

The Orkney Local Biodiversity Action Plan



A plan for action to conserve
Orkney's Biodiversity

Version 1.1: A targeted action plan for 2008 - 2011

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Orkney Local Biodiversity Action Plan 2008-2011

Section 1 Introduction

The Orkney Local Biodiversity Action Plan 2002-2007 (OLBAP) has come to the end of the plan period and it is now time to review progress that has been made and to publish a further more targeted Plan which will guide the conservation and enhancement of key features of biodiversity in Orkney over the coming years. This OLBAP focuses on ten of the Habitat Action Plans (HAPs) from the original Plan and introduces a new set of actions for each. By its nature biodiversity action planning is a developing process and this Plan represents progression of the original OLBAP. The Audit and Habitat Action Plans from the OLBAP 2002-2007 will therefore continue to be relevant to the protection and enrichment of biodiversity in the Orkney Isles and will provide the context to this more focused Plan for 2008-2011.

The Orkney Local Biodiversity Action Plan 2008-2011 comprises three sections. This, the first section, provides a brief overview of changes which have been made to the Biodiversity Action Planning System in the UK since the original OLBAP was produced and also presents the recently introduced environmental legislation and emerging rural development policy which will contribute to influence biodiversity planning in the years to come. Section 1 covers the following areas:

- Biodiversity action planning – the national context
- Developments in environmental legislation relevant to the OLBAP
- Biodiversity and the Local Authority planning system
- Biodiversity and rural development policy
- Links with the Biodiversity Records Centre

The second section begins with an explanation of the process which led to selection of the ten Habitat Action Plans for inclusion in this review of the OLBAP, then presents the ten HAPs and their revised targets and actions for the period 2008-2011. The baseline information relating to each habitat remains largely as it appeared in the original Plan but has been updated to include details relating to legislative and rural policy changes. The Steering Group would like to stress, however, that although it has chosen to select a limited number of habitats to focus on over the next three years, it would still be looking to others to progress conservation activities to any or all of the remaining Orkney LBAP habitats and species as set out in the original Plan.

The third section provides information which relates biodiversity in Orkney to the Scottish and UK frameworks. It takes the form of four appendices containing:

1. lists of Orkney species which appear on the recently revised (2007) UK Biodiversity Action Plan (UKBAP List);
2. a table showing a revision of habitat types and names listed in the OLBAP, reflecting both recent changes to the list of UKBAP habitats and developing understanding of Orkney habitats;
3. lists of Orkney species which appear on the Scottish Biodiversity List that was introduced in 2005; and
4. a table showing correspondence between terrestrial habitat types listed in the OLBAP and those of the Scottish Biodiversity List.

At a national level work is ongoing to revise the Scottish List of priority species and habitats in order to fully incorporate recent changes to the UK BAP List and it is envisaged that, once this task is complete, the Orkney lists of species and habitats will in turn be further updated to take account of the revision.

1.2 Biodiversity Action Planning - The National Context

Scottish Biodiversity Strategy

The Scottish Biodiversity Group (SBG), established in 1996 to progress the UK Biodiversity Action Plan in Scotland, has evolved to become the Scottish Biodiversity Forum (SBF), a group chaired by the Scottish Government. The SBF includes representatives from statutory conservation agencies, non-governmental organisations, landowners and land managers, fisheries interests, commerce and industry, academics and recreational interests.

In May 2004 “Scotland’s Biodiversity: It’s in Your Hands” was published by the Scottish Executive following the work of several working groups convened under the Scottish Biodiversity Forum. It builds on a set of documents published by the Forum in 2003 under the collective title of “Biodiversity Matters: Towards a Strategy for Scotland’s Biodiversity” and draws together Scotland’s obligations under the Convention on Biological Diversity and the UK Biodiversity Action Plan.

The strategy sets out its vision:

“It’s 2030: Scotland is recognised as a world leader in biodiversity conservation. Everyone is involved; everyone benefits. The nation is enriched”,

.....its aim:

“To conserve biodiversity for the health, enjoyment and wellbeing of the people of Scotland now and in the future”,

....and its five key objectives:

1. **Species and habitats:** To halt the loss of biodiversity and continue to reverse previous losses through targeted action for species and habitats;
2. **People:** To increase awareness, understanding and enjoyment of biodiversity, and engage many more people in its conservation and enhancement;
3. **Landscapes and ecosystems:** To restore and enhance biodiversity in all our urban, rural and marine environments through better planning, design and practice;
4. **Integration and co-ordination:** To develop an effective management framework that ensures biodiversity is taken into account in all decision making; and
5. **Knowledge:** To ensure that the best new and existing knowledge on biodiversity is available to all policy makers and practitioners.

Scottish Biodiversity Implementation Plans

Covering the period up to 2030 the strategy’s agenda for action will be implemented through sets of Biodiversity Implementation Plans relating to three broad sectors:

- Urban
- Rural
- Marine

and the following wider cross-cutting issues:

- Interpretation, Communication and Education (ICE)
- Local Delivery

These plans will be revised and developed on a 3-yearly basis and will be implemented by a wide range of organisations across Scotland. In addition, a Biodiversity Implementation Team (BIT), funded by a partnership of public and voluntary bodies has been set up which will encourage and support organisations in meeting their obligations, and will oversee delivery, coordination and reporting of the plans. The Scottish Biodiversity Forum working groups will also play a role in overseeing and facilitating delivery of the plans, as well as developing the next set of plans.

The main focus of the BIT will be to:

- Coordinate and facilitate the delivery of the SBF Implementation Plan
- Report on implementation plan progress to the Scottish Biodiversity Committee (SBC) and Scottish Ministers
- Support and service the SBC and its working groups
- Support SBF including the organisation of annual conference
- Provide communication and liaison focus for LBAPs
- Maintain and develop the *biodiversityscotland* website
- Provide advice on funding and grants for biodiversity projects
- Manage the Biodiversity Action Grant Scheme (BAGS)
- Coordinate the revision and development of new plans (3-yearly)

1.3 Changes to Environmental Legislation

The most significant changes to environmental legislation in Scotland during the lifetime of the OLBAP have been the transposition into Scottish law of the provisions of both the Water Framework Directive and the Strategic Environmental Assessment Directive and the introduction of The Nature Conservation (Scotland) Act 2004.

The Water Framework Directive

The Water Framework Directive (WFD) is a wide-ranging piece of European legislation which became law in Scotland at the end of 2003 through the Water Environment and Water Services (Scotland) Act 2003 (WEWS Act).

The WFD establishes a new legal framework for the protection, improvement and sustainable use of surface waters, transitional waters, coastal waters and groundwaters across Europe. It represents a significant shift in attitude to water resource management, taking a more holistic approach to protection of the water environment, both in terms of the assessment of water status and the scale at which resources are managed.

Under the Directive, water status is determined not only by its chemical condition, but by the health of the animals and plants that live in it. There is now a need to look more broadly at water use, considering all activities that could pose a risk to water life, including alterations to banks, bed or shores, or to the amount of water in the water body. For the first time controls have been put in place for any activity that abstracts or impounds water, and engineering or construction works that alter the shape of a water body, as well as discharges into watercourses.

The WFD looks at the water environment on a larger, river basin scale, rather than at rivers or lochs individually. This means consideration of not only local risks posed by activities in one watercourse but also their impacts on the water environment downstream and in water bodies elsewhere in the River Basin

District. A risk-based planning process is being developed for managing water in each basin, which will set environmental objectives and design a programme of measures to deliver those targets along with monitoring programmes to assess whether the measures are effective.

The WFD also requires all designated authorities to have specific regard to sustainable flood management in the exercise of their functions.

The Strategic Environmental Assessment Directive

Directive 2001/42/EC, the Strategic Environmental Assessment (SEA) Directive was first transposed into Scots law through the Environmental Assessment of Plans and Programmes (Scotland) Regulations 2004 and these Regulations apply to plans and programmes whose preparation began on or after 21 July 2004 and to those whose formal preparation began before this date but which had not been adopted, or submitted to a legislative procedure leading to adoption, by 21 July 2006.

The Environmental Assessment (Scotland) Act 2005 came into force on 20 February 2006, repealing the Regulations and is now the implementing legislation for SEA of all public plans, programmes and strategies (PPS) in Scotland.

The purpose of SEA is to ensure that information on the significant environmental effects of a PPS is gathered and made available to decision makers, both as the PPS is prepared and prior to its adoption. SEA is therefore a key component of sustainable development, focused on protecting the environment. SEA also creates opportunities for participation in public policy-making and increases transparency.

The objectives of SEA are:

- To provide a systematic means of identifying, describing, evaluating and reporting on the environmental effects of PPS.
- To require that Responsible Authorities (in this case Orkney Islands Council) prepare a report on the likely significant environmental effects of their PPS and its reasonable alternatives.
- To prevent, reduce and offset negative environmental effects. The enhancement of positive effects may also benefit from the SEA process.
- To ensure wide consultation and engagement with the statutory Consultation Authorities (Scottish Environment Protection Agency (SEPA), Scottish Natural Heritage (SNH) and Historic Scotland (HS)), other bodies which the Responsible Authority considers appropriate and the public at an early and effective stage of the PPS preparation.
- To deliver a public statement demonstrating how the results of the environmental assessment and the opinions expressed during the SEA consultation process have been taken into account in a final adopted PPS.
- To ensure that Responsible Authorities monitor the significant environmental effects of implementing their PPS, enabling them to also identify unforeseen adverse effects at an early stage and to take appropriate remedial action where necessary.

The Nature Conservation (Scotland) Act 2004

Legislation which reflects the importance of conserving biodiversity in Scotland includes the National Parks and Access to the Countryside Act 1949, the Wildlife and Countryside Act 1981, and the European Birds and Habitats Directives.

Nationally and internationally important natural heritage sites are protected through their designation as Sites of Special Scientific Interest, Special Protection Areas and Special Areas of Conservation.

Introduction of the Nature Conservation Act 2004 now provides the principal legislative components of a new, integrated, system for nature conservation within Scotland. The Act sets out a series of measures which are designed to conserve biodiversity and to protect and enhance the biological and geological natural heritage of Scotland. In doing so, it locates the conservation of biodiversity and of Scotland's natural environment within a wider British, European and global context. In relation to biodiversity in particular, it

requires public bodies and office-holders to consider the effect of their actions at a local, regional, national and international level.

1.4 Biodiversity and the Local Authority Planning Process

The Biodiversity Duty

The Nature Conservation (Scotland) Act 2004 gives all public bodies in Scotland a duty to “*further the conservation of biodiversity*” as they carry out their work. This means that all public bodies now have a duty to think about their impact on the natural world. Public bodies must reduce any negative effects for biodiversity, and look for ways of benefiting biodiversity in the way they go about their business.

This new biodiversity duty applies to all bodies carrying out public functions in Scotland, from Health Boards to Local Authorities, from the Scottish Government to smaller bodies like the Agricultural Wages Board for Scotland, or Scottish Screen.

This new legislation gives the public sector in Scotland a unique leadership role in recognising its impact and dependence on biodiversity, and working to protect our biological inheritance. This new duty applies to public bodies' activities and operations, and to their plans and policies.

The actions that public bodies can take to comply with this new duty may be directly practical ones, such as cutting grass less often to provide more shelter and food for wildlife. Some public bodies may decide to carry out more complex actions like auditing the source of all products they use, to ensure they are produced as sustainably as possible. This ties in very closely with the duty that public bodies have to act sustainably as part of their duty to achieve Best Value, and safeguarding biodiversity is a key part of that.

The Scottish Biodiversity List

The Scottish Biodiversity List is a list of flora, fauna and habitats considered by Scottish Ministers to be of principal importance for the purposes of furthering the conservation of biodiversity.

The publication of the list is another step in the introduction of the new integrated system of nature conservation set out in the Nature Conservation (Scotland) Act 2004, which has at its heart the drive to reconnect people and nature. The Scottish Biodiversity List is a tool for public bodies doing their biodiversity duty under section 1 of the 2004 Act, and is intended to inform and guide them. The List will also be an important information resource for everyone with an interest in Scotland's rich Biodiversity.

The development of the list has been a collaborative effort involving a great many stakeholders, overseen by scientists from the Action Planning and Science Group of the Scottish Biodiversity Forum. Completion of the list is an exciting development in our knowledge of biodiversity in Scotland as it is the first time such a stock-take has been done in Scotland.

The Scottish Biodiversity List comprises four spreadsheets:

- terrestrial and freshwater species
- terrestrial and freshwater habitats
- marine species and habitats
- species and habitats that satisfy the social criterion (i.e. they have been identified as important by the Scottish public in a social survey).

The criteria and the consultants' reports which led to the production of the Scottish Biodiversity List also form an important part of the process.

In addition to these four spreadsheets, the following key documents set out the process which has been followed to achieve the Scottish Biodiversity List.

The Executive Summary summarises the process.

The Audit Report sets out how the process was carried out.

The Technical Report gives full details of how the Scottish Biodiversity List was populated, including the details of the Social Survey.

The Phase 1 Report and Research Summary sets out the process by which the criteria for the project were developed.

The Criteria include scientific criteria and a social criterion and were agreed by Ministers in May 2005.

Data Deficient Species and Habitats and Extinct Species and Habitats have also been listed as part of this project.

Full details of the Scottish Biodiversity List can be found on the Biodiversity Scotland website (www.biodiversityscotland.gov.uk). You can also search the list by species group, habitat type and location and access additional information about the species and habitats from the National Biodiversity Network (NBN) Gateway, the UK's biodiversity information network.

The Species Action Framework

Recognising that there is a need to prioritize the way we manage species and focusing on those where we expect significant gains to overall biodiversity, SNH has produced a Species Action Framework which sets out a strategic approach to species management in Scotland. The Framework covers four topics:

- Species conservation
- Invasive non-native species
- Conflicts of interest involving native species
- Sustainable use of species.

In addition, 32 species have been identified as the focus of new action for five years from 2007 and for each species, detailed five year implementation plans are currently being drafted in consultation with SNH's partners.

Of the 32 species only four are known to presently occur, or to have occurred in the past in Orkney. These are: great yellow bumblebee *Bombus distinguendus*, bird's nest stonewort *Tolypella nidifica*, hen harrier *Circus cyaneus* and native oyster *Ostrea edulis*

Planning and Biodiversity

The planning system ensures the efficient and effective development and use of land in the public interest and makes a significant contribution to the sustainable development of the area to improve quality of life for all. Planning within this framework should:

- Set the land use framework for promoting economic development;
- Encourage economic, social and environmental regeneration;

- Maintain and enhance the quality of the natural heritage and built environment.

The Scottish Government has committed itself to the conservation and enhancement of the natural heritage for the benefit of present and future generations, which in turn has a significant impact on the Development Plan process. Development Plans have a key role to play in conserving biodiversity through the statutory planning system. The statutory planning system recognises that enabling sustainable development requires coordinated action, linking together economic, social and environmental factors and ensuring balance between the promotion of development and environmental issues. In preparing Development Plans (Structure and Local Plans) there is a requirement to take full account of the natural heritage, in accordance with the statutory framework for safeguarding habitats and species under national and international law.

The Orkney Islands Council Structure Plan has in place policies to protect and enhance the natural heritage and the Local Plan reflects these policies paying particular attention to biodiversity whenever reasonably practical.

The protection and enhancement of important natural heritage sites is the most obvious contribution that Development Plans can make towards biodiversity. However, current guidance in National Planning Policy Guideline 14: Natural Heritage, highlights the importance of safeguarding and enhancing the natural heritage beyond the confines of designated areas where the level of protection accorded to local designations is a matter for the planning authority. In this way the statutory planning process can make a significant contribution to the delivery of LBAP targets, both through policies for site protection and enhancement and by providing opportunities for the creation of new habitats in appropriate locations.

Orkney Islands Council is committed to carrying out Strategic Environmental Assessment of qualifying Plans, Programmes and Strategies and this also extends to individual policies and guidance documents where their implementation is likely to result in significant environmental effects. Through assessment of its planned actions and policies, the Council seeks to avoid adverse environmental impacts whilst additionally identifying measures to incorporate environmental benefit. In this context the Orkney Local Biodiversity Action Plan and this targeted revision of the Plan represent valuable tools by prioritising the species and habitats of Orkney and highlighting their vulnerabilities.

1.5 Biodiversity and Rural Development Policy

The Common Agricultural Policy

The 2003 reform of the CAP introduced a new system of direct payments, known as the single payment scheme, under which aid is no longer linked to production (decoupling). The main aim of the single payment is to guarantee farmers more stable incomes. Farmers can decide what to produce in the knowledge that they will receive the same amount of aid, allowing them to adjust production to suit demand.

To receive direct payments, farmers must meet certain standards concerning public, animal and plant health, the environment and animal welfare and keep their land in good agricultural and environmental condition. This is known as cross compliance. Where farmers fail to meet those standards, the direct payments they can claim are reduced or even withdrawn completely for the year concerned.

The instrument known as ‘modulation’ provides a means to ensure the transfer of CAP funds from direct aids to farmers and market measures (‘Pillar 1’ of the CAP) to rural development measures (‘Pillar 2’).

Scotland Rural Development Programme 2007-2013

The Scotland Rural Development Programme is a £1.6 billion programme of economic, environmental and social measures designed to develop rural Scotland over the next seven years.

Measures will be delivered through:

- Crofting Counties Agricultural Grant Scheme
- Food Processing, Marketing and Co-operation Grant Scheme
- Forestry Commission Challenge Funds
- The LEADER initiative
- Less Favoured Area Support Scheme
- Rural Development Contracts
- Skills Development Scheme

The Programme includes measures to address economic and social goals as well as environmental measures. It is outcome-focused and primarily aims to deliver a Greener Scotland and to promote a Wealthier and Fairer rural Scotland. It will contribute to the Government's Healthier and Smarter objectives and will help to strengthen rural communities.

It brings together a wide range of formerly separate support schemes including those covering the farming, forestry and primary processing sectors, rural enterprise and business development, diversification and rural tourism. It includes measures to support and encourage rural communities and delivers the LEADER initiative for local innovation in rural areas.

Rural Development Contracts - Rural Priorities offers support to deliver outcomes which benefit the people of Scotland, through an integrated application process.

Each of the 11 Regions for SRDP will establish a set of 'Regional Priorities', in consultation with local stakeholders, which will contribute to the five key SRDP outcomes:

- improving business viability
- enhancing biodiversity and the landscape
- improving water quality
- tackling climate change
- supporting thriving rural communities

Individuals, businesses and formally constituted groups are invited to put forward proposals on how they would contribute to these Regional Priorities. Regional Proposal Assessment Committees will select those proposals offering to deliver the greatest benefit.

The Biodiversity Priorities which feature in the Orkney Local Priorities for Rural Development Contracts (RDCs) refer to the habitats and species which are presented in the LBAP 2002-2007 and now also the LBAP 2008-2011, and which land managers can consider for inclusion in their RDCs. These priorities focus on halting the loss of biodiversity and reversal of previous losses through management, conservation and enhancement.

Rural Priorities will be assessed jointly by SGRPID, SNH and FCS through area offices.

1.6 Links with the Orkney Biodiversity Records Centre

The Orkney Biodiversity Records Centre is located at the Orkney Library & Archive on Kirkwall's Junction Road. Established in 1998, the Centre forms a central location for the collection and dissemination of information relating to the natural heritage of the Orkney Islands. This information primarily takes the form of data associated with the distribution of the County's habitats and species and has been recorded over many years, both by voluntary recorders and by other organisations with an interest in the natural environment of Orkney.

The species records are stored on a database, and the habitat information is stored on a Geographic Information System which can be accessed by planners or consultants to investigate the possible presence of certain species and any potential environmental conflicts in areas identified for development.

The Centre is also widely used by students and naturalists and promotes study of the natural environment by organising courses which are open to professionals and members of the public alike. An extensive library of natural history reference books is available at the Centre, as is a range of sampling equipment which may be loaned out to assist with sampling and recording projects.

