Habitat Action Plan

‘Freshwater’

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Living Shetland Biodiversity Action Plan
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Freshwater Habitat Action Plan for Shetland

Introduction

The lochs, rivers and burns of Shetland are important landscape features and provide important habitats for many living creatures. These habitats are distinctive and owe their very nature to the geology and climate of the Islands.

Lochs are characteristic of the environment of the Shetland Isles. There are over 1500 lochs shown on maps of the Islands and many more, which are too small to be visible on a map. There are a wider variety of loch types in Shetland than in any area on the Scottish mainland, which is caused by the region's complex geology. Since the last glaciation, valleys have been flooded to form large lochs such as Loch of Cliff and Tingwall Loch. Permanent lochs have formed on the coast behind barriers of sand and silt, which have cut off the ingress of the sea to these lochs e.g. Loch of Spiggie. Areas of small, peaty pools occur on blanket bog, especially on Yell, and larger lochs are also scattered in blanket bog areas.

Habitat Definition

Lochs can be divided into three main groups depending on how nutrient rich they are: *eutrophic* (highly nutrient rich), *mesotrophic* and *oligotrophic* (low nutrient status). Peaty lochs form another group called *dystrophic*. Definitions can be found in Appendix 2.

The Shetland Isles have lochs of all four types and each type supports interesting plants and animals. The most common form of loch is nutrient poor or "oligotrophic", in fact 75% of all lochs in Shetland are of this type. Oligotrophic lochs are common in North Roe and only in this location do they support the nationally scarce Arctic water flea, an aquatic invertebrate. The water flea lives in shallow, seasonal pools and is at the edge of its distribution range in Shetland therefore it could be threatened by the impacts of climate change. Oligotrophic lochs have a relatively sparse diversity of plants and animals although many of them hold large populations of brown trout.

There are few nutrient rich lochs and they tend to be small, Hillwell Loch being a good example. Close-by, the Loch of Spiggie is an exception. This large eutrophic loch supports a large number of wildfowl including widgeon, goldeneye, tufted duck, redshank and over-wintering whooper swans. The Lochs of Kirkigarth and Bardister and Loch of Girlsta are classed as "mesotrophic", medium nutrient status. Kirkigarth and Bardister at Walls have a varied flora including the rare Shetland pondweed, which is only found in a few other lochs on the mainland and the Western Isles. Shetland pondweed has its own UKBAP. The Loch of Girlsta is unique in Shetland in that it supports the only population of Arctic char, a relict fish species from the last postglacial period.

Dystrophic lochs are another major type occurring in Shetland and are distinct because of the brown peat-stained water. These lochs are low in nutrients and the flora is reduced because light cannot penetrate the dark water. The red-throated diver prefers this habitat as it can construct a nest just above the waterline hidden in vegetation. This bird is not very mobile on land and so cannot easily escape into the water if threatened. Bogbean, an emergent plant, is a common sight. The plant lives in dystrophic waters of deep bog pools, small lochs and the sheltered corners of larger lochs, streams and marshy meadows. Red-necked phalaropes use bogbean for cover and shelter as it provides the diversity of habitat (open water, marsh and emergent vegetation) needed for the bird to breed successfully. However, the bird has other important requirements to live because bogbean is found all over Shetland in acidic waters whereas the majority of the UK population of phalaropes is found only on Fetlar.

Many rivers start in boggy areas, where water is retained by peat. Different bog types can be identified by range and type of plants present, as the plant communities formed are dependent on the drainage and soils of the area.

Drainage channels are formed as the water moves downstream and the rivers and burns are generally steep and short with irregular or 'flashy' flow caused by the rugged terrain and impermeability of most of the rocks. Some burns have stony beds while others are carved out of peat. At times of the year when the ground is saturated, rainfall run-off overland is high and burns flow full, although during the summer some burns can dry up completely.

The lower reaches of burns, where flow is slower, support a greater diversity of large plants. And those wet areas, traditionally grazed, mown for hay or cut for sedge peat if left ungrazed, or only lightly grazed, display colourful plants such as flag iris, ragged robin, orchids and forget-me-nots. Gulberwick and Culswick are excellent examples. There are roadside ditches in low-lying agricultural land that often support similar communities creating vivid colour in the summertime in contrast to the green and brown of the normal landscape.

Nature Conservation Importance

Recently a small population of freshwater pearl mussels has been found in a Shetland burn. This is good news for pearl mussels and for Shetland as they were thought to be extinct on the Islands. The last record for seeing live mussels was dated 1929. Freshwater pearl mussels are endangered globally and have a UKBAP specifically for them.

