavourable – declining (August 2009)	
Transition grassland	Favourable – maintained (September 2004)	
Vascular plant assemblage	Unfavourable – declining (August 2004)	
Beetle assemblage	Unfavourable – declining (October 2000)	
Northern brown argus (<i>Aricia artaxerxes</i>)	Favourable - maintained (October 2007)	
Red-throated diver (<i>Gavia stellata</i>), non-breeding	Favourable – maintained (October 2010)	Firth of Forth SPA
Great crested grebe (<i>Podiceps cristatus</i>), non-breeding	Unfavourable – declining (October 2010)	Firth of Forth SPA
Slavonian grebe (<i>Podiceps auritus</i>), non-breeding	Favourable – declining (November 2010)	Firth of Forth SPA, Ramsar
Cormorant (<i>Phalacrocorax carbo</i>), non-breeding	Favourable – maintained (October 2010)	Firth of Forth SPA
Pink-footed goose (<i>Anser brachyrhynchus</i>), non-breeding	Favourable – maintained (October 2010)	Firth of Forth SPA, Ramsar

Natural features of Firth of Forth SSSI	Condition of feature (and date monitored)	Other relevant designations
Shelduck (<i>Tadorna tadorna</i>), non-breeding	Favourable – declining (November 2010)	Firth of Forth SPA, Ramsar
Wigeon (<i>Anas penelope</i>), non-breeding	Favourable – recovered (November 2010)	Firth of Forth SPA
Mallard (<i>Anas platyrhynchos</i>), non-breeding	Unfavourable – declining (October 2010)	Firth of Forth SPA
Scaup (<i>Aythya marila</i>), non-breeding	Unfavourable – declining (November 2010)	Firth of Forth SPA
Eider (<i>Somateria mollissima</i>), non-breeding	Favourable – declining (October 2010)	Firth of Forth SPA
Long-tailed duck (<i>Clangula hyemalis</i>), non-breeding	Unfavourable – declining (October 2010)	Firth of Forth SPA
Common scoter (<i>Melanitta nigra</i>), non-breeding	Unfavourable – declining (October 2010)	Firth of Forth SPA
Velvet scoter (<i>Melanitta fusca</i>), non-breeding	Favourable – maintained (November 2010)	Firth of Forth SPA
Goldeneye (<i>Bucephala clangula</i>), non-breeding	Unfavourable – declining (October 2010)	Firth of Forth SPA, Ramsar
Red-breasted merganser (<i>Mergus serrator</i>), non-breeding	Favourable – declining (October 2010)	Firth of Forth SPA
Oystercatcher (<i>Haematopus ostralegus</i>), non-breeding	Favourable – maintained (October 2010)	Firth of Forth SPA
Ringed plover (<i>Charadrius hiaticula</i>), non-breeding	Favourable – maintained (October 2010)	Firth of Forth SPA
Golden plover (<i>Pluvialis apricaria</i>), non-breeding	Favourable – maintained (October 2010)	Firth of Forth SPA
Grey plover (<i>Pluvialis squatarola</i>), non-breeding	Favourable – declining (October 2010)	Firth of Forth SPA
Lapwing (<i>Vanellus vanellus</i>), non-breeding	Favourable – maintained (October 2010)	Firth of Forth SPA
Knot (<i>Calidris canutus</i>), non-breeding	Unfavourable – declining (October 2010)	Firth of Forth SPA, Ramsar
Dunlin (<i>Calidris alpina alpina</i>), non-breeding	Favourable – declining (October 2010)	Firth of Forth SPA
Bar-tailed godwit (<i>Limosa lapponica</i>), non-breeding	Favourable – declining (October 2010)	Firth of Forth SPA, Ramsar
Curlew (<i>Numenius arquata</i>), non-breeding	Favourable – maintained (October 2010)	Firth of Forth SPA
Redshank (<i>Tringa totanus</i>), non-breeding	Favourable – maintained (October 2010)	Firth of Forth SPA, Ramsar
Turnstone (<i>Arenaria interpres</i>), non-breeding	Favourable – maintained (November 2010)	Firth of Forth SPA, Ramsar
Sandwich tern (<i>Sterna sandvicensis</i>), passage	Favourable – declining (November 2010)	Firth of Forth SPA, Ramsar
Eider (<i>Somateria mollissima</i>), breeding	Unfavourable – no change (May 2006)	
Ringed plover (<i>Charadrius hiaticula</i>), breeding	Unfavourable – declining (June 2007)	
Shelduck (<i>Tadorna tadorna</i>), breeding	Favourable – maintained (July 2003)	

Features of overlapping Natura sites that are not notified as SSSI natural features	Condition of feature (date monitored)	SPA or Ramsar
Waterfowl assemblage, non-breeding	Favourable – declining (November 2010)	Firth of Forth SPA, Ramsar