In the future it is anticipated that the Records Centre will develop further to increase the range of environmental information it can provide.

For further information on the information and services which are available at the OBRC, please contact Sydney Gauld, Orkney Library & Archive, 44 Junction Road, Kirkwall, Orkney, KW15 1AG. Telephone: 01856 873166.

Section 2 Selection of the Ten Habitats for Targeted Action 2008-2011

The OLBAP 2002-2007 consisted of 59 habitats for which action plans were written. It had been intended that action plans would also be produced for a select set of 30 species but these were not written during the lifetime of the first OLBAP. The 59 Habitat Action Plans (HAPs) had 459 individual actions, of which over half have been accomplished. Approximately 25% were deemed unreasonable, either because the lead partner had no remit to accomplish the action or the actions were judged to be too broad. The remainder became unattainable due to changes to national programmes such as further development of the Common Agricultural Policy and introduction of the Water Framework Directive.

Although a number of the actions from these HAPs are now considered unachievable, the OLBAP 2002-2007 continues to represent the base document, providing guidance on the conservation importance of habitats and species and a range of information relating to each habitat including habitat descriptions, information on their local distribution, factors affecting the habitat and current actions and opportunities. This information remains very relevant and people are still encouraged to refer to the HAPs and to utilize the information which they provide.

It was felt that this was a good time to evaluate the quality of the actions and the suitability of the actions to the partners. Changes to the UK Biodiversity Action Planning process through introduction of national levels whereby Scotland is taking an active lead on Scottish Implementation Plans also led to a desire to revise the OLBAP and to incorporate these changes.

The OLBAP 2008-2011 is a more targeted plan which will be more easily monitored and will take into account the national framework which includes the Scottish Biodiversity Strategy and the Scottish Biodiversity Implementation Plans. In line with the latter the OLBAP will be revised and developed on a three-year basis. This action plan will focus on a series of habitats that link to form ecosystems and species from the Biodiversity List will be integrated into the actions. The plan consists of terrestrial and marine habitats.

KT (Kepner-Tregoe) analysis and ranking was undertaken of the terrestrial and marine habitats, based on ten criteria that reflect UK, national and local priorities. The ranked habitats were then analysed against a further set of criteria which were based on potential for positive action towards the habitat and resource implications. Following this second stage the habitats were chosen and the ecosystems identified. It was determined that the previous 429 actions and 59 habitats represented too large a number to effectively complete and monitor and it was decided that 10 habitats from 2-3 ecosystems should be selected. The selected ecosystems and habitats are:

<u>Boundary features</u>	<u>Coastal environment</u>	<u>Freshwater environment</u>
Road verges	Sand dunes	Eutrophic standing water
	Strandline	Mesotrophic standing water
	Coastal vegetated shingle	
	Saltmarsh	
	Saline lagoons	
	Seagrass meadows	
	Aeolianite	

It was envisaged that each Habitat Action Plan would consist of no more than three targets and three actions and that one of the actions should focus on a species which is dependent on the habitat. Rather than write Species Action Plans at this stage, priority species were selected from the Scottish Biodiversity List and actions for those species were incorporated into the appropriate habitat and ecosystem plans. Use of an ecosystem approach ensures that implementation of individual actions does not occur in isolation or at the expense of other habitats and species.

To maintain consistency with the Orkney LBAP 2002-2007, the original numbering system of the Habitat Action Plans has been retained.

The lists of species associated with each habitat remain as they appear in the Orkney LBAP 2002, but their conservation status with reference to the Scottish Biodiversity and UK BAP Lists has been amended as appropriate. However the lists have not been revised to include new species resulting from introduction of the Scottish Biodiversity List, nor to include or exclude species in order to take account of changes to the UK BAP list.

It is anticipated that a similar selection process will be undertaken to identify the 10 habitats for targeted action in 2011 – 2013.

Strategic Environmental Assessment

SEA has been carried out of the OLBAP as it has been written and the results of the assessment process are presented in the accompanying Environmental Report and its appendices.

Consultation Process and Formal Adoption of Plan

Both documents will go out to public consultation for a six-week period and, following the incorporation of any amendments, the final version of the Orkney Local Biodiversity Action Plan 2008-2011 will be adopted at a meeting of the Orkney Islands Council Planning and Protective Services Committee on Tuesday 26 March 2008.

1. LOCAL HABITAT DESCRIPTION

This habitat is comprised of road verges with unimproved/semi-improved dry and damp grassland, some with heather and remnants of past vegetation pre- field creation. Typical are remnant plant communities of unimproved neutral grassland and heaths. Road grit falling on verges of roads which pass through open moorland provides an unusually rich artificial habitat. The locally important habitat does not include verges with coarse vegetation composed of taller grasses and robust weeds.

2. CURRENT LOCAL STATUS AND EXTENT

The entire Orkney road verge is a narrow strip approximately 1125 miles in total length, amounting to an area of at least 525 ha. A survey carried out in 2001 and 2002 by members of the Orkney Field Club to determine the extent of locally important habitat concluded that 58.09 miles of road verge in the Orkney Islands could be described as botanically rich in species. The more species-rich grassland type continues to decline in most areas, being replaced by coarse, species-poor vegetation.

3. LOCAL DISTRIBUTION

Examples of species-rich verges are the new Rackwick Road on Hoy; Olad Brae, South Ronaldsay; Lyde Road, between Harray and Firth; the Hillside and Durkadale roads in Birsay and Evie; the Brodgar road; Leon Brae and part of the Westside road in Rousay.

4. ASSOCIATED SPECIES AND LINKS WITH SPECIES ACTION PLANS

An attractive feature of the Orkney countryside are those verges with naturally short native grasses and sedges and colourful plants including red and white clover *Trifolium pratense* and *T repens*, bush vetch *Vicia sepium*, meadow vetchling *Lathyrus pratensis*, lady's smock *Cardamine pratensis*, primrose *Primula vulgaris*, bird's-foot trefoil *Lotus corniculatus*, devil's-bit scabious *Succisa pratensis*, many orchid species and others. It is the main habitat for twayblade *Listera cordata*. The verges provide relatively safe nesting sites for birds, and habitat for grassland Lepidoptera as well as the Orkney vole and pygmy shrew. A few native species of wild flowers are entirely confined to verges.

4.1 Associated species and their biodiversity conservation status

Species	Common Name	UK BAP List	Scottish Biodiversity List	Local Priority species
<i>Carduelis cannabina</i>	Linnet	√	√	√
<i>Bombus distinguendus</i>	Great yellow bumblebee	√	√	√
<i>Bombus muscorum</i>	Heath carder bee		√	√
<i>Falco tinnunculus</i>	Kestrel		√	√
<i>Microtus arvalis orcadensis</i>	Orkney vole		√	√
<i>Apodemus sylvaticus</i>	Wood mouse			√
<i>Sorex minutus</i>	Pygmy shrew			√
<i>Anthus pratensis</i>	Meadow pipit			√
<i>Dactylorhiza purpurella</i>	Northern fen orchid			√

Species	Common Name	UK BAP List	Scottish Biodiversity List	Local Priority species
<i>Lupinus nootkatensis</i>	Nootka lupin			√
<i>Jasione montana</i>	Sheep's bit			√
<i>Coprinus comatus</i>	Shaggy ink cap			√
<i>Clavaria zollingen</i>	A fairy club (fungus)			√
<i>Lychnis flos-cuculi</i>	Ragged robin			√
<i>Primula vulgaris</i>	Primrose			√
<i>Carex flacca</i>	Glaucus sedge			√
<i>Stellaria holostea</i>	Greater stitchwort			√
<i>Diarsia mendica orkneyensis</i>	Ingrailed clay (a moth)			√
<i>Apion ryei</i>	A weevil			√

5. CURRENT FACTORS AFFECTING THE HABITAT

- OIC Department of Technical Services has a verge management policy that has historically favoured a neat, tidy appearance with frequent cutting. This method of management contributed to the reduction in biodiversity of road verges: frequent cutting of most verges prevents plants from completing their annual cycle of flowering and seeding; leaving cuttings to lie and rot has the effect of returning plant nutrients to the soil. Such management favours robust grasses, especially cocksfoot *Dactylis glomerata*, dock *Rumex* species and hogweed *Heracleum sphondylium* and as a result species diversity and interest is lost. However, the road verge management policy is now under review.
- Enrichment from carelessly spread fertilisers and slurry on adjoining fields also favours robust grasses and weeds.
- Spray drift is very damaging if it occurs: the results are loss of species diversity and replacement with coarse weeds.
- There is some risk of road improvement works destroying sites unless care is taken to reduce fertility, and to re-sow with short native species of grass before coarse weeds take root.

6. CURRENT ACTIONS AND OPPORTUNITIES

6.1 Management

- OIC Technical Services Department has a policy in place to address its statutory duties on road safety and the control of injurious weeds, to maintain highways and a tidy appearance, and to conserve the biodiversity of verges where possible. All main "A" Class roadside verges are cut three times per year and all other roads, with the exception of selected verges, known as "Conservation Verges", twice per year. The Conservation Verges are generally located adjacent to heathland, or may contain fine examples of a particular flower or, alternatively, may feature a wide range of flowers, and for these reasons they are generally left uncut to allow the plants to complete their annual growth cycle. Certain Conservation Verges are subject to only one cut in late summer. Lengths of no-cut verges are located in Orphir, Birsay, Evie, Harray, South Ronaldsay, Burray, Holm, Sandwick, Stenness, St Andrews, St Ola, Firth, Hoy, Rousay, Shapinsay and Eday. One-cut verges are in Egilsay, Eday and Papa Westray. In North Ronaldsay there is discretionary cutting as agreed with the Community Council.

6.2. Research and Guidance

- The Orkney Countryside Committee nominated two representatives (from OFC and SNH) to monitor verges, with a view to protecting the most natural verges and developing a management plan for maintenance of all verges. Deerness and Orphir parishes were originally selected for experimental verge management. Then, from 1997 onwards the whole of Mainland, Burray and South Ronaldsay verges were inspected annually and their condition mapped and reported to both OCC and the Department of Technical Services Department of OIC. From 2000, a comprehensive survey technique was developed and by the end of 2001 a survey was carried out of all Mainland roads. With the assistance of Orkney Field Club the survey covered the remaining areas in 2002.

The long-term solution for verges with taller vegetation may include deliberate impoverishment of soil fertility by the removal of cut vegetation, and prevention of fertilizer and slurry being spread onto field verges. Road Verges feature as a “Local Priority” in the Field Margins package of the Rural Development Contract Scheme and it is to be hoped that measures promoted by this package will contribute to a positive outcome for the biodiversity of verges.

7. ACTION PLAN OBJECTIVE:

- Achieve and maintain favourable management of all 1125 miles of road verges in the Orkney Islands.

8. ACTION PLAN TARGETS:

- Establish criteria for “favourable condition”.
- By 2011, 58.09 miles of verge, i.e. the Conservation Verges, should be under favourable management.

9. ACTION PLAN AGENCIES:

National agencies: **OIC; SNH**

Local Partners: **OFC; World Heritage Site Rangers**

10. PROPOSED ACTIONS WITH AGENCIES:

- Formalise verge/soil replacement seed mixes and provide advice on verge restoration in guidance notes for Orkney Islands Council Department of Technical Services. **Lead: SNH**
- Undertake research into best management for conservation verges. **Lead: SNH**
- Carry out trials of verge management schemes. **Lead: SNH**
- Produce an illustrated information leaflet which highlights the ecological value of roadside verges and explains the dual duties of Orkney Islands Council which are:
 - to maintain safety and visibility on the roads; and
 - to further the conservation of biodiversity. **Lead: OIC**
- Continue to involve WHS Rangers in public awareness raising. **Lead: WHS Rangers**

- Continue to raise awareness in Community Councils of the value of roadside verges:
 - Distribute Roadside Verge leaflet. **Lead: OIC**
 - Attend meetings to give a presentation indicating examples of successful verge management. **Lead: OIC**
- Introduce new, more visible and recognisable conservation verge markers and ensure the system of markers is on all conservation verges by the end of March 2009. **Lead: OIC**
- Establish a roadside verges working group which will meet to implement these actions and will report back to the LBAP Steering Group. **Lead: OIC and SNH**

Keynote Species: Great Yellow Bumble Bee *Bombus distinguendus*, Northern Fen Orchid *Dactylorhiza purpurella*, Common Primrose *Primula vulgaris*

REFERENCES AND OTHER INFORMATION SOURCES

OIC, Technical Services Department.

Orkney Field Club (Secretary) and SNH allocated staff

Eutrophic lochs were identified by the UK biodiversity group as a key habitat that requires specific work over and above that detailed in the *Standing Open Waters and Canals* habitat statement. Note also comments in the *Mesotrophic Lochs* HAP in this audit on the intermediate status of some water bodies and the need to treat the HAPs for eutrophic and mesotrophic water bodies as complementary.

1. UK PRIORITY HABITAT DESCRIPTION

These are lochs that have relatively high levels of nutrients, including total phosphorus (typically at least 0.35 mg/l) and total inorganic nitrogen (at least 0.5 mg/l). Many of these water bodies are characterised by dense populations of algae in summer, which colour the water green. Many lowland water bodies in the UK have much higher levels of nutrients: these are polluted and biodiversity is depressed. In their more natural state eutrophic waters have high biodiversity.

In the UK HAP it is proposed that eutrophic water bodies in the UK should be nationally classified into three tiers distinguished on the grounds of naturalness, biodiversity and restoration potential. The exact criteria for these categories have yet to be agreed and the total number of sites falling into each Tier confirmed. It is likely that most Orkney eutrophic lochs will be in Tier 1, unless excluded on grounds of size.

There are no accurate estimates for the amount of eutrophic standing waters in the UK but is considered to be in the region of 1785 km² of which approximately 15% (360 km²) occur in Scotland.

2. CURRENT LOCAL STATUS AND EXTENT

Orkney has a high proportion of Scotland's naturally eutrophic lochs, an increasingly rare habitat. The occurrence of coastal eutrophic lochs in the north and west of Britain is noted in the UK HAP. They are an especially important local habitat.

Eutrophic lochs were the most frequent type identified in the 1986 Loch Survey in Orkney. 74 were recorded, of which 55 were noted as species-rich and 19 were noted as a species-poor habitat variant. The total area of these is 609 ha. Harray loch was not included in the 1986 survey, and is also included here as a eutrophic loch. It has an area of 1,138 ha. It has been the subject of a number of surveys and reports that variously point to it being borderline eutrophic/ mesotrophic, or eutrophic.

A great many of these lochs are coastal, and some of them are ayre lochs, where there is some saline influence from sea spray and/or seepage. These influences, and occasional deposits of storm-thrown seaweed, raise the trophic status of these lochs. These are an unusual eutrophic loch type.

3. LOCAL DISTRIBUTION

These Lochs are scattered throughout the islands except Hoy, and include notable groups in Egilsay, Sanday, North Ronaldsay and Stronsay. The largest is Harray Loch at 1,138 ha, followed by the Loch of Kirbister, Orphir (100 ha), Loch of Skail (63 ha), North Loch, Sanday (41 ha), Loch of St Tredwell, Papa Westray (39 ha) and Bea Loch, Sanday (37 ha). Other important sites include Lochs of Wasbister and Scockness, Rousay; Meikle Water, Stronsay; Loch of Sabiston,

Mainland; Bea Loch, Sanday; and the Egilsay Lochs. Of the ayre lochs, Echnaloch, Burray, has been noted for its range of invertebrate species, and is a haven for wintering waterfowl.

Clearly, Harray Loch is the outstanding site, but the above and many others, including the small coastal ones, are important sites that should be highlighted in the parish and island action plans.

4. ASSOCIATED SPECIES AND LINKS WITH SPECIES ACTION PLANS

Harray Loch, which together with Stenness Loch is an SSSI, is the largest eutrophic loch in Orkney and is particularly notable for the large number of *Potamogeton* species (nine) it supports. Invertebrate interest of the loch is also high and includes a rare caddis fly *Ylodes reuteri* and the only Scottish locality for the snail *Theodoxus fluviatilis*.

4.1 Associated species and their biodiversity conservation status

Species	Common Name	UK BAP List	Scottish Biodiversity List	Local Priority species
<i>Lutra lutra lutra</i>	European otter	√	√	√
<i>Chara curta</i>	Lesser bearded stonewort	√	√	√
<i>Cygnus cygnus</i>	Whooper swan		√	√
<i>Larus ridibundus</i>	Black-headed gull		√	√
<i>Pochard Aythya ferina</i>	Pochard		√	√
<i>Chara rudis</i>	Rugged stonewort		√	√
<i>Aythya marila</i>	Scaup		√	√
<i>Theodoxus fluviatilis</i>	A snail		√	√
<i>Gavia stellata</i>	Red-throated diver		√	√
<i>Bufo bufo</i>	Common toad			√
<i>Cygnus olor</i>	Mute swan			√
<i>Anas acuta</i>	Pintail			√
<i>Anas crecca</i>	Teal			√
<i>Anas platyrhynchos</i>	Mallard			√
<i>Fulica atra</i>	Coot			√
<i>Anas clypeata</i>	Shoveler			√
<i>Anas penelope</i>	Wigeon			√
<i>Mergus serrator</i>	Red-breasted merganser			√
<i>Anas strepera</i>	Gadwall			√
<i>Aythya fuligula</i>	Tufted duck			√
<i>Bucephala clangula</i>	Goldeneye			√
<i>Salmo trutta</i>	Trout			√
<i>Hydrophilus piceus</i>	Great silver water beetle			√
<i>Potamonectes griseostriatus</i>	A water beetle			√
<i>Libellula quadrimaculata</i>	Four-spotted chaser			√
<i>Coelambus novemlineatus</i>	A water beetle			√
<i>Ischnura elegans</i>	Blue-tailed damselfly			√
<i>Ylodes reuteri</i>	A caddis fly			√
<i>Trienodes reuteri</i>	A caddis fly			√
<i>Schoenoplectus</i>	Glaucus bulrush			√
<i>Schoenoplectus lacustris</i>	Bulrush			√
<i>Callitriche hermaphroditica</i>	Autumnal water-starwort			√
<i>Berula erecta</i>	Lesser water-parsnip			√
<i>Potamogeton filiformis</i>	Slender-leaved pondweed			√
<i>P. praelongus</i>	Long-stalked pondweed			√
<i>P. x suecicius</i>	A hybrid pondweed			√
<i>Cladophora sauteri</i>	A green algae			√

5. CURRENT FACTORS AFFECTING THE HABITAT

There are many pressures on the aquatic environment resulting from population, agriculture, industry, quarrying, construction and other human activity. These can cause particular environmental impacts. In general, smaller, lowland lochs are most at risk. Some more significant factors are outlined below. Many of these factors result in cases of serious deterioration in water quality in southern Britain. While there is no evidence that this is the case in Orkney, there are indications of eutrophication in some lochs.

- Pollution: sewage effluent, diffuse and point source from agriculture, urban drainage and industrial effluent are all potentially involved. In Orkney, agriculture is the most important source, and the greatest effect is enrichment by nutrient loads i.e. increased eutrophication leading to enhanced plant production, the potential for loss of macrophyte species and the possibility of algal blooms. Phosphorus is the key nutrient implicated in freshwater eutrophication. The processes involved are long-term and complex, but changes may be sudden. This loch type is especially at risk from increased nutrient loads.

Some of the practices associated with diffuse pollution from agriculture are worth detailing in this context. These include application of inappropriate quantity and quality of plant nutrients, poor timing of nutrient application and soil cultivation, slurry or fertiliser spilling into ditches and water margins, soil erosion from bare or poached land, and cattle poaching of water margins. Soil under-drainage exacerbates run-off. Point-source pollution has been much reduced by regulation and investment in improved farm waste management, but some management systems and storage facilities remain imperfect and liable to leakage, especially of dilute wastes.

There is likely to be some agri-chemical input, but this will not be high under Orkney farming systems.

