



Scottish Natural Heritage

LOCHS OF HARRAY AND STENNESS

Site of Special Scientific Interest

SITE MANAGEMENT STATEMENT

Site code: 1083

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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.

Natural features of Lochs of Harray and Stenness SSSI	Condition of feature (date monitored)	Other relevant designations
Saline lagoon	Favourable, maintained (September 1999)	Special Area of Conservation (SAC)
Eutrophic loch	Unfavourable, no change (August 2004)	
Goldeneye (<i>Bucephala clangula</i>), non-breeding	Favourable, maintained (March 2000)	
Pochard (<i>Aythya ferina</i>), non-breeding	Favourable, maintained (March 2000)	
Scaup (<i>Aythya marila</i>), non-breeding	Favourable, maintained (March 2000)	
Tufted duck (<i>Aythya fuligula</i>), non-breeding	Unfavourable, declining (December 2007)	
Caddis fly (<i>Ylodes reuteri</i>)	Favourable, maintained (August 2003)	
Freshwater nerite snail (<i>Theodoxus fluviatilis</i>)	Favourable, maintained (August 2003)	

Description of the site

Lochs of Harray and Stenness Site of Special Scientific Interest (SSSI) are the two largest inland lochs in Orkney and are located in the west Mainland. Loch of Stenness is a salt water (saline) lagoon linked at Brig o' Brodgar to Loch of Harray, which is a nutrient-rich freshwater loch. Together these lochs support an unusual mixture of plants as well as notable populations of wintering ducks and some rare invertebrates, as shown in the above table.

Loch of Stenness is the second largest saline lagoon in Britain and is important due to its size, stability, northern location and seasonal variations in water saltiness (salinity).



Loch of Stenness is open to the sea at Brig o' Waithe and is brackish throughout, but salinity levels vary locally and seasonally, being higher in the summer. The salinity near Brig o' Waithe is also affected by the cycle of neap and spring tides. There is also a transition zone between brackish and fresher water around the channel connecting the two lochs at the Brig o' Brodgar. The location and extent of this zone varies depending on the seasonal water levels in each loch and on the tidal cycle. However, the extent of saltwater influence from Stenness on Harray has declined following installation of one-way flaps at Brodgar in the 1960s. The vegetation in Stenness is mainly marine and is dominated by seaweeds and other algae.

Loch of Harray drains a shallow basin in the centre of the west Mainland and is predominantly freshwater. The loch is rich in nutrients and supports a large number of pondweed species, two of which are nationally scarce *Potamogeton filiformis* and *P. friesii*. The unusual mix of pondweed species, together with the presence of various stoneworts, which thrive in lime rich waters, is evidence of the loch's complex water chemistry.

The diverse habitats provided by these lochs support a wide range of insects, other invertebrates and birds. Both lochs are an important wintering ground for a variety of wildfowl notably, pochard, scaup and tufted duck in Loch of Harray and goldeneye in Loch of Stenness. Nationally important populations of a rare caddis fly *Ylodes reuteri* and the freshwater nerite snail *Theodoxus fluviatilis* are also present. This site is the only known Scottish location for both of these species and the Loch of Harray population of *Ylodes reuteri* is probably the largest in the UK.

Part of the SSSI is also designated as the Loch of Stenness Special Area of Conservation, which is notified as internationally important for its saline lagoon. All of the SSSI's notified features are regularly monitored and these details are recorded in the above table. The saline lagoon has been assessed as in favourable condition, although evidence of an increase in salinity and possible associated loss of several rare species of stoneworts, will be the focus of future monitoring. The eutrophic loch feature is in unfavourable condition as there has been a reduction in the maximum depth of vegetation and increases in algal growth, which are indicative of nutrient enrichment. Potential sources of nutrients are discharges from domestic septic tanks and Waste Water Treatment Plants (WWTP) and run-off from surrounding agricultural land.

Wintering populations of goldeneye, scaup and pochard remain in favourable condition but the tufted duck population has declined over recent years and is currently considered to be in an unfavourable condition. The cause of the decline is not clear and further investigation has begun to establish the reasons for this change.

Loch Stenness, from the Brig o' Brodgar	Pochard
	

Past and present management

The ecology of this site is strongly influenced by land management within the surrounding catchment as well as by activities within the site itself.

The SSSI is owned and occupied by several individuals and the land around the lochs is predominantly managed for agriculture. Most of the surrounding fields are under improved grassland used for cattle grazing and silage production. Some of the water margins and feeder burns, as part of the surrounding farmland, are managed under Rural Development Contracts. This helps to improve the condition of the SSSI as nutrient run off and other agricultural impacts on the lochs are mitigated.

The site supports an important trout fishery and recreational fishing dates back to the late nineteenth century. The Orkney Trout Fishing Association (OTFA) operates a voluntary hatchery which it uses to stock lochs in the county. Both lochs are popular for brown trout fishing and Loch of Harray is particularly favoured by anglers who fish from the shore and small boats. The OTFA has a site near Brodgar where boats are left during the season and upwards of 50 boats may be present during the busiest period. A commercial eel fishery has also existed at various times, most recently in the early 1990s when a smokehouse was established in Kirkwall.