Saltmarsh, mudflats and Grangemouth Refinery	Saltmarsh at Skinflats
	

Past and present management

The land adjoining the Firth of Forth has been densely populated for centuries. As a result, the habitats fringing the Firth have been heavily used and altered. Large parts of the intertidal and coastal habitat around the Firth of Forth have been reclaimed, initially for agricultural and later for industrial purposes. In the Inner Forth, about 50% of the intertidal area has been claimed in the last 200 years. Sea walls and barriers have been constructed along much of the coastline during this period to aid in this conversion of intertidal land to other usage. Major sites of reclamation include Skinflats, Grangemouth, and Rosyth in the Inner Forth and Leith Docks and Musselburgh in the Outer Forth. Farmland, chemical works and docks can all be found on former intertidal land. Further reclamations were carried out to create lagoons for the settling of pulverised fuel ash produced by Longannet and Cockenzie coal-fired power stations. These lagoons removed large areas of intertidal mud and sand at Torry Bay and Musselburgh. While the lagoons provide habitat for roosting birds, there has been an overall net loss of habitat.

Coal mining was a major industry on the Forth for centuries until recent years. Several deep mines were located on the shores of the Firth, including Seafield and Frances near Kirkcaldy and Longannet near Kincardine. These mines have had a major influence upon adjacent parts of the Firth. The waste from the Fife coastal mines was deposited on the foreshore, creating large bings which, over the years, have been eroded away by the sea. Now, without the protection of the bings, this coastline is beginning to suffer severe erosion problems.

The coastline near Alloa has also changed dramatically due to the presence of mines. Alloa Inch and Tullibody Inch, two islands in the centre of the Forth, used to be farmed and the larger of the two had a farmhouse and outbuildings. Subsidence due to the mines underneath the Forth has lowered the level of the land to below sea level. As a result, the sea walls were breached several years ago and farming became untenable due to the increasingly saline conditions. Now the islands are covered in saltmarsh

and reedbeds and are owned by the Scottish Wildlife Trust (SWT) and managed as reserves. In March 2002, Longannet Colliery flooded, forcing its closure as the last deep mine in Scotland.

The Firth itself has been a major transportation route for local traffic and international trade for many centuries. Many harbours of various sizes were built along the Forth. Several of these, including Rosyth, Leith Docks, and, in particular, Grangemouth, involved large-scale land reclamation. More recently, however, as use of some of these docks has declined, wildlife has returned and now large numbers of birds can be found in some harbours and docks.

Several major bridges cross the Forth: the Kincardine Bridge and new Clackmannanshire Bridge over the upper Forth and the Forth Bridge and Forth Road Bridge crossing at the narrows between the estuary and the firth proper. A new road crossing is currently planned for this area, crossing just to the west of the existing road bridge.

A hovercraft service is proposed between Edinburgh and Kirkcaldy. This will involve the craft landing on beaches at either end.

The Firth of Forth has historically been used for disposal of domestic, industrial and agricultural effluents. Considerable improvements in the water quality have been made over the last two decades as a result of pollution control by the regulatory authorities, and investment in treatment facilities by local authorities and industrial and commercial bodies. Ironically, the clean-up operations have led to a reduction in numbers of some species of waterfowl, particularly sea duck; however, they have also resulted in an improvement in the overall health of the Firth of Forth ecosystem and an increase in the naturalness of the site.

Mainly due to the nature of the habitats included within the Firth of Forth SSSI, there has been little recent agricultural activity. Some areas, including many areas of saltmarsh, dune, and grassland, have been grazed in the past and this activity still occurs on some grassland areas.

Fishing was formerly an important part of the economy in the Forth but declined due to the increasingly polluted waters. Oysters used to be plentiful and commonly eaten but now are virtually extinct. Mussels, cockles, winkles and razor shells have all been exploited in the past, with small-scale collection of the last three still taking place in certain areas. Creel fishing for crabs, lobsters and prawns was also a large industry but has declined severely, though a few boats still work the East Fife and East Lothian coasts.

Recently, commercial cockle fishing became prominent in the Forth. Concern was raised that uncontrolled collection could harm not only the cockle populations but also the birds which feed on them and other intertidal dwelling invertebrates. As a result of this concern, a Special Nature Conservation Order was imposed, which stopped this activity. Stock assessments will be carried out to ascertain at what level cockle fishing could be resumed in the future.

Fin fish collection was also important, with salmon netting occurring in the upper Firth of Forth and fisheries for various species operating in inshore waters as well as going further afield. The formerly important sparring (or smelt) fishery collapsed due to

extremely low stocks of this fish. In recent years, this species has returned to the Forth in small numbers and it is hoped a fishery may be restarted.

