



Scottish Natural Heritage
Dualchas Nàdair na h-Alba
All of nature for all of Scotland
Nàdair air fad airson Alba air fad

ENDRICK WATER
Site of Special Scientific Interest

SITE MANAGEMENT STATEMENT

Site code: 1693

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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.

This Statement is available in Gaelic on request.

Natural features of Endrick Water SSSI	Condition of feature (date monitored)	Other relevant designations
Fluvial geomorphology of Scotland	Favourable, maintained (January 2007)	
Quaternary of Scotland	Not yet reviewed	
Brook lamprey <i>Lampetra planeri</i>	Favourable, maintained (October 2004)	SAC
River lamprey <i>Lampetra fluviatilis</i>	Favourable, maintained (October 2004)	SAC
Scottish dock <i>Rumex aquaticus</i>	Unfavourable, declining (October 2004)	

Features of overlapping Natura sites that are not notified as SSSI natural features	Condition of feature (date monitored)	Designation (SAC or SPA)
Atlantic salmon <i>Salmo salar</i>	Unfavourable, recovering (September 2004)	SAC

Description of the site

The Endrick Water Special Site of Scientific Interest (SSSI) originates 4 km east of Fintry in the Gargunnock Hills. From here the SSSI extends west for 36 km to meet the Endrick Mouth and Islands SSSI, and then the river continues to flow another 10 km west to enter Loch Lomond south of Balmaha. The lower reaches of the river provide an exceptional example of the fluvial geomorphology of Scotland. The river itself is the largest flowing into Loch Lomond and it is both nationally and internationally important

for its population of river lamprey *Lampetra fluviatilis* and brook lamprey *Lampetra planeri*. The site also supports the nationally-rare Scottish dock *Rumex aquaticus*.

In its lower reaches, near Buchanan Castle, the river is of considerable geomorphological interest. Here the river provides an excellent example of an unmodified and highly sinuous lowland river with irregular to tortuous meanders. At present, the channel is actively migrating across the valley floor, generating a floodplain in which are preserved excellent examples of relict landforms such as meander scrolls, oxbow lakes and sections of abandoned channel. A recent cutoff provides an insight into how such channel adjustment develops and into the processes of fine overbank sedimentation into a former channel. This natural feature continues to be in favourable condition as the extent, visibility and accessibility of key land forms has been maintained.

The Endrick Water SSSI includes an important reference section in Late Devensian sediments. The sequence includes Late Devensian ice sheet till, proglacial lake sediments, Clyde Beds (fossiliferous marine sediments) and proglacial lake sediments partly deformed by the Loch Lomond Readvance glacier that occupied the Loch Lomond basin. It provides clear stratigraphic evidence for renewed glaciation in the type area for the Readvance, supported by radiocarbon dating of marine shells incorporated in the deposits. This recently added feature has not been monitored.

The river is of national and international nature conservation importance for the populations of river lamprey and brook lamprey. Both species are listed in Annex II of the European Habitats and Species Directive. The river lampreys found on the Endrick are of particular interest because they do not migrate to sea as with other populations. Instead, they remain in fresh water as adults feeding in Loch Lomond on freshwater fish species. This is the only instance of this unusual behavioural trait recorded in the UK. Both lamprey species are in favourable maintained condition.

The botanical interest of the site is varied due to the complex mix of geology and associated landforms. The Scottish dock is a nationally-rare species found in Britain only in seasonally flooded ground by Loch Lomond. It is in an unfavourable and declining condition because it is interbreeding with broad-leaved dock. This introgressive hybridization is leading to a population mostly of hybrid individuals. The Royal Botanic Garden Edinburgh is investigating the level of hybridization. Once their investigation is finished, a management strategy will be formulated to determine if weed killers should be used to kill off any broad-leaved dock in the vicinity of the Scottish dock populations in order to prevent any further hybridization.