As well as attracting anglers, the site also attracts other recreational users such as kayakers and wildlife enthusiasts. The site is within the World Heritage Site, Heart of Neolithic Orkney and attracts a significant number of visitors to the archaeological sites surrounding the lochs, such as the Stones of Stenness and the Ring of Brodgar. The Royal Society for the Protection of Birds has a reserve surrounding the Ring of Brodgar which is managed for farmland birds. The less intensive agriculture which this management entails will reduce nutrient run off and benefit the water quality in the lochs.

The estimated human population in the catchment is around 1000. The main settlements are at Dounby and Stenness and there are also many scattered houses and farms. Sewage from Stenness village passes through a treatment plant and reed bed system before entering Loch of Stenness. Effluent from Dounby passes through a similar system before the discharge enters Loch of Harray at Decca Bay. Outwith settlements, most houses use septic tanks and soakaways to treat domestic sewage and residual effluent from these systems may enter the lochs.

Nutrient enrichment can result in changes to the mix of species and, in extreme cases, to algae blooms or, as was seen in Loch of Harray in the 1980s, excessive growth and subsequent die-back of the non-native Canadian Pondweed. Such events lead to reduced oxygen levels which can be detrimental to fish and other wildlife.

Scottish Natural Heritage commissioned a report which was produced in 2004 by the International Centre for Island Technology in order to better understand the interests and influences on the site. The purpose of the project was to consolidate baseline data and develop proposals for management and future monitoring.

The European Water Framework Directive and associated River Basin Management Planning (RBMP) process provides a mechanism to work towards managing water based pollution from diffuse sources. The Lochs of Harry and Stenness catchment has been identified nationally as a priority catchment for diffuse pollution measures and a catchment based approach to management has been endorsed by the local RBMP advisory group.

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 effectiveness of its 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 saline lagoon (Loch of Stenness) in favourable condition.

The condition of the Loch of Stenness is most strongly influenced by the inflow of water from both the sea and surrounding agricultural land. In order to maintain the current favourable condition the site needs to be safeguarded against any increase in chemical or nutrient inputs. This is most likely to be from agricultural fertiliser or pesticide use, as well as domestic sewage inputs.

2. To restore the eutrophic loch (Loch of Harray) to favourable condition.

The natural level of nutrients within this loch is quite high but evidence of algal blooms or outbreaks of luxuriant growth of non-native plants such as Canadian pondweed indicate that the input of nutrients from diffuse sources is now too high. This is best addressed through management of adjoining land. Management of diffuse pollution has been identified as a priority for the Stenness/ Harray catchment within the Orkney and Shetland Area Management Plan, which forms part of the Scotland River Basin Management Plan prepared under the Water Framework Directive.

Inputs arising from agriculture may be reduced through:

- Strict adherence to the General Binding Rules on Diffuse Pollution in the surrounding catchment
- the creation of buffer strips along riparian land and restoration of feeder burns to natural channels. Funding may be available for such positive environmental works through the Rural Priorities scheme, part of the Scotland Rural Development Programme (SRDP) and/or Scottish Environment Protection Agency's (SEPA) Water Environment Restoration Fund

In addition safeguarding against the introduction of non-native species will be beneficial: This can be achieved by:

- avoiding the accidental introduction of non-native plants, fish or aquatic parasites by checking equipment, such as boats, outboard engines, and keep nets when moving between lochs and removing any plant parts or animals before moving to a new waterbody
- discouraging visiting anglers from bringing live bait into Orkney.

3. To maintain the wintering populations of goldeneye, pochard and scaup in

favourable condition by:

- maintaining the habitat in good condition, as set out above
- safeguarding against disturbance. e.g. use of fast boats near flocks of birds, or activities carried out at particularly sensitive places or times (e.g. wildfowling near favoured hard weather “refuges”)

4. To restore the wintering population of tufted ducks to favourable condition.

The reason for the decline in tufted ducks is not fully understood but is likely to be connected to changes in nutrient levels. Measures to safeguard the habitat against rises in nutrients should help with this objective.

5. To maintain the caddis fly and freshwater snail in favourable condition by:

- safeguarding the habitat, as above.
- safeguarding against the introduction of non-native species.

Other factors affecting the natural features of the site

Sewage inputs

Sewage discharges into the lochs can, like diffuse pollution, lead to nutrient enrichment or loss of oxygen. The Dounby and Stenness WWTPs are managed by Scottish Water and regulated by SEPA, who have identified Loch of Harray as an Urban Waste Water Treatment Directive sensitive area. Concerns about cumulative nutrient inputs from private septic tanks could be partially addressed, for new properties, through the Planning system and Water Framework Directive.

Exchange of water between Loch Harray and Loch Stenness

The installation of flaps at Brodgar has reduced the flow of saline water into Loch Harray. This was done with the intention of preventing harmful algae blooms following several major incidences of fish kill in the 1960s. However, this modification to natural water flows has affected the ecology of the system, particularly in the vicinity of Brodgar. It is uncertain what effect removal of the flaps would now have, as nutrient levels have increased in Loch of Harray in the interim. Therefore, a detailed examination of the impacts of removal of the flaps should be considered if this becomes an option.

Introduction of marine alien species

Orkney Islands Council marine services, in consultation with SNH, SEPA and others, are examining how shipping operations in Scapa Flow may be managed to minimise risk of accidental introduction of potentially damaging marine alien species to Loch of Stenness from discharge of ships' ballast water during ship-to-ship oil transfers.

Date last reviewed: 20 December 2011