Renewable energy production is likely to become a major feature of the Forth, with various projects proposed. These include wind turbines and biomass plants in docks, and several large offshore wind farms proposed for the sea area east of the mouth of the Forth, extending out beyond the Scottish waters into the UK waters (beyond 12 nautical miles). Several docks are likely to be used for construction and servicing of the offshore turbines.

Informal recreation such as bait digging, dog walking and birdwatching take place, with heavier recreational use of areas such as John Muir Country Park, Aberlady Bay and Torry Bay Local Nature Reserves and coastal footpaths (e.g. Fife Coastal Footpath). Most informal recreation on the mudflats is fairly low-key since the substrates are unsuitable, but recreational pressure is higher on the rocky and sandy shores and on the grasslands, particularly in the outer Firth. Recreational use of the Firth itself takes place, for example sailing, sight-seeing cruises and jet skiing.

The John Muir Country Park was established in 1976 to encourage recreational usage of this part of the coastline. In 1952, Aberlady Bay became the UK's first Local Nature Reserve (LNR). The SWT set up a reserve at Alloa Inches in 1996 and the RSPB also have a reserve at Skinflats since 2005.

Wildfowling occurs in low levels around the Forth. In some areas, such as the John Muir Country Park and Aberlady Bay, it is regulated with permit systems.

There is little in the way of active management of the intertidal areas of the Forth. Some management of associated habitats such as the saltmarsh and grasslands by grazing or cutting does occur. For example, grazing of saltmarsh occurs at Skinflats and some grassland mowing takes place at Blackness. Grassland is cut and managed at Aberlady, Gullane and Dunbar by the golf courses in which they are located. There have previously been a number of SNH management agreements in place, mainly for scrub and weed control and SNH has previously grant-aided a programme of sea buckthorn removal on grasslands in East Lothian. A number of areas are currently managed under the SNH East Scotland Grassland Management Scheme (ESGMS), largely relating to scrub control. Ongoing sea wall maintenance takes place around the Forth as breaches appear from time to time.

Wader foot and beak prints in mud	Goldeneye
	

Northern brown argus (<i>Aricia artaxerxes</i>)	Sand dunes at Gullane Point
	

Objectives for Management (and key factors influencing the condition of natural features)

We wish to work with the owners and occupiers to protect the site and to maintain and, where necessary, enhance its features of special interest. SNH aims to carry out site survey, monitoring and research as appropriate to increase our knowledge and understanding of the site and its natural features and to monitor the effectiveness of any management.

The EU Habitats and Birds Directives oblige Government to avoid, in SACs and SPAs, the deterioration of natural habitats and the habitats of species, as well as disturbance of the species for which the areas have been designated, in so far as such disturbance could be significant in relation to the objectives of these Directives. The objectives below have been assessed against these requirements. All authorities proposing to carry out or permit to be carried out operations likely to have a significant effect on the European interests of this SSSI must assess those operations against the relevant Natura conservation objectives (which are listed on our website through the SNHi - SiteLink facility).

1. To maintain the populations of birds for which the Firth of Forth is internationally and/or nationally important.

The birds of the Firth of Forth have had mixed fortunes since notification in 2000, with some species increasing spectacularly, some crashing and many less dramatic changes. The most recent monitoring cycle found the majority are either in unfavourable condition or favourable but declining. No obvious pattern has emerged to explain these changes, with species with seemingly similar habits experiencing drastically different fortunes. For example, it could be that recreation on intertidal areas and bait digging are causing the decline of bar-tailed godwit, yet curlew, which inhabit a similar habitat niche, have doubled in numbers since 2000.

For many species, the processes affecting their populations may be linked to factors

outwith the Firth of Forth SSSI/SPA, including shifts in migration leading them to winter further east than before. This is supported by the national increases in some species which have declined locally.

Climate change is possibly affecting some species, such as cormorant or sea duck, due to changes in the marine ecosystem affecting prey species populations.

Any issues that can be dealt with from a site management perspective are discussed under the next objective.

2. To maintain the area in a favourable condition to allow for the continued feeding, resting, roosting and breeding of all the key bird species which use the area.

The main habitats which support birds are the intertidal areas (mud, sand, shingle, rock, and saltmarsh) and sand dunes, the last being primarily important for breeding birds.

Any permanent or long-term loss of intertidal area is considered critical and may cause damage to the ecological functioning of the site by removing important bird feeding areas. This can increase the density of birds on other areas, potentially leading to overcrowding and impacts on bird survival and populations.

There is increasing development pressure along most of the Forth coastline, particularly for industrial use but also for leisure developments such as golf courses. However, the shoreline should be adequately protected by planning controls. The proposed Forth Replacement Crossing may have some impacts upon the SSSI which will need to be assessed fully before construction begins.