Although not a notified feature of the site, the SSSI is of European importance for its populations of salmon - the river is the main spawning ground for salmon and sea trout in the Loch Lomond catchment. This feature is in an unfavourable condition as indicated from the lower fish catches, occasionally poor water quality, damaged habitat, and the possibility of damage due to competition from introduced species of fish. It is considered to be recovering since the Endrick Water was part of the EU Life and UK Rivers Project.

The site also contains small areas of base-rich grassland on the banks in the middle reaches of the river. These contain locally-rare plants including burnet saxifrage and

giant bellflower in woodland margins. Moschatel, narrow buckler fern, and the three-nerved sandwort occur in the woodlands along the waters edge. The site supports a community of breeding birds that includes kingfisher and dipper, and there is also a population of otter.

Unlike other rivers in the area, the Endrick Water is moderately nutrient-rich; it picks up nutrients as it flows across a series of basaltic lava flows in its upper reaches and calcareous sandstone in the lower reaches. It also accumulates nutrients from the surrounding catchment that is mainly used for agricultural purposes. Adjacent habitats range from localised base-rich grasslands, small wetlands and woodlands to extensive acidic grasslands, heath and mire communities above Fintry Bridge. Here the river is steep-sided, fast flowing and upland in character; it becomes a more meandering lowland river in the middle reaches where agricultural use is more intensive. Before reaching the Endrick Mouth and Islands SSSI, there is a series of inundated marsh, swamp and carr communities.



Past and present management

Historically, the Endrick Water provided power for the development of several mills during the 18th and 19th centuries. The flow of the river was too irregular so several power reservoirs were constructed in the upper catchment. The last mill closed in 1943 but the reservoirs remain and are of nature conservation interest in their own right.

The Forestry Commission began planting commercial forests in the Endrick Water catchment in 1936, having acquired land in 1931. Forestry plantations are most prominent in the upper valley around the Carron Reservoir and at Garadhban near Drymen. Semi-natural woodland occurs as a series of riparian (riverbank) woods, some of which are ancient or long-established. Most of these woods are unmanaged and suffer from poor age structure, with a lack of diverse ground vegetation as a result of stock grazing.

The Endrick valley has long been used for farming. Much of the landscape is a result of the enclosed cultivated land that was developed at the beginning of the 19th century. Drainage of low-lying fertile ground around the Endrick continued through to the mid 19th century. The middle reaches of the Endrick valley are still intensively farmed

under mixed farming regimes. The upper reaches are less intensively managed with hill ground used for extensive sheep rearing. In some areas, farming practices such as growing crops to near the edge of the river or allowing sheep and cattle unrestricted access to the riverbank have contributed to bankside erosion. Overgrazing of the river bank has inhibited the natural regeneration of riparian woodland, scrub and tall herb vegetation types in places, while trampling has also exposed the banks to erosion in places. However, in recent years, a number of farms have used support from schemes such as the Scottish Rural Development Programme (SRDP) to put up fencing to create riparian buffer zones to help the riverbanks recover.

Some factors which threaten the condition of the site and need to be addressed by future management include nutrient input, gravel extraction, water abstraction, modification to the river channel, and changes to the genetic integrity of the native fish from restocking. These are addressed individually in the following text.

Nutrient input to the river from point and diffuse sources has an adverse effect on water quality and could affect the fish populations, other species and habitats. Eleven sewage treatment works and an unknown number of privately owned septic tanks discharge into the river and its tributaries. Although several of the sewage works in the catchment are upgraded, there is some unregulated runoff from agricultural fields of fertilisers and slurry. The creation of more buffer strips of bankside habitat together with best practice in use of fertilisers and placement of middens could help to reduce runoff.

There is a long history of gravel extraction from the river bed, mainly for agricultural use. Extracting gravel can damage the natural sediment cycle within the river system, which directly affects the fish and lamprey interests of the river because they need a range of sediment available in their habitat to allow them to spawn successfully. Gravel extraction is now regulated by SEPA under the Controlled Activities Regulations and most extractions will require registration with the Scottish Environmental Protection Agency (SEPA) or a licence before they can legally proceed.