Town sewage and private septic tanks discharge into eutrophic lochs.

Harray Loch is affected by eutrophication and was the subject of a study in 1989-1991 after a Canadian pondweed *Elodea canadensis*/enrichment problem. Monitoring of water quality (by OIC) in feeder burns continued after the study. Sewage waste from the village of Dounby now passes through a reed bed system before entering the loch. The Loch of Saintear, Westray has been affected by algal blooms which are likely to be related to nutrient enrichment. Other similar sites, i.e. small, shallow lochs in catchments with intensively managed grassland, are vulnerable.

- Water abstraction and drainage. Where water abstraction occurs, eutrophication may be enhanced by reduced water flow through the loch (residence), and fluctuating water levels often adversely affect shoreline vegetation and fauna. Drainage of the habitat is especially destructive, likewise in-filling of smaller water bodies. Public water supply is abstracted from Loch of Kirbister; Bea Loch, Sanday; and Lochs of Saintear and Burness, Westray. In many other lochs, water levels are kept low to dry surrounding farmland, and many smaller ones have been drained completely in the past. There are some recent instances of loch drainage.
- Damage to shoreline. This may be from excessive trampling by livestock, and erosion, or cultivation close to edges. The construction of road and other developments may have similar effects.
- Species introduction. Introduced plants, in particular Canadian pondweed *Elodea canadensis*, may alter the ecological balance of a loch. Invasive alien plants and animals can displace native species. In most cases human action, whether deliberate or not, is required. Trout *Salmo trutta* have been widely introduced, including into an SSSI loch in Sanday. Canadian

pondweed *E.canadensis* is very common in Harray. Explosive growth of this weed and subsequent die-back has occurred, probably in response to nutrient enrichment. The plant is now also in the Loch of Bosquoy.

- Recreational pressure. Excessive disturbance for some species may occur from fishing, shooting, boating and dog-walking.
- Climate change. This may alter the character of water bodies e.g. by a rise in temperature or throughput of fresh water and could produce effects such as accelerated plant growth and colonisation by non-native species.

The Orkney Loch Survey of 1986 identified loch edge trampling in 40% of the sites surveyed, water abstraction in 13% and agricultural pollution in 12%. Some also had sewage inflow, disturbance by shooting and levels lowered by drainage. The alien Canadian pondweed is now present in several lochs, and likely to have been spread on fishermen's boats. Since this survey the extent of these activities may have altered: point-source pollution may be reduced, while diffuse pollution continues; major sewage inflows are much reduced; water abstraction is predicted to increase; demand for grazing land and the structure of agricultural support measures has led to drainage of some lochs.

6. CURRENT ACTIONS AND OPPORTUNITIES

The UK HAP outlines current action and directs the statutory agencies in their objectives and targets, providing a conservation direction to the local HAP. Reference should be made to the national HAP. Actions include measures to rehabilitate nutrient enriched lakes and the development of a national strategy for the control of eutrophication. Research continues into methods of reversing eutrophication. The Scotland and Northern Ireland Forum for Environmental Research (SNIFFER), whose members include SEPA and SGRPID, is considering research needs in Scotland and NI.

The actions listed below are additional or complementary to those of the national plan, to which reference should be made.

6.1 Management

- Eutrophic lochs which are located in SSSIs are, in addition to Harray; North Loch, Loch of Langamay and Loch of Rummie in Northwall; Loch of Isbister; and the small Loch of the Stack, West Westray. Site management statements have been drawn up.
- Of these SSSIs, Loch of Isbister and The Loons is a SAC; and West Westray is an SPA.
- Loch of Isbister & the Loons is also an RSPB reserve. (Loch of the Stack is not within the Noup Cliffs RSPB reserve.)
- SGRPID grants – The previous CPS and RSS schemes which are now closed to new entrants, provided grants for annual payments for management of water margins (essentially, fencing off a no grazing zone around loch edges). The management allowed for the development of tall emergent and bank-side vegetation and provides a physical barrier against potentially harmful agricultural operations. From 2008 eutrophic standing waters will feature as a Local Priority in the Running and Standing Water and Water Quality packages of the Rural Development Contracts Scheme.

- SGRPID grant conditions: support payments to farmers are conditional on observance of a code of good farming practice, including the protection of natural habitats. Of the highest importance among these is the avoidance of pollution.
- LERAPs: Local Environmental Risk Assessment for Pesticides provide a practical framework for complying with the anti-pollution laws, including mapping and categorizing streams, ponds and rivers on the farm and observing buffer zones.
- Environmental Impact Assessments are required for developments with a significant impact.
- The Orkney Trout Fishing Association (OTFA) is a repository of advice and guidance on local fisheries management, and exerts influence to maintain water quality and fish habitat.

6.2 Research and Guidance

- SEPA water monitoring: SEPA carries out comprehensive chemical analysis of Harray Loch and Loch of Kirbister on a monthly basis.
- Scottish Water constantly monitors water quality at its pumping stations at Loch of Kirbister; Bea Loch, Sanday; Lochs of Saintear and Burness, Westray.
- Harray monitoring: a study of the impacts of agriculture on water quality of Harray Loch was carried out in 1989-90. Much other research into water quality and biodiversity of Harray Loch has been carried out (see references). A new study of the status of and the factors affecting the Harray and Stenness Lochs was carried out for SNH in 2001-2002.
- Nutrient balancing: research has been carried out by FWAG in Orkney into nutrient inputs and balances, especially in the catchment of the Lochs of Saintear and Burness in Westray (both eutrophic lochs), and guidance given to landowners to help minimise the impact of agriculture on sensitive catchments.
- Guidance on management and entry into agri-environment schemes is provided by FWAG and SAC.
- Codes of practice: SGRPID publishes a code, the Code of Good Practice for the Prevention of Environmental Pollution from Agricultural Activity (PEPFAA Code), and issues it to farmers. It is a comprehensive and well-presented code, which is now reinforced by the Diffuse Pollution Regulations:

Amendments have been made to the Controlled Activities Regulations (CAR) by Scottish Government to include new regulations for diffuse pollution. Effective from 1 April 2008, the Water Environment (Diffuse Pollution) (Scotland) Regulations 2008 are General Binding Rules (GBRs) based on widely accepted standards and codes of good practice (e.g. Prevention of Environmental Pollution from Agricultural Activity (PEPFAA), Forest and Water Guidelines, etc).

The regulations are risk-based and considered a good example of 'better regulation'. Implementation will mainly be based on guidance, training and awareness raising initiatives. SEPA is the lead competent authority but inspections will be provided via the Scotland's Environmental and Rural Services (SEARS) project.

The regulations will provide a statutory baseline of good practice and as such are expected to contribute significantly to improvements in water quality. A range of guidance materials and training course are currently being prepared by SEPA on the GBRs for land managers and SEARS and SEPA staff.

In the context of the national plan, targets and responsibilities will trickle down to the local level. Introduction of the EU Water Directive Framework provides a stronger mechanism for the

protection and enhancement of eutrophic standing waters than has previously existed and includes new statutory objectives for their ecological status. The national HAP directs statutory agencies to classify eutrophic waters on the basis of current condition and develop plans for ensuring or improving their condition.

7. ACTION PLAN OBJECTIVE:

- Maintain water quality

8. ACTION PLAN TARGETS

- Work towards good ecological status by 2011
- Have a River Basin Management Plan in place by 2009

9. ACTION PLAN AGENCIES:

National agencies: SNH; SGRPID; SEPA; OIC

Local partners: RSPB; FWAG; SAC; Scottish Water; Orkney Trout Fishing Association

10. PROPOSED ACTION WITH AGENCIES:

- Implement River Basin Management Plan. **Lead: SEPA**
- Continue to monitor water quality. **Lead: SEPA**
- Ensure LBAP and River Basin Management Plan are linked. **Lead: SEPA**
- Promote eutrophic standing waters as a Local Priority for Land Management Contracts. **Lead: SGRPID**

Keynote Species: Otter, *Lutra lutra*; Common toad, *Bufo bufo*; Shoveler duck, *Anas clypeata*

REFERENCES AND OTHER INFORMATION SOURCES

Hennessy M. M. et al (1995) *Water Quality in Lochs of Harray and Stenness February – April 1995*. Report for OIC

Birkinshaw. D. (1994) *Macrophyte Survey of the Loch of Harray*. Report for SNH

Sinclair et. al (1992) *The Impact of Agriculture on Water Quality in Loch of Harray and Feeder Burns – Report for OIC*. SAC and University of Aberdeen

Mesotrophic lochs were identified by the UK biodiversity group as a key habitat that requires specific work over and above that detailed in the *Standing Open Waters and Canals* habitat statement. Note also comments in the *Eutrophic Standing Waters* HAP in this audit on the intermediate status of some water bodies and the need to treat the HAPs for eutrophic and mesotrophic water bodies as complementary. Much of what is stated there about the conservation of eutrophic lochs applies equally to the mesotrophic and is not repeated below.

1. UK PRIORITY HABITAT DESCRIPTION

These are lochs in the middle of the trophic range, characterized by their relatively narrow range of nutrients, mainly inorganic nitrogen (0.3-0.65mg/l) and phosphorus (0.01-0.01mg/l). They hold the highest diversity of macrophytes (larger plants, excluding plankton etc.) of any type of loch and also a relatively high proportion of rare and scarce plants. They should also hold high numbers of invertebrates, especially dragonflies, water beetles, stoneflies and mayflies.

These lochs are increasingly rare due to human-induced changes in water chemistry. Few UK sites have natural species assemblages, as a consequence of introductions.

Eutrophic and mesotrophic waterbodies exist along an environmental gradient and intermediate types occur. As the upper end of the mesotrophic scale merges into the eutrophic, status may change as the result of nutrient inputs, the action plans for mesotrophic and eutrophic are complementary, and their implementation should be co-coordinated.

2. CURRENT LOCAL STATUS AND EXTENT

37 sites were identified as mesotrophic in the 1986 Loch Survey. The total area was 713 ha. Mesotrophic water bodies being infrequent in the UK, these Orkney sites are of great importance. The fact that many sites in Orkney are unaffected by species introduction (but see exceptions below), contributes to their importance. One site in Orkney, the Muckle Water, Rousay was in 1986 classified separately from the others as 'species-rich mesotrophic'.

3. LOCAL DISTRIBUTION

Distribution is concentrated in the West Mainland, the South Parish of South Ronaldsay, and North Ronaldsay. Only 4 sites are located outwith these areas.

The largest sites are the Loch of Boardhouse (227 ha), Loch of Swannay (224 ha), Loch of Hundland (97 ha), Loch of Tankerness (67 ha), Muckle Water, Rousay (44ha), and Loch of Clumly (23 ha). Some of the remainder are substantial lochans, others quite small pools. In addition to the 29 surveyed, a further 10 quarries and pools were identified as mesotrophic.

Most notable lochs include the Muckle Water, Rousay; Loch Swannay, with a high diversity of open water plant species; Graemston Loch; The Loons; Loch of Boardhouse; Loch of Wasdale and Loch of Hundland, all of which support seven *Potamogeton* species. Muckle Water, Rousay was defined as the most species-rich of the mesotrophic lochs in the 1986 Loch Survey.

4. ASSOCIATED SPECIES AND LINKS WITH SPECIES ACTION PLANS

Particularly characteristic of this trophic state are shining pondweed *Potamogeton lucens*, autumnal water-starwort *Callitriche hermaphroditica* and stonewort species *Characeae*. The

latter in turn support numerous invertebrates and are associated with populations of trout *Salmo trutta*.

The UK Priority Species bird's-nest stonewort *Tolypella nidifica* is a very rare species that has been recorded from the Loch of Boardhouse, though recent attempts have failed to re-find it.

4.1 Associated species and their biodiversity conservation status

Species	Common Name	UK BAP List	Scottish Biodiversity List	Local Priority species
<i>Lutra lutra lutra</i>	European otter	√	√	√
<i>Tolypella nidifica</i>	Bird's nest stonewort	√	√	√
<i>Chara curta</i>	Lesser bearded stonewort	√	√	√
<i>Chara rudis</i>	Rugged stonewort		√	√
<i>Cygnus cygnus</i>	Whooper swan		√	√
<i>Larus ridibundus</i>	Black-headed gull		√	√
<i>Aythya ferina</i>	Pochard		√	√
<i>Aythya marila</i>	Scaup		√	√
<i>Theodoxus fluviatilis</i>	A snail		√	√
<i>Gavia stellata</i>	Red-throated diver		√	√
<i>Bufo bufo</i>	Common toad			√
<i>Cygnus olor</i>	Mute swan			√
<i>Anas acuta</i>	Pintail			√
<i>Anas crecca</i>	Teal			√
<i>Anas platyrhynchos</i>	Mallard			√
<i>Fulica atra</i>	Coot			√
<i>Anas clypeata</i>	Shoveler			√
<i>Anas penelope</i>	Wigeon			√
<i>Mergus serrator</i>	Red-breasted merganser			√
<i>Anas strepera</i>	Gadwall			√
<i>Aythya fuligula</i>	Tufted duck			√
<i>Bucephala clangula</i>	Goldeneye			√
<i>Salmo trutta</i>	Trout			√
<i>Hydrophilus piceus</i>	Great silver water beetle			√
<i>Potamonectes griseostriatus</i>	A water beetle			√
<i>Libellula quadrimaculata</i>	Four-spotted chaser			√
<i>Coelambus novemlineatus</i>	A water beetle			√
<i>Ischnura elegans</i>	Blue-tailed damselfly			√
<i>Enallagma cyathigeum</i>	Common blue damselfly			√
<i>Schoenoplectus</i>	Glaucus bulrush			√
<i>Schoenoplectus lacustris</i>	Bulrush			√
<i>Callitriche hermaphroditica</i>	Autumnal water-starwort			√
<i>Potamogeton filiformis</i>	Slender-leaved pondweed			√
<i>Cladophora sauteri</i>	A green algae			√

5. CURRENT FACTORS AFFECTING THE HABITAT

The principal factors are outlined in the *Eutrophic standing waters* HAP, to which reference should be made. Some factors with particular effects for Orkney mesotrophic lochs are:

- Pollution: the unusual character of lowland mesotrophic lochs – their relatively low trophic status in the lowland situation – is at some risk from increased nutrient loads. Small sites are especially at risk. An example of such a site is the Mill Dam of Rango, being small, shallow and surrounded by agricultural land.

- Water abstraction and drainage: public water supply is abstracted from Loch of Boardhouse, and the quantity abstracted has recently increased. Abstraction also affects Muckle Water, Rousay, and causes considerable fluctuation in water level. Water levels in many other lochs are kept low to dry surrounding farmland, and many smaller ones have been drained completely in the past. There are recent instances also.
- Species introduction: the natural integrity of mesotrophic lochs is altered by introduction of species. Introduced fish, including trout, can alter the structure of the food web, reducing invertebrate numbers with knock-on effects on the grazing of algae. Rarer invertebrates may be lost. The stone loach *Barbatula barbatulus*, a species native to Britain but not north Scotland, has become established and is now common in the Lochs of Boardhouse and Hundland and their catchments (Booth 1996).

Introduced plants, in particular Canadian pondweed *Elodea canadensis*, may alter the balance. It is present in Loch of Boardhouse. Invasive alien plants and animals can displace native species. In most cases human action, whether deliberate or not, is required.

- Recreational pressure.
For some species, notably breeding birds, it is likely that excessive disturbance is occurring.

6. CURRENT ACTIONS AND OPPORTUNITIES

The UK HAP outlines the national framework of actions to rehabilitate nutrient enriched mesotrophic lakes and the development of a national strategy for the control of eutrophication. Research continues into methods of reversing eutrophication.

The actions listed below are additional or complementary to those of the national plan, to which reference should be made.

6.1 Management

- Sites within SSSIs are the Muckle Water, Rousay; The Loons; and some pools at Saquoy Head, Rousay, and North Hill, Papa Westray.
- Of these SSSIs, Loch of Isbister and The Loons is an SAC.
- Loch of Isbister & the Loons and North Hill, Papa Westray are also RSPB reserves.
- Remaining actions (SGRPID grants, SEPA grants, LERAPs, Environmental Impact Assessments and OTFA): see Eutrophic standing waters HAP.

6.2 Research and Guidance

- See Eutrophic standing waters HAP.
- SEPA carries out comprehensive chemical analysis of Boardhouse, Hundland and Swannay Lochs on a monthly basis.
- Scottish Water constantly monitors water quality at its pumping stations at Loch of Boardhouse and Swannay Loch.

7. ACTION PLAN OBJECTIVE:

- Maintain water quality

8. ACTION PLAN TARGETS

- Work towards good ecological status by 2011
- Have a River Basin Management Plan in place by 2009

9. ACTION PLAN AGENCIES:

National agencies: SNH; SGRPID; SEPA; OIC

Local partners: RSPB; FWAG; SAC; Scottish Water; Orkney Trout Fishing Association

10. PROPOSED ACTION WITH AGENCIES:

- Implement River Basin Management Plan. **Lead: SEPA**
- Continue to monitor water quality. **Lead: SEPA**
- Ensure LBAP and River Basin Management Plan are linked. **Lead: SEPA**
- Promote mesotrophic standing waters as a Local Priority for Land Management Contracts. **Lead: SGRPID**

Keynote Species: Blue-tailed damselfly, *Ischura elegans*; European eel, *Anguilla anguilla*

REFERENCES AND OTHER INFORMATION SOURCES - format and complete

See under Standing Open Waters and Canals, and

Booth, C. J. (1996). Fish in Orkney – 1996. *Bull. Orkney Field Club 1997*

1. UK PRIORITY HABITAT DESCRIPTION

Sand dunes form where there is a supply of medium grained sand in the inter-tidal zone and prevailing onshore winds. The critical factor is presence of a sufficiently large area of beach where the surface dries between tides, allowing the sand to be blown inland. The forces of the wind, waves and tide can form dunes in many different ways. There are bay dunes between headlands, spit dunes at the mouth of estuaries and hindshore dunes where sand is blown inland. Climbing dunes form where sand is blown onto higher ground and tombolos where a neck of sand is deposited out to an island. Dune vegetation is dependant on both the stability of the sand and the time period since the last deposition.

Embryonic or mobile dunes lack vegetation cover altogether, while semi-fixed dunes, as their name implies, are partially stabilized by grass, principally marram grass *Ammophila arenaria* and more locally lyme grass *Leymus arenarius*. Fixed dune grassland forms largely closed swards where accretion is no longer taking place and some soil development is taking place, and the vegetation is usually comprised of fescue *Festuca* grasses, eyebrights *Euphrasia* species, lady's bedstraw *Galium verum*, and a variety of other species. Dune slack vegetation occurs in wet depressions between and behind dune ridges.

There are approximately 23,000 hectares of sand dune in England, Wales and Northern Ireland. The Sand Dune Vegetation Survey of Great Britain - Part 2. Scotland (1993) indicates there may be as much as 48,000 ha of dune and machair in Scotland, of which 33,000 is dune. Major dune systems are widely distributed within the UK. In Scotland they are found on all coasts but are less frequent in the north-west and in Shetland.

2. CURRENT LOCAL STATUS AND EXTENT

The definition of *Coastal sand dunes* includes a range of dune, wetland, heath and grassland types. The Priority habitat *Machair*, occurring in northwest Scotland only, has also been defined, though in terms of plant and animal communities, and most of its physical features, it could broadly be defined within the *Coastal sand dunes* habitat. In Orkney it occurs mainly in Sanday (see section 17.2). Also in Orkney there are many areas of 'links' or dune grassland not, or scarcely, associated with dune formation. For the Orkney LBAP, *Links* have also been defined separately, as a Locally Important Habitat. There are therefore many overlaps in the descriptions, defined areas, factors affecting the habitat and actions. These should be borne in mind when reading this HAP.