Habitats may be lost through “coastal squeeze”. This is where the sea level rises but sea walls or other developments or land use prevents habitat formation inward, thereby restricting the transition of intertidal habitats. With climate change, this could be an increasing problem. Breaching sea walls in certain areas has been considered to allow some flooding and re-creation of intertidal and transitional habitats in these areas. These options have been considered in parts of the inner Forth such as at Skinflats. Sand dunes could also be lost or heavily modified where land uses inshore inhibit their natural migration.

Preventing damage to these habitats is equally critical for their continued use by birds. The greatest threat to most intertidal areas is through pollution, either from land or from the sea, largely from industrial and farming effluents. However, with increasing regulations and controls, this is becoming less of a problem. The presence of three large petrochemical facilities, the oil refinery at Grangemouth, the Hound Point oil terminal and the Braefoot gas terminal, increases the risk of an accident involving a large-scale spill. The Maritime & Coastguard Agency, local authorities and Forth Ports plc. produce oil spill contingency plans should any such event occur. Care must also be taken to prevent non-industrial and small-scale pollution incidents which could lead to sections of the site being damaged.

Saltmarshes need to be managed sensitively to avoid damage. This largely involves preventing overgrazing and controlling recreational activities to appropriate levels. Dumping of waste material also damages saltmarshes in some areas.

Disturbance to birds must be minimised as much as is possible. Wintering birds are particularly at risk due to increased energy demands in cold weather. Frequent disturbance means they run the risk of expending more energy through avoidance/feeding than they manage to gain from food consumed.

All round the Forth, the coast is being used by an increasing number of people for recreational activities. This increased use is creating more disturbance issues for birds and may be causing a decline in the breeding populations of the notified breeding birds, all of which nest on the ground near the shore. Management of the coastal zone should attempt to control certain activities where they are impacting upon the wintering and breeding birds. East Lothian Council are currently looking at ways to manage the coast and its visitors to allow more birds to successfully nest.

Birds are particularly vulnerable to disturbance when humans are visible; they are less concerned by vehicles, particularly those regularly sighted, such as heavy plant in docks. Care must be taken when planning activities which may disturb nearby birds.

3. To maintain and enhance the habitat, botanical and invertebrate interest along the Forth

Grassland and some saltmarsh areas require appropriate management in the form of grazing to promote species diversity and structure within the habitats. Loss of grazing could lead to the deterioration of these species-rich areas to rank grassland or structurally poor saltmarsh. Scrub and gorse encroachment has the potential to be a problem in some areas and will require control where necessary. For example, loss of grazing on the East Wemyss - Anstruther coast and at Seafield on the Burntisland - Kirkcaldy coast has resulted in a deterioration of the grassland habitats and an increase in scrub. At Aberlady Bay, non-native sea buckthorn has colonised areas of sand dune, requiring intensive scrub clearance operations.

Scrub encroachment is a threat to northern brown argus and needs to be managed to prevent the loss of rock rose, the food plant of the butterfly's larvae. The several rare beetle species found around the Forth are currently in unfavourable condition. These species will benefit from general habitat enhancement but may also need species-specific measures.

4. To maintain the geological features of interest and access to them

Fly tipping is an ongoing problem which can damage and destroy coastal habitats as well as obscure geological features of interest. Tipping often involves inert rubble material which does not pose any pollution problems; however, some agricultural and domestic waste dumping does occur. Other threats to the geological interest include fossil collection from fossil-rich rock exposures. Although this is sustainable in small amounts, some sites have been irreparably damaged through large-scale removal using excavators. Some features have been covered in sand but this is a natural process and also serves as some protection at vulnerable sites.

5. Encourage recreational enjoyment around the Firth of Forth whilst

recognising the need to protect the nature conservation interest

As discussed above, the Forth coast is increasingly visited for recreational purposes. This can be of benefit to the natural heritage by instilling a sense of value in the general public. However, this must not be at the cost of the environment itself. The coast must be managed in a way that allows recreational activities to take place without damaging habitats and disturbing species. Likely detrimental effects include erosion of delicate habitats such as the dune lichen systems which are slow-growing but easily damaged by walking through them or use of quad bikes. Breeding birds are particularly susceptible to disturbance, which can lead to their eggs being predated.

Management should include legal methods of steering visitors away from particularly sensitive habitats and encouraging the use of less sensitive areas instead. Important bird nesting areas can be signed to alert visitors that certain steps, such as keeping dogs on leads, should be carried out in order to minimise disturbance.

Other factors affecting the natural features of the site

None noted at present.

Date last reviewed: 29 March 2011