Shetland has a greater variety of freshwater types than anywhere else of equivalent area on the Scottish mainland however the number of species found here is low in comparison. For example there is only one species of damselfly resident in Shetland and its distribution range is small. There are only three species of caddis fly. This does not imply that Shetland has poor water quality however. There are three main reasons for this low species diversity - Firstly, it is difficult for species of plants and animals to colonise Shetland because of its isolation. Secondly, there are few nutrient rich lochs so the high numbers of species that prefer to live in this environment are not readily found. Lastly, all freshwater habitats, especially lochs, are affected by salt spray caused by their closeness to the sea and the strong winds that are common. The increased salinity of the freshwater gives a relative uniformity of species across many loch types.

The low number of species found in Shetland freshwater habitats makes the Islands' flora and fauna unique. There are many factors that influence biodiversity including Shetland's northerly location, the variety of geology affecting the landscape, climate, and human intervention. This Action Plan has been produced to highlight the value of the freshwater environment with its many interesting animals and plants some that are not common in mainland Scotland or not found at all. The Action Plan will also identify threats to this environment and outline objectives to preserve and improve freshwater habitats and species in the Shetland Islands.

Associated species and habitats listed in the Shetland LBAP (Tranche 1)

- Arctic char
- Trout
- Red–throated diver
- Red-necked phalarope
- Hawkweeds
- Woodlands
- Strandlines
- Un-grazed areas

- Community Action Plans
- Waders (Grouped Species Action Plan)
- Roadsides
- AgriBAP

Sites of Importance in Shetland

See list in Appendix IV

Current status

The freshwater habitat action plan for Shetland covers three broad Habitat types as listed in the 1998 National UK Biodiversity Group - Tranche 2 Action Plans. These include “Fen, marsh, and swamp”, “Rivers and streams”, and “Standing open water and canals”. The latter includes lakes, mires and pools, reservoirs, ponds, adjacent wetland habitats, open water ditches, bog pools, and temporary pools on heath.
Listed priority Habitats include Eutrophic standing waters, Mesotrophic lakes, and Reedbeds.

Factors affecting the Habitat

Current

The freshwater habitats of Shetland are highly valuable not only from a conservation point of view but also for their recreational and commercial interests. Tourists come to Shetland for many reasons including to see the rare wildlife dependent on lochs and burns, for example, the internationally rare red-necked phalarope. Recreational fishing is popular, especially for brown trout. Freshwater is required for many purposes including agriculture, aquaculture hatcheries to rear juvenile salmonids, and also for abstraction from lochs to supply industry and residential uses. All of these uses put pressure on freshwater habitats to a greater or lesser extent.

Agriculture Traditionally crofting has benefited wildlife due to the diversity of management of the land however in recent years there has been a move towards agricultural intensification, especially in sheep farming, which can damage freshwater ecosystems. Shetland’s soils are naturally infertile so this move has increased the use of fertiliser to improve the productivity of the land. Codes of practice exist for applying fertiliser to land. If these are not followed fertiliser can easily run-off into burns, wetlands and lochs, a process known as diffuse pollution. High sheep stocking densities cause overgrazing on the hills and this, as well as peat cutting, leads to peat erosion, which can release high concentrations of sediment into burns and lochs causing nutrient enrichment. The input of nutrients to freshwater systems in Shetland threatens wildlife because most are adapted to nutrient poor conditions and will not survive if conditions change significantly.

Wetlands have been drained in the past to provide more land. The plants adapted to live in wet conditions are destroyed resulting in a loss of habitat for breeding birds such as curlew, snipe and black-tailed godwit and a loss of less conspicuous animals such as bumblebees. Some lochs have been negatively impacted upon by the widening of the streams that flow out of them. This partly drains the loch, which changes the natural ecological system.

Aquaculture Fish hatcheries are located around Shetland. They draw off water from burns to feed fish tanks and discharge further downstream either into the same burn or a loch. The discharges released contain waste food and faeces, which increase nutrient levels in the water changing the species composition of aquatic invertebrates. If the discharge is not diluted sufficiently the water environment becomes polluted and there is not enough oxygen in the water to support normal life. Legal limits are placed on discharges to ensure that environmental degradation does not occur.

Septic tanks Septic tank discharges that go directly to freshwater can impact on the system if they are not correctly managed, however only a few discharge to freshwater. Most are directed to soakaways or to the sea because there is a presumption against effluent being discharged to freshwater.

Future

Global warming is a recognised phenomenon and threatens to seriously affect the quality of the freshwater environment. Sea level rise, increased rainfall and more stormy weather are all predicted effects of global warming. They lead to an increased risk of flooding (or a perception that an increased risk is present), which may lead to policies for hard engineering of river channels with the accompanying loss of riverine and loch habitat. Hard engineering is very restricted at present in the Shetland Islands.