There are no extensive dune systems in Orkney comparable with those of the Scottish mainland. Where dunes occur they are usually in the form of single ridges. Dune material in Orkney originates from wind-blown offshore deposits of sand, mainly derived from glacial till and seashells and therefore high in lime. Insufficient studies have been made, so far, of these offshore deposits. The only present area of active accretion is at No. 4 Barrier which links Burray and South Ronaldsay and it is believed that some of this sand results from coastal sand depletion elsewhere rather than from original sources. Offshore glacial till and eroded sandstone add to the sand. In some bays, e.g. Rackwick in Hoy, inland glacial deposits also contribute a fine-grained mineral material to the sand. The varying proportions of lime in the sand of different sites depend on the proportions of shell sand and mineral sand.

Bay dunes are the commonest type in Orkney with the seaward face often steeply eroded.

Dune habitats listed in Annex 1 of the EC Habitats Directive include: embryonic dunes, coastal dune heathland, fixed dunes with herbaceous vegetation (grey dunes), humid dune slacks and dunes with creeping willow *Salix repens*. Examples of all of these occur in Orkney.

The JNCC survey found 6 ha of strand and embryo dune, and 481 ha of mobile and semi-fixed. Much of this is in the Sanday machair area (and HAP).

The extent and quality of dune habitat appears to have been reduced significantly, particularly in the last 50 years, mainly as a result of sand extraction, but also from other factors.

3. LOCAL DISTRIBUTION

Some 84 separate dune sites have been recorded by JNCC, the most common of which are undoubtedly bay dunes. The greatest area of dune and machair occurs in the North isles, particularly in Sanday.

Elsewhere spit dunes build up at the mouths of rivers or estuaries, but only a few small examples are present in Orkney, e.g. at Bay of Newark and Sty Wick (Sanday): these are in the latter stages of their lifespan. They evolved when sea levels were lower than present and have become sediment-starved and prone to erosion as sea levels continue to rise.

Coastal dune heathland on acid sand dune is rare in Orkney, the only known locations being Rackwick (Hoy) and Doomy (Eday). Dunes with creeping willow *Salix repens* also occur at Rackwick.

The outstanding sites for dunes are in Sanday, where the Central Sanday SSSI has been notified for its complex of landforms, which include dunes and machair. Elsewhere in Sanday is the only example of climbing dunes, on Warsetter Hill. Further extensive sand areas are present in Burray, Stronsay, Eday, Westray and North Ronaldsay. Bu Links, Burray, has proved notable for its invertebrate species.

An unusual feature for Orkney is the system of bay dunes developed beside the Churchill Barriers of Scapa Flow, which have formed since the construction of the Barriers during the Second World War: it is unusual to have a definite date for the onset of dune formation. This process has created a fine example of vegetation succession in an accreting shingle/dune system and is a major site for oyster plant *Mertensia maritima*.

4. ASSOCIATED SPECIES AND LINKS WITH SPECIES ACTION PLANS

The diversity of dune types strongly influences the vegetation communities that can thrive on them. On mobile and semi-fixed dunes the number of plant species is restricted. Sand-binding species that predominate are lyme-grass *Elymus arenarius*, marram *Ammophila arenaria*, sand sedge *Carex arenaria* and sand couch *Elytrigia juncea*. Perennial sowthistle *Sonchus arvensis* is often present. On the more stable fixed dunes an increasing number of species occur in the vegetation, including ragwort *Senecio jacobaea*, hogweed *Heracleum sphondylium*, red fescue *Festuca rubra*, bird's-foot trefoil, *Lotus corniculatus*, white clover *Trifolium repens*, lesser meadow-rue *Thalictrum minus* and, at one site only, sea bindweed *Calystegia soldanella*. Primrose *Primula vulgaris* is common at a very few sites. Completely stabilized dunes, merging

into links, may support a herb-rich pasture, the species composition highly dependent on the level of the water table and on the grazing management. Species include the nationally scarce curved sedge *Carex maritima*, which has an arctic-alpine distribution. Three other nationally scarce species normally associated with other habitats are also found on dunes in Orkney. These are: oyster plant *Mertensia maritima* (more typical of shingle), limestone bedstraw *Galium sternerii* (varied habitats) and Scottish primrose *Primula scotica* (more typical of maritime heath and grassland). It is likely that further studies of the eyebright *Euphrasia* genus, so abundant in dune habitats, and often so difficult to identify to species level, will reveal the occurrence of new rarities. A variety of additional plant species give local character to individual sites. Primrose *Primula vulgaris* occurs abundantly at a few sites.

The lichen flora of dunes has not been closely studied but it is believed that at least one rare species does occur in Orkney.

There have been no detailed studies on the animal populations of regional sand dune systems. However, otter *Lutra lutra lutra* is closely associated with this coastal habitat. No dune site is outstanding in terms of Invertebrate Site Register records, but a few dunes have a small number of notable species e.g. archers dart moth *Agrotis vestigialis*, and the sawfly *Nematus stichi*. Bu Links, Burray is known as the only remaining Orkney site for the dark green fritillary *Argynnis aglaja scotica*, and more common butterfly species occur there with unusual abundance. Eight species of bumblebee and cuckoo-bumblebee can also be found at Bu Links, including the nationally rare great yellow bumblebee *Bombus distinguendus*.

Bird species most associated with dunes are twite *Carduelis flavirostris* and shelduck *Tadorna tadorna*.

4.1 Associated species and their biodiversity conservation status

Species	Common Name	UK BAP List	Scottish Biodiversity List	Local Priority species
<i>Lutra lutra lutra</i>	European otter	√	√	√
<i>Alauda arvensis</i>	Skylark	√	√	√
<i>Bombus distinguendus</i>	Great yellow bumblebee	√	√	√
<i>Carex maritima</i>	Curved sedge		√	√
<i>Asio flammeus</i>	Short-eared owl		√	√
<i>Primula scotica</i>	Scottish primrose		√	√
<i>Viola tricolor ssp curtisii</i>	Heart's-ease pansy		√	√
<i>Bombus muscorum</i>	Heath carder bee		√	√
<i>Microtus arvalis orcadensis</i>	Orkney vole		√	√
<i>Sorex minutes</i>	Pygmy shrew			√
<i>Apodemus sylvaticus</i>	Wood mouse			√
<i>Anthus pratensis</i>	Meadow pipit			√
<i>Haematopus ostralegus</i>	Oystercatcher			√
<i>Carduelis flavirostris</i>	Twite			√
<i>Somateria mollissima</i>	Eider			√
<i>Tadorna tadorna</i>	Shelduck			√
<i>Charadrius hiaticula</i>	Ringed plover			√
<i>Oenanthe oenanthe</i>	Wheatear			√
<i>Agrotis vestigialis</i>	Archers dart moth			√
<i>Argynnis aglaja scotica</i>	Dark green fritillary			√
<i>Polyommatus icarus</i>	Common blue			√

Species	Common Name	UK BAP List	Scottish Biodiversity List	Local Priority species
<i>Diarsia mendica orkneyensis</i>	Ingrailed clay			√
<i>Euxoa cursoria</i>	Coast dart			√
<i>Nematus stichi</i>	A sawfly			√
<i>Chrysolina crassicornis</i>	A leaf beetle			√
<i>Ammophila arenaria</i>	Marram			√
<i>Erodium cicutarium</i>	Common stork's-bill			√
<i>Calystegia soldanella</i>	Sea bindweed			√
<i>Mertensia maritima</i>	Oysterplant			√
<i>Juncus balticus</i>	Baltic rush			√
<i>Dactylorhiza purpurella</i>	Northern fen orchid			√
<i>Parnassia palustris</i>	Grass of Parnassus			√
<i>Rhinanthus minor</i>	Yellow rattle			√
<i>Galium sternerii</i>	Limestone bedstraw			√
<i>Primula vulgaris</i>	Primrose			√
<i>Drepanocladus lycopodioides</i>	A moss			√
<i>Brachythecium mildeanum</i>	A moss			√
<i>Distichium inclinatum</i>	A moss			√
<i>Riccia cavernosa</i>	A liverwort			√
<i>Geoglossum arenarium</i>	An earth tongue			√

5. CURRENT FACTORS AFFECTING THE HABITAT

Although, in general, sand dunes are among the least modified of terrestrial habitats, this does not fully apply to those in Orkney. As mentioned in the introduction to this section, old accounts and botanical lists seem to indicate an overall loss. In the UK as a whole, there are a number of major impacts on dunes, including recreation, sea defences, erosion, grazing, scrub invasion, forestry and military use: some of these apply in Orkney, but there is another more important local factor, sand extraction, and other minor ones.

The following are the most important factors:

- Sand extraction: several sites have been degraded by sand and shingle extraction, with major impacts at Evie; Burray Links; Melberry Links, South Walls; and Scrimpo, Rousay in the early 1970s, and similar activities have aggravated coastal erosion problems in Bay of Skail. At Burray Links the habitat has been so extensively damaged that the previous SSSI was de-notified. The possibly unique form of dark green fritillary butterfly *Argynnis aglaja scotica* that breeds there is now much reduced in numbers. Natural sources of building sand are rare in Orkney, and heavy extraction occurred during both World Wars and during the 1970s for oil related developments. Shell sand is used for agricultural liming, and scarce, localised resources are often quite heavily used, with damaging effects, as at Bu, Stronsay, and East Side South Ronaldsay. Small-scale extraction of sand and shingle from beaches as traditionally practised has less impact, but can lead to blow-out and local degradation.
- Grazing: cattle (less often sheep) graze links areas and dunes. At moderate stocking levels in summer this is likely to have little impact on the dune vegetation, but the practice of out-wintering has a very marked effect: where the dune area enclosed includes the seaward edge, marram *Ammophila arenaria* can be grazed to the ground, and the dune de-stabilised, leading to blow-outs. Rabbits seem encouraged to move in and burrow once the coarse vegetation is removed by cattle, and this combines with the treading action of cattle to break up areas of vegetation cover. On more stable dunes where cattle shelter from the weather, the vegetation

can be transformed by nutrient enrichment, hogweed *Heracleum sphondylium* often becoming abundant. Stock feeding sites often become weed-infested.

- Dumping: sand extraction sites and coastal blowouts have often been used for dumping, especially of vehicles and farm waste in the north isles (where bulk waste disposal is difficult and/or expensive). The effect on the habitat is mainly one of appearance, but may also include localised hydrocarbon pollution from old vehicles and nutrient enrichment from silage bales. Attempts to prevent further erosion from blow-outs are usually unsuccessful: turbulent winds simply scour the sand in new ways.
- Recreation: localised damage is a possible concern. Newly accreted sand on the seaward side of dunes is colonised by pioneer plants. Excessive surface disturbance can halt the process, though other more important factors are usually involved in the accretion or erosion process. Recreational pressure on most dune systems is low, with the only area recorded with a serious impact being at Bay of Skaill, close to Skara Brae, however recreational wheeled traffic has caused damage elsewhere.
- Fire: deliberate firing has occurred in the past, in the early spring, apparently by tradition, but seems less common nowadays. The effect on vegetation is not known, but clearly would be damaging to early nesting birds.
- Erosion: dunes systems are not static. The seaward edges are usually highly mobile. In the UK, most are subject to erosion and net sand loss, and the same is probably true of Orkney. While this is a natural process (though now exacerbated by sea level rise and other effects of climate change), it increases the potential effects of localised management. Erosion is likely to be related also to insufficient sand supply: in this case the removal of sand from beaches, as at Bu, Burray, would have an effect.

6. CURRENT ACTIONS AND OPPORTUNITIES

The UK HAP outlines current action and directs the statutory agencies in their objectives and targets, and gives a conservation direction to the local HAP. Reference should be made to the national HAP.

6.1 Management

- Central Sanday is the only SSSI that includes dunes (Northwall SSSI, Sanday, has machair vegetation but no dunes). A management statement exists. The European Natura designations of Sanday sites do not include the dune areas or dune interest.
- All sand extraction is subject to planning controls. Orkney Islands Council is developing a policy on mineral extraction, including sand. Small-scale extraction for farm use is usually permitted, but not from mobile or semi-fixed dune sites. Larger-scale extraction is subject to environmental conditions and requirements for re-instatement.
- SGRPID grants – The previous CPS and RSS schemes which are now closed to new entrants, provided grants for conservation grazing management of ‘species-rich grassland’, which would include dunes if they were grazed as part of a links or machair area. Under the terms of these schemes, the feeding of livestock on the habitat is not permitted, or in certain circumstances, severely restricted. From 2008 Coastal Sand Dunes will feature as a Local Priority in the Species-Rich Coastal Grasslands package of the Rural Development Contracts Scheme.
- LFA support payments to farmers are conditional on observance of a code of good farming practice, including the protection of natural habitats and avoidance of

overgrazing: however, these are weak in relation to management of grazing or other farm operations on dunes.

6.2 Research and Guidance

- SNH carried out National Vegetation Classification (NVC) vegetation surveys of all dunes and links in Orkney in 1996, and a geomorphological survey of Central Sanday SSSI in 1994.
- Guidance on management and entry into agri-environment schemes is provided by FWAG and SAC.
- Orkney Islands Council is developing a policy on mineral extraction, including sand.

7. ACTION PLAN OBJECTIVE:

- Maintain all 84 sites in favourable condition.

8. ACTION PLAN TARGETS:

- Establish criteria for favourable condition using attributes established by SNH under site condition monitoring.
- Survey all sand dune sites to establish current condition

9. ACTION PLAN AGENCIES:

National agencies: OIC; SEPA; SGRPID; SNH; JNCC

Local partners: FWAG; SAC; ICIT

10. PROPOSED ACTIONS WITH AGENCIES:

- Have a Minerals Strategy in place by 2011. **Lead: OIC**
- Raise awareness of the law relating to dumping and clearing rubbish from dunes. **Lead: SEPA**
- Develop best practice guidance on restoration of sites. **Lead: SNH**
- Identify and survey sand dune Sites of Local Nature Conservation Importance. **Lead: OIC**

Keynote Species: Great Yellow Bumble Bee *Bombus distinguendus*; Marram Grass *Ammophila arenaria*; Common Blue Butterfly *Polyommatus icarus*

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1. LOCAL HABITAT DESCRIPTION

Aeolianite is blown sand cemented by calcium carbonate derived from dissolved shell and from sub-surface water. It is quite unusual in northern climates, being found mainly along the Mediterranean coast and in the Middle East. In Britain aeolianite is rare and confined to a dozen localities scattered around the northern and western coasts of Scotland.

2. CURRENT LOCAL STATUS AND EXTENT

Nowhere else in Britain are the outcrops as thick or as extensive as they are at Aikerness, making it one of the most important landforms in Orkney.

3. LOCAL DISTRIBUTION

In addition to the outstanding example at Aikerness other examples of aeolianite occur in Stromness, Westray and South Ronaldsay.

4. ASSOCIATED SPECIES AND LINKS WITH SPECIES ACTION PLANS

Aeolianite outcrops support typical machair or links vegetation (see 17.2 and 17.3 for *Machair* and *Links* HAPs). Aeolianite supports a sparse but highly characteristic vascular plant and moss flora. Plant communities include eyebright *Euphrasia* spp, thyme *Thymus praecox*, moonwort *Botrychium lunaria*, orchids and, notably, the usually southern stiff sand grass, *Catapodium marinum*.

4.1 Associated species and their biodiversity conservation status

Species	Common Name	UK BAP List	Scottish Biodiversity List	Local Priority species
<i>Catapodium marinum</i>	Stiff sand grass			√

Factors, objectives and actions for Aeolianite are closely linked to those outlined for the Coastal sand dunes and Machair HAPs, to which reference should be made. Only additional items are listed below.

5. CURRENT FACTORS AFFECTING THE HABITAT

Aeolianite is confined to a few small sites, some of which may be at risk from destruction by sand extraction or other operations that disturb the site. From a management point of view, an aeolianite site is similar to an ancient monument, where a list of damaging operations and factors includes:

- Vehicle traffic;
- Feeding of stock, especially placement of ring feeders;

- Fencing through or close to the site (which can cause heavy trampling by livestock);
- Ploughing, mole-ploughing or other ground disturbance;
- Planting of trees or other deep-rooting plants.

6. CURRENT ACTIONS AND OPPORTUNITIES

- Assess this key site for management (SNH)
- Aeolianite features as a “Local Priority” in the Geodiversity package of the Rural Development Contract Scheme.

7. ACTION PLAN OBJECTIVES:

- Identify all sites and list their locations.
- Establish criteria for favourable condition.
- Maintain all sites in favourable condition.

8. ACTION PLAN TARGET:

- Implement a management plan by 2011.

9. ACTION PLAN AGENCIES

National agencies: SNH; SGRPID; OIC; SEPA

Local partners: FWAG; SAC; ICIT

10. PROPOSED ACTIONS WITH AGENCIES:

- Assess key site for management. **Lead: SNH**
- Desk study into site locations. **Lead: ICIT**
- Minerals strategy to be in place by 2011. **Lead: OIC**

Keynote Species: Stiff sand grass, *Catapodium marinum*

REFERENCES AND OTHER INFORMATION SOURCES

As for *Coastal sand dunes*

1. UK PRIORITY HABITAT DESCRIPTION

Shingle is defined as sediment with particle sizes in the range 2-200mm. It is a globally restricted sediment type with few occurrences outside northwest Europe, Japan and New Zealand. Shingle beaches are widely distributed round the coast of the UK, where they develop in high-energy environments. Shingle structures take the form either of spits, barriers or barrier islands formed by longshore drift, or of cusped forelands where a series of parallel ridges pile up against the coastline.

Most of the length of shingle coastline in the UK consists of simple fringing beaches within the reach of storm waves, where the shingle remains mobile and vegetation is restricted to temporary and mobile strandline communities. This plan addresses only structures sufficiently stable to support perennial vegetation. Such structures are rare even in the UK, and have been subject to considerable exploitation and damage.

Shingle habitats are listed in Annex 1 of the EC Habitats Directive and include perennial vegetation of stony banks, and annual vegetation of drift lines.

2. CURRENT LOCAL STATUS AND EXTENT

Orkney has no major shingle structures, but there are considerable lengths of shingle shoreline including spits and barrier beaches (ayres), as well as about 22.5 km of fringing bay head beaches. Some of the shingle ayres are sand-covered. Many of the ayres have developed perennial vegetation, and comprise much of the priority habitat in Orkney. In some exposed situations, substantial shingle banks have been thrown up by concurrences of great storms and high tides: they are seldom wave-washed and have developed perennial vegetation.

At some sites, boulders well in excess of 200 mm in diameter have been piled up; because of the size of the boulders these banks cannot be included in this priority habitat type (see section 17.6 *Storm beach*). Most simple fringing beaches do not develop perennial vegetation and these cannot be considered as part of the priority habitat.

All the shingle features in Orkney are derived from the underlying sandstone and associated volcanics. Virtually all of the shingle resource has been derived from erosion of glacial deposits such as till. Current coastal erosion processes produce a negligible amount of shingle.

The Orkney shingle resource is finite. This is not obvious because shingle is continuously being redistributed by natural processes. Most of the shingle sites are in good condition, but some damage and loss have occurred due to extraction. Several ayres have roads on them.

3. LOCAL DISTRIBUTION

Shingle barriers forming ayre lochs, or occasionally just wetlands, occur almost entirely on the eastern side of Orkney and in the north isles. Some notable examples are Roos Loch, Sanday; Straenia Water, Stronsay; Loch of the Graand, Egilsay; Loch of Carness and Work, St Ola; Ayre of Hestecruive, Tankerness; and Loch of Liddle, South Ronaldsay.

Shingle spits are much less common. There is one at Mirkady, Deerness, and several within the Central Sanday SSSI.

Vegetated shingle banks on exposed shores are scarce but widely distributed, occurring on low rocky shores with a high, but not extreme, degree of exposure. They are mainly in the north isles, for example at Holms of Ire, Sanday; and the Holms of Copinsay.