Artificial reinforcement of the river banks for stabilisation is likely to have caused habitat loss for those species that utilise natural sand and earth banks, and may cause increased downstream erosion. Breakwaters and weirs (for angling purposes) alter the nature of the river and may harm spawning/breeding grounds for fish. The long-term channel migration in the lower reaches of the river could influence future management as the habitat in this location changes.

The Endrick Water is an important angling river and is managed as a fishery by a number of proprietors including the Loch Lomond Angling Improvement Association. Game angling is an increasingly popular activity and there are concerns about declining salmon stocks caused by factors from outside the river. Salmon broodstock, collected from the Endrick and reared at a hatchery are released back to the river as fry and smolts. There is a clear need for effective monitoring to help understand how these factors affect the fish populations and to develop appropriate protective measures. Introduced species such as ruffe, gudgeon and dace have become established on the river, probably through the discarding of live bait.

Fishery management in the Endrick is a sensitive issue requiring coordination between

anglers, fish biologists and land managers. All parties are agreed on the strong need to assess any action to improve fishing interests against the overwhelming priority to sustain the fish populations in the long term and, in the case of the salmon population, the legal requirements of the Habitats Regulations. Some of the key issues that must be considered in any fisheries management include the genetic integrity of the Endrick's salmon populations, the quality of the available habitat for juvenile salmon and the need to ensure that the Endrick's salmon are kept free from imported parasites and disease. These issues are best considered along with robust biological data. The Loch Lomond Fisheries Trust is well-placed to conduct the necessary research and analysis in conjunction with other interested parties.

The EU Life and UK Rivers Project funding was used in part to fund the Endrick Water SAC Consultation Strategy 2003. The fundamental recommendations of the consultation are now delivered through the Clyde River Basin Management Plan which is supported by the Water Framework Directive and managed by SEPA.

The Endrick Water SAC Natural Care Management Scheme in part funded the monitoring of the diffuse pollution from five farms along the Endrick Water.

The Endrick Water falls within the Loch Lomond catchment, for which a Clyde River Basin Catchment Management Plan is currently being developed by a multi-agency partnership. The aim of the management plan is to encourage sympathetic management of the river.

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 the 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, where 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 improve the water quality of the river.** Carry out appropriate best practice in the application of herbicides, manure slurry and the release of treated sewage and distillery by-product into the river. This will help to improve the water quality of the Endrick Water and provide more favourable habitat for all of the river's wildlife interests.
- 2. To maintain the river's nesting and spawning habitat in favourable**

condition for river lamprey, brook lamprey and salmon. Excess sand extraction, bankside disturbance causing erosion and siltation must be avoided to maintain the gravel bed preferred for spawning grounds. Any extraction should take place between late June and August to avoid the spawning and egg incubation periods of the lamprey and salmon. Fences need to be maintained to prevent poaching by livestock on the river margins. Applications to extract sand must be applied for from SEPA.

- 3. To promote fisheries management appropriate to the salmon interests of the river.** This should be based on good quality data with close collaboration between the Loch Lomond Fisheries Trust, fisheries managers and regulatory authorities such as Marine Scotland and SNH.

- 4. Allow the natural fluvial processes of the river to take place.** Reinforced embankments and impoundment of the water should be prevented so that the river is allowed to develop naturally through sediment deposition and bank erosion which will eventually result in the river changing its course.

- 5. To increase the population of Scottish dock.** The few sites in which the Scottish dock occurs should not be disturbed or drained. Research into the hybridisation of this species with broad-leaved dock is being carried out by staff at the Royal Botanic Gardens in Edinburgh and this may lead to recommendations for management action to maintain the genetic integrity of the Scottish dock colonies.

First-page photograph: View of the Endrick Water upstream from the Balfron Bridge.

Date last reviewed: 19 November 2010