Current Action

The EU Water Framework Directive and the Water Environment and Water Services (Scotland) Bill 2003, which transposes the directive into Scots law, will cause a major legislative change in the way all aquatic environments are regulated. The overall objective is to bring about the effective co-ordination of water environment policy and regulation across Europe in order to:

- Prevent deterioration and enhance the status of aquatic ecosystems, including groundwater,
- Promote sustainable water use,
- Reduce pollution and
- Contribute to the mitigation of floods and droughts.

Objectives for Freshwater LBAP.

Objective	Targets for the objectives	Actions for the objectives/ targets	Potential partners
1. Maintain, protect and improve the water quality and physical habitat of burns and lochs according to SEPA River Classification Scheme priorities and water quality targets.	Secure "excellent" or "good" water quality for Shetland's freshwater habitat by 2010 (or appropriate target year).	Review current water quality to identify causes of down grading, particularly where biodiversity priorities may be important.	SEPA
		Ensure that all statutory water quality and discharge consent standards are maintained and, where necessary, prepare and implement action plans to improve water quality in downgraded stretches of burns and lochs. (For example, aim to improve Class C and D watercourses to at least Class B and ensure no degradation of Class A and B watercourses).	SEPA, Scottish Water
		Promote adoption of SUDS (Sustainable Urban Drainage Systems) principles, such as swales, infiltration basins, detention/ retention ponds, wetlands, and reedbeds) in new developments.	SIC Planning and Roads Services, SEPA
		Prepare and implement a catchment management plan for the catchment of watercourse by 2007 or a single plan for the whole of Shetland, where diffuse pollution water quality problems require this approach.	SEPA, SIC Planning Service Scottish Water SIC, SNH, all relevant bodies.

Objective	Targets for the objectives	Actions for the objectives/ targets	Potential partners
2. Ensure that policies exist to incorporate the protection and improvement of burns and lochs through routine public sector decision-making and operations.	Establish and implement freshwater-oriented strategic policies and operational policies for Local Authority Departments and other relevant public bodies and statutory undertakers by year 2007	Develop policies to control alien plant species in and adjacent to lochs and rivers, and policies that promote the use of locally-sourced native plant species for developments and publicly funded schemes.	SIC Planning, & Roads ServicesDepts, SNH,
		Develop policies that promote a presumption against further culverting, and the promotion of re-opening of culverted watercourses, as part of development proposals.	SEPA, SNH, SIC Planning & Road Services, Shetland Enterprise
		Promote the adoption of SUDS principles in all new developments, and consider "retrofitting" SUDS where these are a possible solution to significant surface water quality problems.	SIC Planning and Roads Services, SEPA, Scottish Water
		Develop operational policies that encourage the avoidance of unnecessary management interventions in watercourses and lochs, and "soft engineering" alternatives for necessary operations.	SIC Planning & Roads Services.
		Ensure that development plan policies recognise the biodiversity, amenity and recreational value of the area's lochs and burns and their value as a habitat for wildlife, and promote the protection of this habitat.	SIC Planning Service., SNH, SEPA
		Ensure that development plan policies promote opportunities through development proposals and public schemes, for rehabilitation and restoration of physically degraded watercourses and lochs.	SIC Planning Service., SNH, SEPA

Objective	Targets for the objectives	Actions for the objectives/ targets	Potential partners
3. Maintain and protect burns and lochs supporting semi-natural assemblages of animals and plants in both the channel and the riparian zone.	No net loss or reduction of river and loch shore habitat in the LBAP area by year 2005	Use all opportunities to encourage best practice in the management of watercourses on farmland, as outlined in "*Farming and Watercourse Management: A Good Practice Handbook*".	FWAG, SAC, SEPA, SNH
		Promote the creation of riparian woodland using appropriate species of local provenance.	FWAG, SAC, SEPA, SNH
		Promote the adoption of fishery management practices that minimise intervention in the loch and make use of soft engineering techniques where intervention is necessary.	Shetland Angling Club, SEPA, SNH.

Water quality targets and actions (see Objective 1 above) may also be appropriate for this objective.

Objective	Targets for the objectives	Actions for the objectives/ targets	Potential partners
4. Identify and improve, on a site by site basis, the factors impairing appropriate biodiversity, including the quality of the physical structure, water quality, and the impact of non-native species.	Identify priority areas of river, riparian and loch habitat for habitat enhancement by year 2007.	Identify priority areas on publicly owned and managed land where habitat enhancement proposals can be promoted.	SEPA, SIC Planning, & Roads Services, SNH
		Promote better management of riparian strips through all available opportunities, including opportunities to increase buffers strip widths.	SCFWAG, SAC, SEPA, SNH, SIC Roads Service

Water quality targets and actions (see Objective 1 above) may also be appropriate for this objective, where water quality is one of the factors impairing appropriate biodiversity.