4. ASSOCIATED SPECIES AND LINKS WITH SPECIES ACTION PLANS

Typical plants of fairly stable shingle include sea campion *Silene maritima*, corn sowthistle *Sonchus arvensis*, cleavers *Galium aparine*, Scots lovage *Ligusticum scoticum*, curled dock *Rumex crispus*, stinging nettle *Urtica dioica* and occasionally the nationally rare oysterplant *Mertensia maritima*. Orkney holds about 50% of the UK population at about 21 separate locations, thus making the islands a very important area for this plant. Scots lovage *Ligusticum scoticum* is restricted in Britain to Scottish and north Irish cliffs and shingle. It was long believed that the coastal cushion form of the herb robert, *Geranium robertianum* spp *maritimum* only occurs on a shingle ridge in St. Ola but even if this is not correct, the species, which is otherwise a weed of cultivation, is certainly native here. Cleavers *Galium aparine* in Orkney is significant for the large size of its seeds, which enable it to establish more easily within the large interstices between the pebbles. Skullcap *Scutellaria galericulata*, is a local rarity known at only 3 sites in Orkney. It is found solely on beaches on the Holm of Scockness; Loch of the Graand, Egilsay; and the Holms of Ire, Sanday; though it is common elsewhere in the UK and Europe.

Where greater stability is established, barrier beaches, spits and bars may have in addition, red fescue *Festuca rubra*, false oat grass *Arrhenatherum elatius*, the hybrid couch, *Elytrigia x laxa*, field forget-me-not *Myosotis arvensis*, pink campion *Silene dioica* and thrift *Armeria maritime*. This stable shingle normally supports a rich development of crustose and foliose lichens, especially *Cladonia* spp. Backshore shingle vegetation, further from the maritime influence, is dominated by false-oat grass, couch-grass *Elytrigia repens*, its hybrid, (which is often dominant), hogweed *Heracleum sphondylium*, curled dock *Rumex crispus*, meadow vetchling *Lathyrus pratensis*, silver weed *Potentilla anserina* and cleavers *Galium aparine*.

Organic enrichment of the shingle habitat occurs where seals haul out, or large numbers of birds nest or roost. This results in a community of sea mayweed, curled dock *Rumex crispus*, chickweed *Stellaria media*, common mouse-ear *Cerastium fontanum*, procumbent pearlwort *Sagina procumbens*, white clover *Trifolium repens*, sea plantain *Plantago maritima* and annual meadow-grass *Poa annua*. Some of the higher shingle ridges, particularly on the smaller islands (e.g. Corn Holm) have become nesting sites for fulmars. Arctic terns *Sterna paradisaea* may breed on shingle, with a large colony on Swona partly on this type of habitat. Sometimes colonies have common terns *Sterna hirundo* among them. Ringed plovers *Charadrius hiaticula* are widespread on shingle sites.

4.1 Associated species and their biodiversity conservation status

Species	Common Name	UK BAP List	Scottish Biodiversity List	Local Priority species
<i>Sterna hirundo</i>	Common tern		√	√
<i>Sterna paradisaea</i>	Arctic tern		√	√
<i>Charadrius hiaticula</i>	Ringed plover			√
<i>Haematopus ostralegus</i>	Oystercatcher			√
<i>Oenanthe oenanthe</i>	Wheatear			√
<i>Rhamphomyia morio</i>	A fly			√
<i>Aphrosylus raptor</i>	A dolichopodid fly			√
<i>Mertensia maritima</i>	Oysterplant			√
<i>Scutellaria galericulata</i>	Skullcap			√

5. CURRENT FACTORS AFFECTING THE HABITAT

Shingle structures are subject to natural mobility, in particular during storm events. There are human impacts too. There are few designated sites for the habitat (none for ayre barriers):

- Extraction operations: small-scale operations to remove shingle for local farm road and construction use are not uncommon, especially in the north isles. In most cases damage is negligible, but an instance of breaching of the ayre barrier has occurred at Scockness, Rousay.
- Grazing: rabbits graze many of the sandy shingle areas, and grazing by sheep and cattle influences the shingle communities on all the inhabited islands.
- Vehicle traffic: this is usually on defined tracks where little damage is caused.
- Recreation: breeding birds may be subject to undue disturbance.
- Oil spills, coast defence and road building: these are other potential threats

6. CURRENT ACTIONS AND OPPORTUNITIES

The UK HAP outlines current action and directs the statutory agencies in their objectives and targets, providing a conservation direction to the local HAP. Reference should be made to the national HAP.

6.1 Management

- East Sanday Coast and Central Sanday are SSSIs that include vegetated shingle. Almost all the coastal edge of the eastern half of Sanday is included in the East Sanday Coast SPA and Sanday SAC. Site management statements have been drawn up.
- Commercial shingle extraction (but not small-scale farm use) is subject to planning controls. Orkney Islands Council is developing a strategy on mineral extraction, including shingle.
- SGRPID grants - The previous CPS and RSS schemes which are now closed to new entrants, provided grants for conservation management of varied habitats which could, rarely, include shingle banks. At least two such sites are thought to have been managed by reduced, timed grazing and restriction of other potentially damaging activities. From 2008 vegetated shingle will feature as a Local Priority in the Species-Rich Coastal Grasslands package of the Rural Development Contracts Scheme.
- Oil spill contingency plans are in place.

6.2 Research and Guidance

- Guidance on management and entry into agri-environment schemes is provided by FWAG and SAC.

7. ACTION PLAN OBJECTIVE:

- Maintain all sites in favourable condition.

8. ACTION PLAN TARGETS:

- Establish criteria for favourable condition using attributes established by SNH under Site Condition Monitoring
- Survey all vegetated shingle sites to establish current condition.

9. ACTION PLAN AGENCIES:

National agencies: SNH; SGRPID; SEPA; JNCC

Local partners: OIC; FWAG; SAC; ICIT

10. PROPOSED ACTIONS WITH AGENCIES:

- Have a Minerals Strategy in place by 2011. **Lead: OIC**
- Raise awareness on potential for habitat damage when carrying out works on sea defences: **Lead: SNH**
- Ensure the sensitivities of Coastal Vegetated Shingle are included in Integrated Coastal Zone Management. **Lead: OIC**
- Raise awareness of the permitted rights of landowners with respect to extraction of mineral resources. **Lead: OIC**

Keynote Species: Skullcap: *Scutellaria lateriflora*

REFERENCES AND OTHER INFORMATION SOURCES

Barne, J.H., Robson, C.F., Kaznowska, S.S., Doody, J.P., Davidson, N.C. & Buck, A.L. (eds.). (1997). *Coasts and Seas of the United Kingdom*. Coastal Directories Series, JNCC, Peterborough

Bullard, E.R. & Goode, D.A. (1975). The Vegetation of Orkney. In *The Natural Environment of Orkney*. Goodier, R. (ed.). NCC, Edinburgh.

Mather, A.S., Ritchie, W. & Smith, J.S. (1974). *Beaches of Orkney*. Dept. of Geography, Aberdenn

1. LOCAL HABITAT DESCRIPTION

Strandlines support mainly annual vegetation that colonises accumulations of drift material rich in nitrogenous organic matter at or near the high water mark. Open in nature, they support few species.

Orkney strandline plant communities are often dominated by orache *Atriplex* species. Sea rocket *Cakile maritima* is locally dominant. The accumulations of rotting organic matter support various invertebrates, including some unusual species. Many species of shorebirds feed on strandline invertebrates and other detritus.

2. CURRENT LOCAL STATUS AND EXTENT

Orkney strandlines in some places support nationally important concentrations of wintering waders.

There is no estimate of the amount of strandline within the UK. Apart from steep slopes and cliffs, strandlines occur on nearly all supralittoral habitats including sand and shingle beaches, saltmarshes and in locally sheltered areas on rocky coasts.

3. LOCAL DISTRIBUTION

All sloping beaches can potentially develop strandline vegetation, but the most extensive well-vegetated beaches appear to be in the north isles, where the long, broad beaches of sand and fine shingle with plentiful deposits of rotting seaweed sometimes support extensive stands of annual plants.

4. ASSOCIATED SPECIES AND LINKS WITH SPECIES ACTION PLANS

Species include sea mayweed *Triplospermum maritimum*, orache *Atriplex* species, sea rocket *Cakile maritima* and sea sandwort *Honkenya peploides*. Frosted orache *Atriplex lasciniata* is a scarce species in Orkney. Just above the strandline, the nationally scarce oysterplant *Mertensia mertensia* sometimes occurs. On more sheltered beaches, other perennial or biennial plants may grow down to the strandline, including sea mayweed *Tripleurospermum maritimum*, silverweed *Galium aparine*, curled dock *Rumex crispus*, and at one site only, sea bindweed *Calystegia soldanella*. Very large numbers of adult kelp flies *Coelpa* species and their larvae frequent strandlines with rotting seaweed, and many species of predatory flies, including some unusual species, are associated with these and the midges of rock pools. Large numbers of turnstone *Arenaria interpres* and purple sandpiper *Calidris maritima* can be found on some beaches, particularly in the north isles. Rock pipit *Anthus petrosus* are common. Twite *Carduelis flavirostris* search the strandline for drift seeds in winter. Other birds not usually associated with the shore move to the strandline in frosty weather.

4.1 Associated species and their biodiversity conservation status

Species	Common Name	UK BAP List	Scottish Biodiversity List	Local Priority species
<i>Calidris alpina</i>	Dunlin		√	√
<i>Numenius arquata</i>	Curlew		√	√

Species	Common Name	UK BAP List	Scottish Biodiversity List	Local Priority species
<i>Limosa lapponica</i>	Bar-tailed godwit		√	√
<i>Charadrius</i>	Ringed plover			√
<i>Calidris alba</i>	Sanderling			√
<i>Tringa totanus</i>	Redshank			√
<i>Carduelis</i>	Twite			√
<i>Mertensia</i>	Oysterplant			√
<i>Calystegia</i>	Sea bindweed			√
<i>Rhamphomyia</i>	A fly			√
<i>Aphrosylus raptor</i>	A dolichopodid fly			√

5. CURRENT FACTORS AFFECTING THE HABITAT

This important local habitat is common in Orkney and not affected by the most important adverse factors in more populated regions of the UK – human disturbance, regular cleaning of popular beaches and sea defence works. However, there are these:

- The potential for oil spills,
- Litter, almost all washed up from the sea. Large quantities accumulate at certain beaches. Litter is unsightly and some polluting materials can be washed up, including spent oil and chemicals in drums, and nets and twine that may trap animals and birds.

6. CURRENT ACTIONS AND OPPORTUNITIES

6.1 Management

- East Sanday Coast, Central Sanday, Copinsay, Faray & Holm of Faray, Auskerry and Waulkmill are SSSIs that include strandline. Almost all the coastal edge of the eastern half of Sanday is included in the East Sanday Coast SPA and Sanday SAC. Site management statements have been drawn up.
- Nearly all beaches where debris accumulates are cleaned of debris once every year by teams from local voluntary groups. The effort, called ‘Bag the Bruck’ is organised by Environmental Concern Orkney (ECO) and supported by OIC.
- Orkney Islands Councils Department of Harbours and some local shipping operators, including Pentland Ferries and Orkney Ferries, have waste management policies to back up statutory regulations on disposal of waste at sea.
- Oil spill contingency plans are in place.

6.2 Research and Guidance

None known

7. ACTION PLAN OBJECTIVE:

- Maintain the high quality of the habitat in Orkney.

8. ACTION PLAN TARGET:

- Undertake three events or activities per year to raise awareness of marine litter issues.
Lead: OCEAN

9. ACTION PLAN AGENCIES

National agencies: OIC; SEPA

Local partners: RSPB; ECO; Orkney Fishermen's Association; Orkney Fish Farmers' Association

10. PROPOSED ACTIONS WITH AGENCIES

- Continue to monitor the impact of plastics ingestion on birds and other marine organisms.
Lead: RSPB
- Raise awareness of marine litter through events and leaflets. **Lead: OIC**
- OIC Waste Management Department are to provide a facility for the collection, baling and despatch for recycling of plastics before 2011. **Lead: OIC**
- Support the annual "Bag the Bruck" event. **Lead: OIC/ECO**
- Project within the HLF-Scapa Flow Landscape Partnership Scheme. **Lead: OIC**
- Raise awareness through an information leaflet of the need to recycle waste from boats and shipping. **Lead: OIC**

Keynote Species: Turnstone *Arenaria interpres*

REFERENCES AND OTHER INFORMATION SOURCES

JNCC. (1997). *Coasts and Seas of the United Kingdom*. Coastal Directories Series, JNCC, Peterborough

1. UK PRIORITY HABITAT DESCRIPTION

Coastal saltmarshes comprise the upper, vegetated portions of the intertidal zone. For the purposes of this plan however, the upper limit of saltmarsh is defined as one metre above Mean High Water Springs. Saltmarsh vegetation develops in sheltered waters such as estuaries, where fine sediment can accumulate. A natural saltmarsh system shows a zonation of vegetation according to the frequency of tidal inundation: few species are adapted to frequent inundation, so the lower levels are species-poor, while the opposite is the case for the upper-mid marsh. At the upper tidal limits, true saltmarsh communities are replaced by transitional communities, which can only withstand occasional inundation.

Saltmarshes are an important resource for wading birds and wildfowl.

Transitional areas between saltmarsh and freshwater are particularly important for invertebrates.

There are approximately 45,000 ha of saltmarsh in Britain, of which 6747 ha are in Scotland. It is estimated that only 3% of the Scottish coastline consists of saltmarsh vegetation.

2. CURRENT LOCAL STATUS AND EXTENT

While the geography of Orkney does not provide for the development of large areas of saltmarsh there are many fragments, some of them showing the full range of vegetation zonation, with rich upper and transitional zones. Transitions are quite scarce in England but still comparatively common in Scotland.

British saltmarshes are grouped into 3 types and all the salt marshes in Orkney belong to Type C. Type C saltmarshes are characterised by a limited number of plant communities, but with higher species diversity in the upper marsh. This characteristic is a result of the modification of the upper marsh area, either by the influence of freshwater seepage or because of a natural transition into a non-tidal area.

Shimwell (1985), from a detailed survey of Orkney saltmarshes, estimated a total extent of 80.5 ha. The JNCC (1997) figure for area is 76 ha.

3. LOCAL DISTRIBUTION

Saltmarshes are concentrated in three main areas; the sheltered bays and strands of Scapa Flow (particularly Hoy), the Mainland's north east coastline and the island of Sanday. Much of the coast is exposed and saltmarshes are restricted to sites that provide some shelter. Most of the larger sites are found in shallow bays protected by a sand or shingle bar (locally known as an ouse, - the Ouse at Finstown is an example). The many smaller sites tend to be located at the head of beaches within embayments, either at the mouth of a stream or the base of a cliff from which drainage seeps on to the beach. Some saltmarshes are enclosed behind man-made features such as roads, with tidal water entering through a natural channel. In addition to these sites, vegetation showing many similarities to saltmarsh is widespread on rock platforms, reefs and low cliffs.

Though the total area is small, there are about 30 main saltmarsh sites (Shimwell 1985) widely distributed around the coastline. There are eight sites of more than 2.5 ha which are located at Tor Ness and Quivals Creek, Cata Sand and Little Sea, all in Sanday; the Ouse at Veantrow Bay,

Shapinsay; the Ouse Finstown; Bay of Suckquoy, St Andrews; Waulkmill, Orphir; and Cummi Ness, Stenness.

The more important sites are the larger examples, which tend to be structurally and botanically diverse. The two outstanding sites are Little Sea and Cata Sand, Sanday (Shimwell 1985). There are some diverse transitional zones, particularly in Sanday. An interesting example is at Black Rock, Sanday, where the transition is into freshwater swamp and wet machair.

4. ASSOCIATED SPECIES AND LINKS WITH SPECIES ACTION PLANS

A typical saltmarsh zonation in the region comprises only small areas of pioneer and low-mid marsh. The main pioneer species is sea blite *Suaeda maritima* and the low-mid marsh zone is usually a species-poor common saltmarsh grass *Puccinellia maritima* community. The dominant species in the mid to upper marsh are mud rush *Juncus gerardii* and common saltmarsh grass. Other widespread species are sea milkwort *Glaux maritima*, thrift *Armeria maritima*, common scurvy grass *Cochlearia officinalis*, orache *Atriplex* species, autumnal hawkbit *Leontodon autumnalis*, greater sea-spurrey *Spergularia media*, sea plantain *Plantago maritima*, red fescue *Festuca rubra*, and sea arrow grass *Triglochin maritima*. Glassworts *Salicornia* species occur in channels at a few Orkney sites.

On the upper levels of the saltmarsh, in wet depressions and where it is flushed, there are strands of saltmarsh flat-sedge *Blysmus rufus*, very occasionally with slender spike-rush *Eleocharis uniglumis*. These two species are both northern elements in the British saltmarsh flora, found mainly on the west coast of Britain from mid-Wales northward and whilst neither is nationally scarce as a species, their extent as a vegetation type on British saltmarsh is very limited. There are several sites with this vegetation in Orkney, but it is less widespread than on the north-west coast of Scotland, the Western Isles and Shetland. Conversely, the southern species, long-bracteate sedge *Carex extensa* also occurs in several Orkney saltmarshes. A nationally scarce species found on the saltmarshes is the eyebright *Euphrasia foulaensis*.

At the landward edge of saltmarsh there are transitions to other habitats such as hay meadows, wet grasslands, freshwater marsh, shingle, dune pasture, and to low cliffs. Such areas are often of particular ecological interest with a high diversity of both plants and invertebrates.

4.1 Associated species and their biodiversity conservation status

Species	Common Name	UK BAP List	Scottish Biodiversity List	Local Priority species
<i>Calidris alpina</i>	Dunlin		√	√
<i>Vanellus vanellus</i>	Lapwing		√	√
<i>Tringa totanus</i>	Redshank			√
<i>Euphrasia foulaensis</i>	An eyebright			√
<i>Aster tripolium</i>	Sea aster			√

5. CURRENT FACTORS AFFECTING THE HABITAT

Saltmarshes will be affected by any rise in sea level but generally there are few threats at present from human activities in Orkney. They include the following:

- Road, culvert, and sea-defence works could affect tidal flows into saltmarsh areas, causing loss of or damage to habitats.

- Drainage: drainage works mainly date from the 19th century, with more recent attempts to prevent re-entry of seawater by fitting of sluice gates. There have been some attempts to deepen existing drains, which have affected wet machair vegetation and loch margins in the transitional zone, potentially opening it to increased grazing or even reclamation. Some saltmarshes are found in situations where flooding by tidal waters is through a narrow or restricted entrance and therefore they are particularly vulnerable to changes in their tidal regime through drainage works or the construction of culverts and embankments.
- Reclamation: Considerable areas of the upper edges of several saltmarshes have in the past been re-seeded.
- Grazing: grazing has a marked effect on the structure and composition of saltmarsh vegetation. Over-grazing accompanied by poaching of the soft ground would be damaging, but is not known to be a significant factor in Orkney. Abandonment of grazing on traditionally grazed saltmarshes could lead to the formation of rank, tussocky grassland, but this is not known to be occurring in Orkney.
- Fertiliser and slurry: any applications of these would be highly damaging to plant communities, but is not known to occur.
- Dumping: some sites have been affected by fly tipping.
- Oil spills are a potential threat.

6. CURRENT ACTIONS AND OPPORTUNITIES

The UK HAP outlines current action and directs the statutory agencies in their objectives and targets, providing a conservation direction to the local HAP. Reference should be made to the national HAP.

6.1 Management

- Waulkmill, East Sanday Coast and Central Sanday are SSSIs that include some of Orkney's best areas of saltmarsh. Almost all the coastal edge of the eastern half of Sanday is included in the East Sanday Coast SPA and Sanday SAC. Site management statements have been drawn up.
- SGRPID grants - The previous CPS and RSS schemes which are now closed to new entrants, provided grants for conservation grazing management of 'species-rich grassland', which could include saltmarsh. From 2008 coastal saltmarsh will feature as a Local Priority in the Species-Rich Coastal Grasslands package of the Rural Development Contracts Scheme.
- Oil spill contingency plans are in place.

6.2 Research and Guidance

- SNH has carried out Phase 1 and National Vegetation Classification (NVC) vegetation surveys of Central Sanday SSSI.
- Guidance on management and entry into agri-environment schemes is provided by FWAG and SAC.

7. ACTION PLAN OBJECTIVE:

- Identify all sites and list their locations.

8. ACTION PLAN TARGETS:

- Establish criteria for favourable condition using attributes established by SNH under Site Condition Monitoring.
- Survey all saltmarsh sites to establish current condition.

9. ACTION PLAN AGENCIES:

National agencies: **SNH; SGRPID; OIC; SEPA; JNCC**

Local partners: **FWAG; SAC**

10. PROPOSED ACTION WITH AGENCIES

- Promote Saltmarsh as a “Local Priority” in Rural Management Contract Scheme. **Lead: SGRPID**
- Raise awareness with the appropriate agencies to ensure that road and drainage works do not adversely affect saltmarsh. **Lead: OIC**

Keynote Species: Sea aster *Aster tripolium*

REFERENCES AND OTHER INFORMATION SOURCES

- Barne, J.H., Robson, C.F., Kaznowska, S.S., Doody, J.P., Davidson, N.C. & Buck, A.L. (eds.). (1997). *Coasts and Seas of the United Kingdom*. Coastal Directories Series, JNCC, Peterborough
- Bullard, E.R. & Goode, D.A. (1975). The Vegetation of Orkney. In *The Natural Environment of Orkney*. Goodier, R. (ed.). NCC, Edinburgh.
- Shimwell, D.M. (1985). *Salt-marshes of Orkney*. Report to NCC, Peterborough

20.1 Seagrass beds (<i>Zostera marina</i> and <i>Zostera angustifolia</i>)	priority habitat
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1. CURRENT LOCAL STATUS AND EXTENT

Only *Zostera marina* and *Z. angustifolia* occur in Orkney, with the former making up the majority of what are called seagrass beds or meadows. They are commonly known as eelgrass and slender eelgrass (respectively) with the former known locally in Orkney as mella or mallow. They are, however, not grasses, but marine angiosperms, more closely linked to the lily family of flowering terrestrial plants. The 59th parallel is near to the northern-most boundary of *Zostera*, but the warming influence of the Gulf Stream allows them to flourish in Orkney. Seagrass beds are amongst some of the most productive yet dynamic ecosystems on the planet. *Zostera angustifolia* beds are found intertidally (and thus might be best included in the broad habitat type of “littoral sediments”), but those of *Zostera marina* commonly extend into or are limited to the subtidal. The depth to which they extend is unconfirmed although they are definitely present down to 10m. Elsewhere they are known to reach down to 30m if conditions are ideal. Owing to the fact that these plants are perennial and the marine environment very dynamic, the extent of the seagrass beds at certain locations will fluctuate annually. Seagrass is only found on soft sediments, such as sand and mud, or mixed sediment.

2. SCOTTISH AND UK SIGNIFICANCE

The importance of sea grass is only noticed once it has disappeared from a region by pollution, disturbance or disease. They are critical to the early life stages of many marine organisms, some commercially important. Associated with the sea grass beds is a rich and diverse fauna. On occasion the weight of those organisms that are attached to the blades can equal the entire weight of the plant. Other organisms, such as turbot, plaice, cod, flounder and numerous crustaceans, reside in these habitats for only part of their lifespan. In addition, many birds e.g. wigeon, feed on the blades of the sea grass. Some organisms use the beds as protection from the harsh marine environment, or as a place to avoid predators, while others use it as a place to hunt prey. Sea grass beds are locally critical for the stabilisation of sediments in an otherwise fluid environment. The root systems stabilise the sand and extensive meadows can dissipate wave energy. If a bed or meadow is destroyed it can take a significant amount of time for its full recovery, during which the sediment may have become unstable and altered sediment transport may prevent subsequent re-colonisation. All attempts at transplanting seagrasses have met with failure.

2.1 Associated species and their biodiversity conservation status

Species	Common Name	UK BAP List	Scottish Biodiversity List	Local Priority species
<i>Zostera marina</i>	Eelgrass			√
<i>Zostera angustifolia</i>	Narrow leaved eelgrass			√

3. LOCAL DISTRIBUTION

Recent surveys have been incomplete in surveying the whole of Orkney. However the work done so far has found several significant sites of seagrass meadows. These are typically in protected bays, estuaries and away from particularly strong winds

4. FACTORS AFFECTING THE HABITAT

The presence of seagrass beds in an area is not always obvious throughout the year. The seagrass leaves remain attached until September and do not reappear until March. Thus areas of importance may be excluded by inappropriate timing of surveys when the presence of sea grass is not obvious. While the root systems are always present, these can go unnoticed. Threats to sea grass come from a variety of sources: physical; biological environmental and human impacts. They include long periods of elevated sea temperature, extremes of rainfall, low levels of insolation and the long-term cycles in oceanic circulation. All of these factors will be affected to different degrees by global warming. Additionally, wasting diseases, similar to one which occurred during the 1930s, can decimate local populations by 99-100%.

Direct man-induced impacts included dredging and bottom trawling in areas where seagrass is present. This can tear out the root systems, essential to the community's survival. Boat anchors have the same effect if inappropriately deployed or left to drag. Sewage inputs and the eutrophication of coastal waters from farmland runoff disturbs the balance of the low nutrient environment that seagrass requires. Seagrass communities are simply out-competed by other species and lost if eutrophication is not carefully controlled. Herbicides also can have toxic effects where coastal runoff results in high concentrations, particularly in the sediments. Runoff can also increase turbidity decreasing the sea grasses ability to compete with other species.

Protecting seagrass beds and meadows is also important for other aspects of Orkney's marine environment. Extensive areas of seagrass stabilise benthic sediments and provide protection from coastal erosion in addition to providing important nursery grounds for commercially important fishes. The exploitation of seagrass in bygone days utilised the blades that were swept up onto the beaches and the historic importance of seagrass should not be forgotten. It was once used to place over manure to prevent smells spreading, as a substitute for horsehair for padding, as feed for ruminants and for thatching roofs of Orkney's humbler dwellings. The future holds possibilities for the use of seagrass in the treatment of sewage.

5. CURRENT ACTIONS AND OPPORTUNITIES

- From 2008 seagrass beds will feature as a Local Priority in the Species-Rich Coastal Grasslands package of the Rural Development Contracts Scheme.

6. ACTION PLAN OBJECTIVE:

- Identify all sites and list their locations.
- Establish criteria for favourable condition.
- Maintain current known extent.

7. ACTION PLAN TARGETS:

- *Zostera angustifolia* – reduce pollutant related effects by 2011.

- *Zostera marina* – protect from pollutants and human disturbance.

8. ACTION PLAN AGENCIES:

National agencies: **SNH; SGRPID; OIC; SEPA; JNCC**

Local partners: **FWAG; SAC**

9. PROPOSED ACTION WITH AGENCIES:

- Reduce discharge of sewage-related nutrients to the Ouse, Finstown. **Lead: SEPA**
- Monitor the health of *Zostera angustifolia* in The Ouse, Finstown. **Lead: ICIT**
- Ensure regulators are aware of issues in planning and development. **Lead: SEPA**
- Raise awareness with appropriate agencies to ensure that road and drainage works do not adversely affect *Zostera* meadows. **Lead: OIC**

Keynote Species: *Zostera marina*, *Zostera angustifolia*

Information sources

Jackson E. (1998) MSc dissertation : Distribution and Importance of *Zostera* in Orkney. ICIT, Heriot-Watt University, Stromness.

Short F.T., Ibelings B.W., Den Hartog C. (1988) Comparison of a current eelgrass disease to the wasting disease of the 1930s. *Aquatic Biology* (30): 295-304.

Thyer G.W., Wolfe D.A., Williams R.B. (1975) The Impact of Man on Seagrass Systems. *American Scientist* (63):288-296.

Urquhart, J.T. (1824) On the preparation of the *Zostera* or Sea-Grass in Orkney. *Prize Essays and Transactions of the Highland Society of Scotland*. (6): 588-593.

1. UK PRIORITY HABITAT DESCRIPTION

Saline lagoons are lochs having a pH range 7.0-9.8 and a conductivity range of 5,400-35,000 mhos due to their varying salinity. In terms of their physiography, typical saline lagoons are defined as areas of salt or brackish water separated from the adjacent coastal sea by a low lying sand or shingle barrier. Atypical lagoons are distinguished by their mode of formation, being formed by the landward transgression of seawater into freshwater lakes as a result of land subsidence or sea level rise. Locally in Orkney, these lochs and lochans are sometimes called oycles. The total area of UK lagoons is 1,300 ha.

2. CURRENT LOCAL STATUS AND EXTENT

The most recent figure regarding the size of the Loch of Stenness puts it at 562 ha. Consequently, the Loch of Stenness alone represents approximately 43% of the total UK lagoon area. The rest of Orkney's lagoons are much smaller and typically less than 1 ha.

3. LOCAL DISTRIBUTION

There are 15 such examples in Orkney, all along the coast, and generally of the typical form, separated from the sea by shingle banks or ayres. Numerically, their distribution is concentrated in Sanday, but they are also found on other islands as far apart as North Ronaldsay and South Ronaldsay. However, in terms of area, the Loch of Stenness represents the bulk of lagoon habitat in Orkney, covering more than 500 ha.

4. ASSOCIATED SPECIES AND EXAMPLE SITES

Lagoons contain soft sediments which support brackish water-crowfoot *Ranunculus baudotii*, fennel-leaved pondweed *Potamogeton pectinatus*, tasselweed *Ruppia maritima* and spiral tasselweed *R. cirrhosa*, horned pondweed *Zannichellia palustris*, stoneworts (charophytes) e.g. the bearded stonewort *Chara canescens*, the Baltic stonewort *C. baltica*, the lesser bearded stonewort *C. curta*, the rugged stonewort *C. rudis*, the birds nest stonewort *Tolypella nidifica* and the clustered stonewort *T. glomera*. Numerous algae species may also be present. Depending on the influence of the sea, marine representatives may be common, e.g. the wracks *Fucus spiralis* and *Ascophyllum nodosum*. Microscopic green, brown and red algae also occur. Freshwater algae may also be present in areas where the salinity is low enough. In the Loch of Stenness, small green ball-forming algae *Cladophora aegagropila* (also *Cladophora sauteri*) may be found when the freshwater run-off from the adjacent Loch of Harray is sufficient to lower the salinity. Although common in Loch Harray, this alga is rare on a national scale. Invertebrate fauna includes the snails, *Hydrobia neglecta* and *Theodoxus fluviatilis*. Worms such as the polychaete *Nereis diversicolor* commonly occur in sedimentary areas, as well as the small amphipod crustacean *Corophium volutator*. Lagoons are also important habitat for waterfowl, e.g. shelduck *Tadorna tadorna*, marshland birds and seabirds and, in the case of the Loch of Stenness and Ayre Loch, St. Mary's, they also support populations of brown and sea trout *Salmo trutta*.

Key sites include the Loch of Stenness, which is designated as a Special Area of Conservation under the Habitats Directive purely as an example of a coastal lagoon, and smaller lochs, such as Little Vasa Loch on Shapinsay.

4.1 Associated species and their biodiversity conservation status

Species	Common Name	UK BAP List	Scottish Biodiversity List	Local Priority species
<i>Chara canescens</i>	Bearded stonewort	√	√	√
<i>C. baltica</i>	Baltic stonewort	√	√	√
<i>C. curta</i>	Lesser bearded	√	√	√
<i>Tolypella nidifica</i>	Bird's nest stonewort	√	√	√
<i>C. rudis</i>	Rugged stonewort		√	√
<i>Theodoxus fluviatilis</i>	A snail		√	√
<i>Ruppia cirrhosa</i>	Spiral Tasselweed		√	√
<i>Salmo trutta</i>	Brown and sea trout			√
<i>Tadorna tadorna</i>	Shelduck			√
<i>Hydrobia neglecta</i>	A snail			√
<i>Nereis diversicolor</i>	Ragworm			√
<i>Corophium volutator</i>	An amphipod			√
<i>Ranunculus baudotii</i>	Brackish water			√
<i>Potamogeton pectinatus</i>	Fennel-leaved			√
<i>Ruppia maritima</i>	Tasselweed			√
<i>Zannichellia palustris</i>	Horned pondweed			√
<i>Tolypella glomera</i>	Clustered stonewort			√
<i>Fucus spiralis</i>	Spiral wrack			√
<i>Ascophyllum nodosum</i>	Egg wrack			√
<i>Cladophora sauteri</i>	A pondweed			√

5. CURRENT FACTORS AFFECTING THE HABITAT

Some of these sites are very public, e.g. the Peedie Sea in Kirkwall and St. Mary's Loch in Holm. Many are close to farms and may potentially suffer direct nutrient enrichment from land run-off, or indirectly, via feeder burns. More distant threats, especially concerning the smaller lagoons, might include the demolition of the protective ayres by storms, with increasing frequency of high winds and rising water levels associated with climatic change. Even in recent years some of these smaller sites are showing an increase in salinity.

6. CURRENT ACTIONS AND OPPORTUNITIES

The UK HAP outlines current action and directs the statutory agencies in their objectives and targets, and gives a conservation direction to the local HAP. Reference should be made to the national HAP.

7. ACTION PLAN OBJECTIVE:

- Identify all sites and list their locations.
- Establish criteria for favourable condition.

- Maintain all sites in favourable condition.

8. ACTION PLAN TARGET:

- Encourage establishment of a management forum and plan for the key site, Loch of Stenness, by 2009.

9. ACTION PLAN AGENCIES:

National agencies: SNH; SGRPID; OIC; SEPA; JNCC

Local partners: FWAG; SAC

10. PROPOSED ACTION WITH AGENCIES:

- Monitor the ecology and water quality of selected saline lagoons. **Lead: SEPA**
- Raise awareness with appropriated agencies to ensure that road and drainage works do not adversely affect saline lagoons. **Lead: OIC**
- Promote saline lagoons as a priority for Land Management Contracts. **Lead: SGRPID**

Keynote Species: Bird's nest stonewort *Tolypella nidifica*; Shelduck *Tadorna tadorna*; Mussel, *Mytilus edulis*; Three spined stickleback, *Gasterosteus aculeatus aculeatus*; Brown trout, *Salmo trutta*

Further reading

Coastal Directories Series Region 2. JNCC 1997.

The UKBSG Report (1995) contains a habitat statement for saline lagoons.

Moray, J. and Pullar, L., 1910. Bathymetrical survey of the lochs of Orkney. Bathymetrical survey of the freshwater lochs of Scotland, Vol. 2: 222-230.

Nicol, E.A.T., 1938. The brackish water lochs of Orkney. Proc. R. Soc. Edinb., B, Vol. 57(No. 2): 181-191.

Thomson, M., 1997. The ecology and hydrography of the brackish Loch Stenness, Orkney. BSc Dissertation as part of degree of Applied Marine Biology at Heriot-Watt University.

Orkney Field Club Bulletin, 1972 3: 7-8.

UKBSG (1999). Tranche 2: Habitat Action Plans (Volume V – maritime species and habitats) contains a costed UK habitat action plan for saline lagoons.

APPENDIX I

Orkney Local Biodiversity Action Plan Species which are included on the UK Biodiversity Action Plan List

Scientific Name	Common Name	Group
<i>Phymatolithon calcareum</i>		Algae - benthic red, brown and green seaweeds
<i>Fucus distichus</i>		Algae - benthic red, brown and green seaweeds
<i>Rana bufo</i>	Common toad	Amphibia
#		Annelida - segmented worms: bristleworms, ragworms, earthworms, leeches and their allies
#		Asciacea - sea squirts
<i>Aythya marila</i>	Greater scaup	Aves – birds
<i>Lagopus lagopus</i>	Willow ptarmigan	Aves – birds
<i>Gavia arctica</i>	Black-throated diver	Aves – birds
<i>Crex crex</i>	Corncrake	Aves – birds
<i>Vanellus vanellus</i>	Northern lapwing	Aves – birds
<i>Limosa limosa</i>	Black-tailed Godwit	Aves – birds
<i>Numenius arquata</i>	Eurasian curlew	Aves – birds
<i>Stercorarius parasiticus</i>	Arctic Skua	Aves – birds
<i>Larus argentatus</i>	Herring gull	Aves – birds
<i>Alauda arvensis</i>	Sky lark	Aves – birds
<i>Prunella modularis</i>	Dunnock	Aves – birds
<i>Turdus philomelos</i>	Song thrush	Aves – birds
<i>Acrocephalus palustris</i>	Marsh warbler	Aves – birds
<i>Sturnus vulgaris</i>	Common starling	Aves – birds
<i>Carduelis cannabina</i>	Common linnet	Aves – birds
<i>Carduelis flavirostris</i>	Twite	Aves – birds
<i>Emberiza schoeniclus</i>	Reed bunting	Aves – birds
<i>Millaria calandra</i>	Corn bunting	Aves – birds
#		Bryophytes - mosses, liverworts and hornworts
#		Bryozoa - aquatic colonial animals

Scientific Name	Common Name	Group
#		Carabidae - spiders
<i>Megaptera novaeangliae</i>	Humpback whale	Cetacea - whales, dolphins and porpoises
<i>Balaenoptera physalus</i>	Fin whale	Cetacea - whales, dolphins and porpoises
<i>Balaenoptera musculus</i>	Blue whale	Cetacea - whales, dolphins and porpoises
<i>Balaenoptera borealis</i>	Sei whale	Cetacea - whales, dolphins and porpoises
<i>Physeter macrocephalus</i>	Sperm whale	Cetacea - whales, dolphins and porpoises
<i>Ziphius cavirostris</i>	Cuvier's beaked whale	Cetacea - whales, dolphins and porpoises
<i>Mesoplodon bidens</i>	Sowerby's beaked whale	Cetacea - whales, dolphins and porpoises
<i>Phocoena phocoena</i>	Harbour porpoise	Cetacea - whales, dolphins and porpoises
<i>Delphinus delphis</i>	Short-beaked common dolphin	Cetacea - whales, dolphins and porpoises
<i>Stenella coeruleoalba</i>	Striped dolphin	Cetacea - whales, dolphins and porpoises
<i>Tursiops truncatus</i>	Bottle-nosed dolphin	Cetacea - whales, dolphins and porpoises
<i>Lagenorhynchus acutus</i>	Atlantic white-sided dolphin	Cetacea - whales, dolphins and porpoises
<i>Lagenorhynchus albirostris</i>	White-beaked dolphin	Cetacea - whales, dolphins and porpoises
<i>Orcinus orca</i>	Killer whale	Cetacea - whales, dolphins and porpoises
<i>Grampus griseus</i>	Risso's dolphin	Cetacea - whales, dolphins and porpoises
#		Chaetognatha - predatory marine worms
<i>Chara baltica</i> *	Baltic stonewort	Charophyta (stoneworts)
<i>Chara canescens</i> *	Bearded stonewort	Charophyta (stoneworts)
<i>Tolypella nidifica</i> *	Bird's nest stonewort	Charophyta (stoneworts)
#		Chelicerata - sea spiders etc.
<i>Haliclystus auricula</i>	Stalked jellyfish	Cnidaria - sea anemones, corals, jellyfish, sea pens, hydra
#		Coleoptera - beetles
<i>Palinurus elephas</i>	Crawfish, (Common) spiny lobster	Crustacea - crabs, shrimps, lobsters etc.
#		Ctenophora - comb jellies
#		Diatoms - unicellular organisms
#		Dinoflagellates - marine plankton
#		Diptera - flesh flies, blowflies and parasitic flies
#		Echinodermata - starfishes, sea-cucumbers, brittle-stars and sea-urchins
#		Echiura - spoon worms