Objective	Targets for the objectives	Actions for the objectives/ targets	Potential partners
5. Increase public awareness of biodiversity, the wildlife value of burns and lochs and their importance as an asset to the community.	Establish public awareness programme for the area's burns and lochs by 2007, and run the programme until year 2009.	Provide a newsletter, progress report or leaflet to raise awareness and report good practice management for biodiversity in river and burn habitats	LBAP subgroup, Catchment Management Plan steering groups SEPA, SNH, Living Shetland
		Prepare proposals for information leaflets on burns and lochs, wildlife etc.	ALL
		Compile a directory of private landowners and local interest groups who would be receptive to participation in discussions about local freshwater habitats, organise initial meetings and community talks.	LBAP sub group, LBAP Project Officer, SCFWAG

References

Laughton Johnston, J. 1999. A Naturalist's Shetland, Poyser Natural History.

SNH Publication. 2002. Natural Heritage futures: Shetland, SNH Publications.

http://www.ukbap.org.uk/UKPlans.aspx?ID=22

Key contacts

For further information or advice on management for these habitats and species please contact;

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Appendix I

River Classification Scheme used by SEPA

SEPA monitors the water quality of Scotland's rivers and reports the results to the public. Monitoring involves assessing water chemistry, biology, toxicity and the amount of litter, including sewage waste, in the rivers. The latter form of monitoring is called aesthetic assessment. The monitoring results are divided into classes, which makes them easier to interpret. The classes and a description of what they mean are listed below.

Class	Description
A1	Excellent
A2	Good
B	Fair
C	Poor
D	Seriously Polluted

Rivers are divided into stretches in which a sampling point is located. The results from an individual sampling point are used to classify the identified stretch of river. For any stretch an overall class is determined and this is limited to the poorest class result from the water chemistry, biology, aesthetic and toxicity assessments.

A classification system for lochs in Scotland is currently being developed together with changes to the river classification system. Both methods will have more emphasis on assessing the ecology and structure of the river or loch because this is more indicative of the overall quality of the ecosystem than chemical assessment.

Appendix II

The Diversity of Lochs

Dystrophic lochs are highly acidic with brown stained water caused by peat drainage. Generally, they do not support a diverse flora and fauna and biological productivity is low.

Oligotrophic lochs have a low nutrient status. Their waters are clear and the quantity and diversity of plants and animals is typically lower than in more nutrient rich waters. They are most common in upland areas.

Mesotrophic lochs have a moderate nutrient status. They have higher nutrient concentrations than upland oligotrophic lochs, but have clear water and typically support a diverse mixture of submerged water plants and associated animal life. Potentially, they have the highest biodiversity of any loch type.

Natural **eutrophic** lochs have a high nutrient status. They support a high abundance of vegetation and a high diversity of animals. Many are important breeding, roosting and wintering sites for wildlife.

Appendix III

Glossary of terms

RSPB	Royal Society for the Protection of Birds
SCFWAG	Shetland Crofting Farming and Wildlife Advisory Group
SAC	Scottish Agricultural College
SEPA	Scottish Environment Protection Agency
SNH	Scottish Natural Heritage
SIC	Shetland Islands Council
SW	Scottish Water
SUDS	Sustainable Urban Drainage Scheme
CMP	Catchment Management Plan
SSSI	Site of Special Scientific Interest
SPA	Special Protection Area
SAC	Special Area Conservation

Appendix IV

List of important freshwater sites in Shetland

Site	Grid Ref.	Designation	Description
Burn of Aith	HU 442295	SSSI	
Burn of Lunklet	HU 370573	SSSI	Hawkweed communities
Burn of Valayre	HU 369693	SSSI	Ravine with relict scrub vegetation
Culswick Marsh	HU 273445	SSSI	Mesotrophic Marsh. Rare habitat in Shetland. Important plant communities and breeding birds
Easter Loch	HP 598013	SSSI	Brackish Loch
Laxo Burn	HU 445634	SSSI	Hawkweeds
Loch of Girlsta	HU 433522	SSSI	Noted for its relict Arctic char population
Loch of Clousta	HU 315582	SSSI	Holds several islands that have relict scrub
Lochs of Kirkigarth & Bardister	HU 238497	SSSI	Mesotrophic Lochs
Lochs of Spiggie and Brow	HU 374160	SSSI, SPA, RSPB reserve	Eutrophic
Lochs of Tingwall and Asta	HU 417429	SSSI	Mesotrophic Lochs
Sandwater	HU 415547	SSSI	
Trona Mires	HU 670915	SSSI, RSPB reserve	Basin Mires
Fetlar/Funzie mires	HU6292	SSSI, SPA	Red-necked phalarope
Loch of Cliff	HP 600120		Mesotrophic Loch
Loch of Strom	HU 400490		Brackish Loch
Clickimin Loch	HU 465410		