Scientific Name	Common Name	Group
#		Entoprocta - goblet worms
#		Formicidae - ants
#		Freshwater algae
#		Gastrotrichia - worm-like aquatic invertebrates
<i>Andrena tarsata</i>	a mining bee	Hymenoptera - bees and wasps
<i>Bombus distinguendus</i>	Great yellow bumblebee	Hymenoptera - bees and wasps
<i>Bombus muscorum</i>	Moss carder bumblebee	Hymenoptera - bees and wasps
#		Hymenoptera - parasitic wasps
<i>Lepus europaeus</i>	Brown hare	Lagomorpha, Insectivora, Rodentia and Carnivora - hares, shrews, mice and otter
<i>Lepus timidus</i>	Mountain hare	Lagomorpha, Insectivora, Rodentia and Carnivora - hares, shrews, mice and otter
<i>Erinaceus europaeus</i>	Hedgehog	Lagomorpha, Insectivora, Rodentia and Carnivora - hares, shrews, mice and otter
<i>Lutra lutra</i>	Otter	Lagomorpha, Insectivora, Rodentia and Carnivora - hares, shrews, mice and otter
<i>Amphipoea oculea</i>	Ear moth	Lepidoptera - moths and butterflies
<i>Amphipyra tragopoginis</i>	Mouse moth	Lepidoptera - moths and butterflies
<i>Apamea remissa</i>	Dusky brocade	Lepidoptera - moths and butterflies
<i>Aporophyla lutulenta</i>	Northern deep-brown dart	Lepidoptera - moths and butterflies
<i>Arctia caja</i>	Garden tiger	Lepidoptera - moths and butterflies
<i>Brachylomia viminalis</i>	Minor shoulder-knot	Lepidoptera - moths and butterflies
<i>Celaena haworthii</i>	Haworth's minor	Lepidoptera - moths and butterflies
<i>Chesias legatella</i>	The streak	Lepidoptera - moths and butterflies
<i>Coenonympha tullia</i>	Large heath	Lepidoptera - moths and butterflies
<i>Dasypolia templi</i>	Brindled ochre	Lepidoptera - moths and butterflies
<i>Diarsia rubi</i>	Small square-spot	Lepidoptera - moths and butterflies
<i>Ecliptopera silaceata</i>	Small phoenix	Lepidoptera - moths and butterflies
<i>Entephria caesiata</i>	Grey mountain carpet	Lepidoptera - moths and butterflies
<i>Graphiphora augur</i>	Double dart	Lepidoptera - moths and butterflies
<i>Hepialus humuli</i>	Ghost moth	Lepidoptera - moths and butterflies
<i>Hydraecia micacea</i>	Rosy rustic	Lepidoptera - moths and butterflies

Scientific Name	Common Name	Group
<i>Mesoligia literosa</i>	Rosy minor	Lepidoptera - moths and butterflies
<i>Orthonama vittata</i>	Oblique carpet	Lepidoptera - moths and butterflies
<i>Orthosia gracilis</i>	Powdered quaker	Lepidoptera - moths and butterflies
<i>Scotopteryx chenopodiata</i>	Shaded broad-bar	Lepidoptera - moths and butterflies
<i>Spilosoma lubricipeda</i>	White ermine	Lepidoptera - moths and butterflies
<i>Stilbia anomala</i>	The anomalous	Lepidoptera - moths and butterflies
<i>Xanthia icteritia</i>	The sallow	Lepidoptera - moths and butterflies
<i>Xestia agathina</i>	Heath rustic	Lepidoptera - moths and butterflies
<i>Xestia alpicola alpina</i>	Northern dart	Lepidoptera - moths and butterflies
<i>Xestia castanea</i>	Neglected rustic	Lepidoptera - moths and butterflies
<i>Xylena exsoleta</i>	Sword-grass	Lepidoptera - moths and butterflies
<i>Atrina fragilis</i>	Fan mussel	Marine Mollusca - snails, clams, mussels, squid, octopi, chitons and tusk shells
<i>Ostrea edulis</i>	Native oyster	Marine Mollusca - snails, clams, mussels, squid, octopi, chitons and tusk shells
#		Myriapods - centipedes and millipedes
#		Nematoda - roundworms
#		Nemertea - ribbon worms
#		Odonata - dragonflies and damselflies
#		Orthoptera - grasshoppers and crickets
<i>Anguilla anguilla</i>	European eel	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Lamna nasus</i>	Porbeagle	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Cetorhinus maximus</i>	Basking shark	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Prionace glauca</i>	Blue shark	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Galeorhinus galeus</i>	Tope	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Squalus acanthias</i>	Spur dog	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes

Scientific Name	Common Name	Group
<i>Squatina squatina</i>	Monkfish, Angel shark	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Clupea harengus</i>	Herring	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Cadus morhua</i>	Cod	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Merlangius merlangus</i>	Whiting	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Molva molva</i>	Ling	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Merluccius merluccius</i>	Hake	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Lophius piscatorius</i>	Angler, Angler fish, Monk	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Hippocampus hippocampus</i>	Short-snouted seahorse	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Trachurus trachurus</i>	Scad, Horse mackerel	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Ammodytes marinus</i>	Raitt's sandeel	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Scomber scombrus</i>	Mackerel	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Hippoglossus hippoglossus</i>	Halibut	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Pleuronectes platessa</i>	Plaice	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Salmo salar</i>	Atlantic salmon	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Salmo trutta</i>	Brown/sea trout	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Phoca vitulina</i>	Common seal, Harbour seal	Pinnepedia - seals and walruses
#		Platyhelminthes

Scientific Name	Common Name	Group
#		Porifera - sponges
#		Priapulida - Priapulid worms (Penis worms)
#		Pseudoscorpionidae - false scorpions
<i>Dermochelys coriacea</i>	Leathery turtle	Reptilia - turtles
#		Sipuncula - peanut worms
<i>Ajuga pyramidalis</i>	Pyramidal bugle	Vascular plants - ferns, clubmosses, horsetails, flowering plants, conifers and other gymnosperms
<i>Carex maritima</i>	Curved sedge	Vascular plants - ferns, clubmosses, horsetails, flowering plants, conifers and other gymnosperms
<i>Carum carvi</i>	Caraway	Vascular plants - ferns, clubmosses, horsetails, flowering plants, conifers and other gymnosperms
<i>Centaurea cyanus</i>	Cornflower	Vascular plants - ferns, clubmosses, horsetails, flowering plants, conifers and other gymnosperms
<i>Coeloglossum viride</i>	Frog orchid	Vascular plants - ferns, clubmosses, horsetails, flowering plants, conifers and other gymnosperms
<i>Euphrasia heslo-harrisonii</i>	Eyebright	Vascular plants - ferns, clubmosses, horsetails, flowering plants, conifers and other gymnosperms
<i>Euphrasia marshallii</i>	Eyebright	Vascular plants - ferns, clubmosses, horsetails, flowering plants, conifers and other gymnosperms
<i>Euphrasia ostenfeldii</i>	Eyebright	Vascular plants - ferns, clubmosses, horsetails, flowering plants, conifers and other gymnosperms
<i>Euphrasia rotundifolia</i>	Eyebright	Vascular plants - ferns, clubmosses, horsetails, flowering plants, conifers and other gymnosperms
<i>Fumaria purpurea</i>	Purple ramping fumitory	Vascular plants - ferns, clubmosses, horsetails, flowering plants, conifers and other gymnosperms
<i>Gentianella campestris</i>	Field gentian	Vascular plants - ferns, clubmosses, horsetails, flowering plants, conifers and other gymnosperms
<i>Platanthera bifolia</i>	Lesser butterfly orchid	Vascular plants - ferns, clubmosses, horsetails, flowering plants, conifers and other gymnosperms
<i>Polystichum lonchitis</i>	Holly-fern	Vascular plants - ferns, clubmosses, horsetails, flowering plants, conifers and other gymnosperms

Scientific Name	Common Name	Group
<i>Pseudorchis albida</i>	Small white orchid	Vascular plants - ferns, clubmosses, horsetails, flowering plants, conifers and other gymnosperms
<i>Salix myrsinites</i>	Whortle-leaved willow	Vascular plants - ferns, clubmosses, horsetails, flowering plants, conifers and other gymnosperms
<i>Scandix pecten-veneris</i>	Shepherd's needle	Vascular plants - ferns, clubmosses, horsetails, flowering plants, conifers and other gymnosperms

The species from this group which appear on the UK BAP List have not been recorded in Orkney

* species which has not been recorded in Orkney for a number of years

List compiled June 2008

APPENDIX II

BAP categories of habitat found in Orkney - Revised 2007

Table 1 includes many changes from the 2002 edition of the LBAP, most arising from revision of the UK BAP in 2007, some from re-interpretation of Orkney LBAP habitats. Note that that section C of the 2002 LBAP describing each of the habitats has not yet been revised and some sections are now out-dated.

Table 1: Terrestrial and Freshwater Habitats

No.	Broad Habitat Type	UK Priority Habitats	UK Priority Habitat Occurrence in Orkney	Local Habitats UK Priority= Bold Locally important =*
1	BROAD-LEAVED MIXED AND YEWE WOODLAND	Upland oak woodlands	Not present	Upland birchwood * Upland willow scrub Wet woodlands *Broad-leaved plantations and policy woodlands
		Upland birchwood	Present	
		Lowland beech	Not present	
		Upland mixed ashwoods	Not present	
		Wet woodlands	Present	
		Lowland wood pastures and parkland	Not present	
2	CONIFEROUS WOODLAND	Native pine wood	Not present	Conifer plantation
3	BOUNDARY AND LINEAR FEATURES	Ancient and/or species rich hedgerows	Not present	*Miscellaneous field boundaries *Road verges Hedges Stone and earth boundary features
4	ARABLE AND HORTICULTURE	Arable field margins	Present	Arable field margins *Arable crops
5	IMPROVED GRASSLAND	Coastal and floodplain grazing marsh	Not present	Improved grassland *Extensive Hay/Silage crops
6	NEUTRAL GRASSLAND	Lowland meadows	Present	Lowland meadows *Wet meadow Semi-natural grassland
		Upland hay meadows	Not present	
7	CALCAREOUS GRASSLAND	Upland calcareous grassland	Present	Upland calcareous grassland
		Lowland calcareous grassland	Not present	

No	BROAD HABITAT TYPE	UK Priority Habitats	UK Priority Habitat Occurrence in Orkney	Local Habitat UK Priority= Bold Locally important=*
8	ACID GRASSLAND	Lowland dry acid grassland	Present	Lowland dry acid grassland Acid grassland
9	BRACKEN	Bracken	Not present	
10	DWARF SHRUB HEATH	Upland heathland	Present	Upland heathland
		Lowland heathland	Not present	*Treeless woodland and dales *Maritime heath *Empetrum heath *Lichen heath *Species rich heath
11	FEN, MARSH AND SWAMP	Lowland fens	Present	*Marsh Lowland fens
		Upland Flushes, Fens and Swamps	Present	Upland Flushes, Fens and Swamps
		Reedbeds	Present	Reedbeds
		Purple moorgrass and rush pastures	Present	Purple moorgrass and rush pastures
12	BOG	Lowland raised bog	Not present	Blanket bog
		Blanket bog	Present	*Basin bog
13	STANDING OPEN WATER AND CANALS	Eutrophic standing waters	Present	Eutrophic standing waters
		Mesotrophic lakes	Present	Mesotrophic lakes
		Oligotrophic and Dystrophic Lakes	Present	Oligotrophic and Dystrophic Lakes
		Ponds	Present	Ponds
		Aquifer fed naturally fluctuating water bodies	Not present	
14	RIVERS AND STREAMS	Chalk rivers	Not present	*Burns and Canalised burns
15	MONTANE HABITATS	Mountain Heaths and Willow Scrub	Present	Mountain Heaths and Willow Scrub
16	INLAND ROCK	Limestone pavement	Not present	

No	BROAD HABITAT TYPE	UK Priority Habitats	UK Priority Habitat Occurrence in Orkney	Local Habitat UK Priority= Bold Locally important=*
16	INLAND ROCK	Inland rock and scree outcrops	Present	Inland rock and scree outcrops
17	BUILT UP AREAS AND GARDENS	None		*Built up areas and gardens
18	SUPRALITTORAL ROCK	Maritime cliff and slopes	Present	Maritime cliff and slopes *Maritime grassland
19	SUPRALITTORAL SEDIMENT	Coastal sand dunes	Present	Coastal sand dunes Machair *Links *Aeolianite Coastal vegetated shingle *Coastal strandline Storm beach
		Machair	Present	
		Coastal vegetated shingle	Present	

MARINE HABITATS/

MARINE HABITATS

Table 2 lists the UK and Scottish Priority Habitats which occur in Orkney and, where relevant, expands these Priority Habitats to identify the specific habitat types which relate to the LBAP. It includes many additions to the list of marine habitats featured in the 2002 LBAP, reflecting both recent work which has been carried out into marine recording in Orkney and also the introduction of the Scottish Biodiversity List (SBL) in 2005 and the UK BAP review which was carried out in 2007. Although UK priority habitats present in Scotland all qualify under the criteria used for habitat selection, they are not explicitly named in the SBL. Instead the SBL has a much longer list of habitats using more narrowly defined units – mostly at the level of NVC community for terrestrial/freshwater habitats, and MNCR biotope for marine. Work is ongoing to correlate the UK and Scottish lists and, once finalised, a list of Orkney marine biotopes will be produced for inclusion in the LBAP.

Table 2: Marine Habitats

No.	BROAD HABITAT TYPE	UK/Scottish Priority Habitat within Broad Habitat Type	Occurrence in Orkney	LBAP Specific Habitat Type UK Priority= Bold
20	LITTORAL ROCK	Littoral chalk	Not Present	
		<i>Sabellaria alveolata</i> reefs	Not Present	
21	LITTORAL SEDIMENT	Intertidal mudflats (Mudflats)	Present	Littoral mud
		Sandy shores	Present	Littoral sand
		Coastal saltmarsh	Present	Coastal saltmarsh
		Seagrass beds (<i>Zostera noltii</i>)	Not present	
	LITTORAL SEDIMENT	Intertidal boulder communities	Present	Intertidal boulder communities
Blue mussel beds (<i>Mytilus edulis</i>)		Present	Blue mussel beds (<i>Mytilus edulis</i>)	
22	INSHORE SUBLITTORAL ROCK	Littoral caves and overhangs	Present	Littoral caves and overhangs
		Sublittoral wave surge gullies and caves	Present	Wave surge gullies and caves Circalittoral caves and overhangs

No.	BROAD HABITAT TYPE	UK/Scottish Priority Habitat within Broad Habitat Type	Occurrence in Orkney	LBAP Specific Habitat Type UK Priority= Bold
		Tide-swept channels Wave exposed and/or tide swept infralittoral and circalittoral rock and tidal rapids	Present	Tide-swept channels Tide-swept fucoids High-energy infralittoral rock Tide-swept infralittoral rock Tide-swept kelp Very tide-swept faunal turf Tide-swept faunal turf Tide- and wave-swept faunal turf
23	INSHORE SUBLITTORAL SEDIMENT	Sheltered muddy gravels Seagrass meadows Saline lagoons and environs	Present Present Present	Circalittoral sandy mud Seagrass beds (<i>Zostera marina</i> and <i>Zostera angustifolia</i>) <i>Ruppia</i> meadows Saline lagoons Variable salinity fucoids Low salinity sublittoral mud Low salinity sublittoral mixed sediment Low salinity infra-littoral rock

No.	BROAD HABITAT TYPE	UK/Scottish Priority Habitat within Broad Habitat Type	Occurrence in Orkney	LBAP Specific Habitat Type UK Priority= Bold
23	INSHORE SUBLITTORAL SEDIMENT	Inlets, enclosed and sheltered bays and sublittoral sand, fine sand and mud	Present	Circalittoral coarse sediment Sublittoral sands and fine sand Infralittoral mixed sediment <i>Sparse Modiolus modiolus</i> Circalittoral mixed sediment Brittlestar beds
		Infralittoral mixed sediment	Present	Sublittoral sands and gravel Offshore gravely mud
		Sublittoral sands and gravel	Present	Mud habitats in deep water (Mud in deep water) Sublittoral sands and gravel
		Maerl beds	Present	Maerl beds
		Horse mussel beds (Biogenic reefs)	Present	Horse mussel beds (<i>Modiolus modiolus</i> beds)
24	OFFSHORE	Cold-water coral reefs (Biogenic reefs)	Present	Cold-water coral reefs (<i>Lophelia pertusa</i> reefs)
		Mud habitats in deep water (Mud in deep water)	Present	Mud habitats in deep water (Offshore circalittoral mud)

APPENDIX III

Orkney Local Biodiversity Action Plan Species which are included on the Scottish Biodiversity List

Scientific Name	Common Name	Group
#		Algae - benthic red, brown and green seaweeds
#		Amphibia
#		Annelida - segmented worms: bristleworms, ragworms, earthworms, leeches and their allies
#		Ascidacea - sea squirts
<i>Alauda arvensis</i>	S skylark	Aves - birds
<i>Anas querquedula</i>	Garganey	Aves - birds
<i>Anser albifrons</i>	White-Fronted Goose	Aves - birds
<i>Anser fabalis</i>	Bean Goose	Aves - birds
<i>Aquila chrysaetos</i>	Golden Eagle	Aves - birds
<i>Asio flammeus</i>	Short-Eared Owl	Aves - birds
<i>Aythya ferina</i>	Pochard	Aves - birds
<i>Aythya marila</i>	Scaup	Aves - birds
<i>Branta leucopsis</i>	Barnacle Goose	Aves - birds
<i>Calidris alpina</i>	Dunlin	Aves - birds
<i>Calidris maritima</i>	Purple Sandpiper	Aves - birds
<i>Carduelis cannabina</i>	Linnet	Aves - birds
<i>Carduelis spinus</i>	Siskin	Aves - birds
<i>Circus aeruginosus</i>	Marsh Harrier	Aves - birds
<i>Circus cyaneus</i>	Hen Harrier	Aves - birds
<i>Corvus cornix</i>	Hooded Crow	Aves - birds
<i>Crex crex</i>	Corncrake	Aves - birds
<i>Cygnus cygnus</i>	Whooper Swan	Aves - birds
<i>Emberiza schoeniclus</i>	Reed Bunting	Aves - birds
<i>Erithacus rubecula</i>	Robin	Aves - birds

Scientific Name	Common Name	Group
<i>Falco columbarius</i>	Merlin	Aves - birds
<i>Falco peregrinus</i>	Peregrine	Aves - birds
<i>Falco tinnunculus</i>	Kestrel	Aves - birds
<i>Fringilla montifringilla</i>	Brambling	Aves - birds
<i>Gavia arctica</i>	Black-Throated Diver	Aves - birds
<i>Gavia immer</i>	Great Northern Diver	Aves - birds
<i>Gavia stellata</i>	Red-Throated Diver	Aves - birds
<i>Haliaeetus albicilla</i>	White-Tailed Eagle	Aves - birds
<i>Hydrobates pelagicus</i>	Storm Petrel	Aves - birds
<i>Larus argentatus</i>	Herring Gull	Aves - birds
<i>Larus ridibundus</i>	Black-Headed Gull	Aves - birds
<i>Limosa lapponica</i>	Bar-Tailed Godwit	Aves - birds
<i>Limosa limosa</i>	Black-Tailed Godwit	Aves - birds
<i>Miliaria calandra</i>	Corn Bunting	Aves - birds
<i>Numenius arquata</i>	Curlew	Aves - birds
<i>Oceanodroma leucorhoa</i>	Leach's Petrel	Aves - birds
<i>Plectrophenax nivalis</i>	Snow Bunting	Aves - birds
<i>Pluvialis apricaria</i>	Golden Plover	Aves - birds
<i>Podiceps auritus</i>	Slavonian Grebe	Aves - birds
<i>Podiceps grisegena</i>	Red-Necked Grebe	Aves - birds
<i>Porzana porzana</i>	Spotted Crake	Aves - birds
<i>Puffinus puffinus</i>	Manx Shearwater	Aves - birds
<i>Scolopax rusticola</i>	Woodcock	Aves - birds
<i>Stercorarius parasiticus</i>	Arctic Skua	Aves - birds
<i>Sterna albifrons</i>	Little Tern	Aves - birds
<i>Sterna hirundo</i>	Common Tern	Aves - birds
<i>Sterna paradisaea</i>	Arctic Tern	Aves - birds
<i>Sterna sandvicensis</i>	Sandwich Tern	Aves - birds
<i>Turdus iliacus</i>	Redwing	Aves - birds
<i>Turdus philomelos</i>	Song Thrush	Aves - birds
<i>Vanellus vanellus</i>	Lapwing	Aves - birds

Scientific Name	Common Name	Group
<i>Bryum calophyllum</i>	Blunt Bryum	Bryophytes - mosses, liverworts and hornworts
<i>Ditrichum flexicaule</i>	Bendy ditichrum	Bryophytes - mosses, liverworts and hornworts
<i>Jungermannia polaris</i>	Arctic flapwort	Bryophytes - mosses, liverworts and hornworts
<i>Microbryum rectum</i>	Upright Pottia	Bryophytes - mosses, liverworts and hornworts
<i>Sanionia orthothecioides</i>	St Kilda Hook-moss	Bryophytes - mosses, liverworts and hornworts
<i>Tortula protobryoides</i>	Tall Pottia	Bryophytes - mosses, liverworts and hornworts
#		Bryozoa - aquatic colonial animals
#		Carabidae - spiders
<i>Balaenoptera physalus</i>	Fin whale	Cetacea - whales, dolphins and porpoises
<i>Delphinus delphis</i>	Short-beaked common dolphin	Cetacea - whales, dolphins and porpoises
<i>Grampus griseus</i>	Risso's dolphin	Cetacea - whales, dolphins and porpoises
<i>Hyperoodon ampullatus</i>	Northern bottlenose whale	Cetacea - whales, dolphins and porpoises
<i>Lagenorhynchus acutus</i>	Atlantic white-sided dolphin	Cetacea - whales, dolphins and porpoises
<i>Lagenorhynchus albirostris</i>	White-beaked dolphin	Cetacea - whales, dolphins and porpoises
<i>Megaptera novaeangliae</i>	Humpback whale	Cetacea - whales, dolphins and porpoises
<i>Mesoplodon bidens</i>	Sowerby's beaked whale	Cetacea - whales, dolphins and porpoises
<i>Orcinus orca</i>	Killer whale	Cetacea - whales, dolphins and porpoises

Scientific Name	Common Name	Group
<i>Phocoena phocoena</i>	Harbour porpoise	Cetacea - whales, dolphins and porpoises
<i>Tursiops truncatus</i>	Bottle-nosed dolphin	Cetacea - whales, dolphins and porpoises
<i>Ziphius cavirostris</i>	Cuvier's beaked whale	Cetacea - whales, dolphins and porpoises
#		Chaetognatha - predatory marine worms
<i>Chara baltica</i> *	Baltic Stonewort	Charophytes (stoneworts)
<i>Chara canescens</i> *	Bearded Stonewort	Charophytes (stoneworts)
<i>Chara curta</i>	Lesser Bearded Stonewort	Charophytes (stoneworts)
<i>Chara rudis</i>	Rugged Stonewort	Charophytes (stoneworts)
<i>Tolypella nidifica</i> *	Bird's nest stonewort	Charophytes (stoneworts)
#		Chelicerata - sea spiders etc.
<i>Pipistrellus pipistrellus</i>	Common pipistrelle	Chiroptera - bats
<i>Ventromma halecioides</i>		Cnidaria - sea anemones, corals, jellyfish, sea pens, hydra
<i>Cercyon depressus</i>		Coleoptera - beetles
<i>Cercyon melanocephalus</i>		Coleoptera - beetles
<i>Cercyon quisquilius</i>		Coleoptera - beetles
<i>Cryptopleurum minutum</i>		Coleoptera - beetles
<i>Elodes minuta</i>		Coleoptera - beetles
<i>Enochrus quadripunctatus</i>		Coleoptera - beetles
<i>Helophorus griseus</i>		Coleoptera - beetles
<i>Megasternum obscurum</i>		Coleoptera - beetles
#		Crustacea - crabs, shrimps, lobsters etc.
#		Ctenophora - comb jellies
#		Diatoms - unicellular organisms
#		Dinoflagellates - marine plankton
#		Diptera - flesh flies, blowflies and parasitic flies
#		Echinodermata - starfishes, sea-cucumbers, brittle-stars and sea-urchins

Scientific Name	Common Name	Group
#		Echiura - spoon worms
#		Entoprocta - goblet worms
#		Formicidae - ants
#		Freshwater algae
<i>Inonotus nodulosus</i>	Silvery porecrust	Fungus
<i>Microglossum olivaceum</i>	Earth-tongue	Fungus
#		Gastrotrichia - worm-like aquatic invertebrates
#		Hymenoptera, parasitic wasps
<i>Bombus distinguendus</i>	Great Yellow Bumble Bee	Hymenoptera - bees and wasps
<i>Bombus muscorum</i>	Moss carder bumblebee	Hymenoptera - bees and wasps
<i>Lepus europus</i>	Brown hare	Lagomorpha, Insectivora, Rodentia and Carnivora - hares, shrews, mice and otter
<i>Lepus timidus</i>	Mountain hare	Lagomorpha, Insectivora, Rodentia and Carnivora - hares, shrews, mice and otter
<i>Lutra lutra</i>	Otter	Lagomorpha, Insectivora, Rodentia and Carnivora - hares, shrews, mice and otter
<i>Rattus rattus</i>	Black rat, ship rat	Lagomorpha, Insectivora, Rodentia and Carnivora - hares, shrews, mice and otter
<i>Xestia alpicola alpina</i>	Northern dart	Lepidoptera - moths and butterflies
<i>Xylena exsoleta</i>	Sword -grass	Lepidoptera - moths and butterflies
<i>Calicium corynellum</i>	Lichen	Lichen
<i>Caloplaca ferruginea</i>	an orange lichen	Lichen
<i>Caloplaca ochracea</i>	an orange lichen	Lichen
<i>Lobaria pulmonaria</i>	Lungwort	Lichen
<i>Melaspilea interjecta</i>		Lichen
<i>Nephroma laevigatum</i>	Kidney lichen	Lichen
<i>Ramalina fraxinea</i>	Cartilage lichen	Lichen
<i>Lepus timidus</i>	Mountain Hare	Mammal
<i>Lutra lutra</i>	Otter	Mammal

Scientific Name	Common Name	Group
<i>Microtus arvalis</i>	Orkney/Guernsey Vole	Mammal
<i>Amauropsis islandicus</i>		Marine Mollusca - snails, clams, mussels, squids, octopi, chitons and tusk shells
<i>Atrina fragilis</i>	Fan mussel	Marine Mollusca - snails, clams, mussels, squids, octopi, chitons and tusk shells
<i>Devonia perrieri</i>		Marine Mollusca - snails, clams, mussels, squids, octopi, chitons and tusk shells
<i>Hancockia uncinata</i>	A hydroid	Marine Mollusca - snails, clams, mussels, squids, octopi, chitons and tusk shells
<i>Hydrobia neglecta</i>	A small mud snail	Marine Mollusca - snails, clams, mussels, squids, octopi, chitons and tusk shells
<i>Manzonia crassa</i>		Marine Mollusca - snails, clams, mussels, squids, octopi, chitons and tusk shells
<i>Okenia leachii</i>	A sea slug	Marine Mollusca - snails, clams, mussels, squids, octopi, chitons and tusk shells
<i>Ostrea edulis</i>	Native oyster	Marine Mollusca - snails, clams, mussels, squids, octopi, chitons and tusk shells
<i>Simnia patula</i>		Marine Mollusca - snails, clams, mussels, squids, octopi, chitons and tusk shells
<i>Margaritifera margaritifera</i>	Freshwater Pearl Mussel	Mollusc
<i>Theodoxus fluviatilis</i>	River Nerit	Mollusc
#		Myriapods - centipedes and millipedes
#		Nematoda - roundworms
#		Nemertea - ribbon worms
#		Odonata - dragonflies and damselflies
#		Orthoptera - grasshoppers and crickets

Scientific Name	Common Name	Group
<i>Aguilla anguilla</i>	Eel	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Ammodytes marinus</i>	Raitt's sandeel	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Ammodytes tobianus</i>	Sandeel	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Brosme brosme</i>	Torsk	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Cetorhinus maximus</i>	Basking shark	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Clupea harengus</i>	Herring	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Gadus morhua</i>	Cod	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Merlangius merlangius</i>	Whiting	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Merluccius merluccius</i>	Hake	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Molva molva</i>	Ling	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Pleuronectes platessa</i>	Plaice	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Pollachius virens</i>	Saithe	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes

Scientific Name	Common Name	Group
<i>Raja batis</i>	Skate	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Raja clavata</i>	Roker, Thornback ray	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Salmo salar</i>	Atlantic Salmon	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Sebastes viviparus</i>	Norway haddock	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
<i>Trisopterus esmarkii</i>	Norway pout	Petromyzoniformes, Chimaeriformes - jawless (Lampreys) and jawed fishes
#		Pinnipedia - seals and walruses
#		Platyhelminthes - flatworms
#		Porifera - sponges
#		Priapulida - Priapulid worms (Penis worms)
#		Pseudoscorpionidae - false scorpions
<i>Dermochelys coriacea</i>	Leathery turtle	Reptilia - reptiles
#		Sipuncula - Peanut worms
<i>Anagallis arvensis</i>	Scarlet Pimpernel	Vascular plant
<i>Calluna vulgaris</i>	Heather	Vascular plant
<i>Campanula rotundifolia</i>	Harebell	Vascular plant
<i>Carex maritima</i>	Curved Sedge	Vascular plant
<i>Carum carvi</i>	Caraway	Vascular plant
<i>Centaurea cyanus</i>	Cornflower	Vascular plant
<i>Draba incana</i>	Hoary Whitlowgrass	Vascular plant
<i>Euphorbia helioscopia</i>	Sun Spurge	Vascular plant

Scientific Name	Common Name	Group
<i>Euphrasia heslop-harrisonii</i>	Eyebright	Vascular plant
<i>Euphrasia marshallii</i>	Eyebright	Vascular plant
<i>Euphrasia rotundifolia</i>	Eyebright	Vascular plant
<i>Fallopia convolvulus</i>	Black Bindweed	Vascular plant
<i>Fumaria capreolata</i>	White Ramping-Fumitory	Vascular plant
<i>Fumaria purpurea</i>	Purple Ramping-fumitory	Vascular plant
<i>Gnaphalium sylvaticum</i>	Heath Cudweed	Vascular plant
<i>Hierochloe odorata</i>	Holy-grass	Vascular plant
<i>Hyoscyamus niger</i>	Henbane	Vascular plant
<i>Juniperus communis</i>	Juniper	Vascular plant
<i>Plantago media</i>	Hoary Plantain	Vascular plant
<i>Platanthera bifolia</i>	Lesser Butterfly-orchid	Vascular plant
<i>Polystichum lonchitis</i>	Holly-fern	Vascular plant
<i>Primula scotica</i>	Scottish Primrose	Vascular plant
<i>Rosa tomentosa</i>	Harsh Downy-rose	Vascular plant
<i>Ruppia cirrhosa</i>	Spiral Tasselweed	Vascular plant
<i>Sherardia arvensis</i>	Field Madder	Vascular plant
<i>Sinapis alba</i>	White mustard	Vascular plant
<i>Sinapis arvensis</i>	Charlock	Vascular plant
<i>Stachys arvensis</i>	Field Woundwort	Vascular plant
<i>Viola tricolor</i>	Wild Pansy	Vascular plant

The species from this group which appear on the Scottish Biodiversity List have not been recorded in Orkney

* Species which has not been recorded in Orkney for a number of years

List compiled June 2008

APPENDIX IV

Correspondence between Orkney LBAP habitat types and Scottish Biodiversity List habitats.

Table and interpretation by John Crossley 2007

The SBL habitats are expressed in the form of a list of National Vegetation Classification (NVC) vegetation communities. This table reflects current knowledge of NVC communities that occur in Orkney, and a best fit of correspondence to BAP habitats. It is a guide, not a definitive list. Knowledge of NVC communities in Orkney is continually developing, and since NVC communities can cover small areas of ground they may be found in unexpected places.

Bold = UK Priority and proposed UK Priority Habitat

Regular = Locally Important habitat

UK PRIORITY and Locally Important habitat	HABITAT NAME	NVC Code	Comments
Upland Birchwood	<i>Betula pubescens-Molinia caerulea</i> woodland	W4	W4 may be the best NVC fit for Hoy and other scrub with <i>Betula</i> -but could be W7 - research needed
	<i>Alnus glutinosa-Fraxinus excelsior-Lysimachia nemorum</i> woodland	W7	Berriedale woodland could be a scrub form of this community
Wet Woodland	<i>Alnus glutinosa-Fraxinus excelsior-Lysimachia nemorum</i> woodland	W7	Some wet woodland with <i>Salix</i> is W3, but other types including W7 could be involved Former LBAP habitat is 'Willow scrub'
	<i>Salix pentandra-Carex rostrata</i> woodland	W3	
Upland Willow Scrub	<i>Alnus glutinosa-Fraxinus excelsior-Lysimachia nemorum</i> woodland	W7	<i>Salix</i> scrub form of W7 is a possibility for this type, but may not fit any NVC community Former LBAP habitat is 'Willow scrub'
Broad-leaved plantations and policy woodlands	None		
Miscellaneous field boundaries	Various		Can include MG2, MG5, MG13, M23, H10 and others
Road verges	Various		More species-rich could include MG5
Arable Field Margins	Not identified by SBL		New UKBAP habitat is 'Arable field margins', changed from 'Cereal Field Margins'
Arable Crops	None		Probability of including some arable crops in a new 'Arable fields' UKHAP is still being considered
Extensive hay/silage fields	None		

UK PRIORITY and Locally Important habitat	HABITAT NAME	NVC Code	Comments
Wet meadow	<i>Agrostis stolonifera-Alopecurus geniculatus</i> grassland	MG13	
	<i>Festuca rubra-Agrostis stolonifera-Potentilla anserina</i> inundation grassland	MG11	
	<i>Cynosurus cristatus-Caltha palustris</i> flood-pasture	MG8	
Lowland meadows	<i>Cynosurus cristatus-Centaurea nigra</i> meadow and pasture	MG5	
	<i>Cynosurus cristatus-Caltha palustris</i> flood-pasture	MG8	
Upland calcareous grassland	<i>Festuca ovina-Agrostis capillaris-Thymus polytrichus</i> grassland	CG10	
Lowland dry acid grassland	None		NVC U4 mainly includes species-poor grassland, but more species-rich forms could equate to 'Lowland dry acid grassland'
Upland heathland	<i>Calluna vulgaris-Erica cinerea</i> heath	H10	
	<i>Calluna vulgaris-Arctostaphylos uva-ursi</i> heath	H16	
	<i>Calluna vulgaris-Racomitrium lanuginosum</i> heath	H14	
	<i>Calluna vulgaris</i> heath with tall mesotrophic herbs	not NVC	
	<i>Calluna vulgaris-Vaccinium myrtillus</i> heath	H12	
	<i>Calluna vulgaris-Vaccinium myrtillus-Sphagnum capillifolium</i> heath	H21	
	<i>Juncus squarrosus-Festuca ovina</i> grassland	U6	
	<i>Nardus stricta-Galium saxatile</i> grassland	U5	
	<i>Trichophorum cespitosum-Erica tetralix</i> wet heath	M15	
Lowland heath	Various		Mostly H10, M15 and M19, but can include several other lowland vegetation types
Treeless woodland dale	<i>Calluna vulgaris</i> heath with tall mesotrophic herbs	not NVC	
	<i>Luzula sylvatica-Geum rivale</i> tall-herb community	U17	
Maritime heath	<i>Calluna vulgaris-Scilla verna</i> heath	H7	
Empetrum heath	Various		Can include H10 and M15, but probably non-NVC
Lichen heath	Lichen heath	not NVC	
Species-rich heath	<i>Calluna vulgaris-Erica cinerea</i> heath	H10	

UK PRIORITY and Locally Important habitat	HABITAT NAME	NVC Code	Comments
	<i>Calluna vulgaris</i> heath with tall mesotrophic herbs	not NVC	
Lowland fens	<i>Carex rostrata-Calliergonella cuspidata</i> mire	M9	Former LBAP habitat is 'Fens'. Scope as well as name is changed, not clear yet how 'Lowland fens' applies in Orkney
	<i>Agrostis stolonifera-Alopecurus geniculatus</i> grassland	MG13	
	<i>Filipendula ulmaria-Angelica sylvestris</i> tall-herb fen	M27	
	<i>Phalaris arundinacea</i> fen	S28	
	<i>Potentilla palustris-Carex rostrata</i> fen	S27	
Marsh	<i>Agrostis stolonifera-Alopecurus geniculatus</i> grassland	MG13	Marsh' is a category that could include elements of other grassland, fen and flush habitats
	<i>Festuca rubra-Agrostis stolonifera-Potentilla anserina</i> inundation grassland	MG11	
	<i>Juncus effusus/acetiflorus-Galium palustre</i> rush-pasture	M23	
	<i>Filipendula ulmaria-Angelica sylvestris</i> tall-herb fen	M27	
	<i>Phalaris arundinacea</i> fen	S28	
	<i>Potentilla palustris-Carex rostrata</i> fen	S27	
Upland flushes, fens and swamps	<i>Carex dioica-Pinguicula vulgaris</i> mire	M10	Former LBAP definition consists of two separate habitats 'Base-rich flushes' and 'Base-rich fens'
	<i>Carex rostrata-Sphagnum fallax</i> mire	M4	
	<i>Carex rostrata-Sphagnum squarrosum</i> mire	M5	
	<i>Carex echinata-Sphagnum fallax/denticulatum</i> mire	M6	
	<i>Carex viridula ssp. oedocarpa-Saxifraga aizoides</i> mire	M11	
	<i>Palustriella commutata-Festuca rubra</i> spring	M37	
	<i>Philonotis fontana-Saxifraga stellaris</i> spring	M32	Possible in Hoy only
	<i>Carex rostrata-Sphagnum fallax</i> mire	M4	Recorded from Hoy
	<i>Juncus effusus/acetiflorus-Galium palustre</i> rush-pasture	M23	
	<i>Schoenus nigricans-Juncus subnodulosus</i> mire	M13	
Reedbeds	<i>Phragmites australis</i> reedbed	S4	
Basin Bog			Same communities as Blanket bog

UK PRIORITY and Locally Important habitat	HABITAT NAME	NVC Code	Comments
Blanket Bog	<i>Calluna vulgaris-Eriophorum vaginatum</i> blanket mire	M19	
	<i>Calluna vulgaris-Vaccinium myrtillus-Sphagnum capillifolium</i> heath	H21	
	<i>Erica tetralix-Sphagnum papillosum</i> raised & blanket mire	M18	
	<i>Eriophorum angustifolium</i> bog pool community	M3	
	<i>Sphagnum cuspidatum-S. fallax</i> bog pool community	M2	
	<i>Sphagnum denticulatum</i> bog pool community	M1	
	<i>Trichophorum cespitosum-Erica tetralix</i> wet heath	M15	
	<i>Trichophorum cespitosum-Eriophorum vaginatum</i> blanket mire	M17	
Eutrophic Standing Waters	<i>Potamogeton pectinatus-Myriophyllum spicatum</i> community	A11	
Mesotrophic lakes	<i>Potamogeton perfoliatus-Myriophyllum alterniflorum</i> community	A13	Former LBAP habitat is 'Mesotrophic lochs' (misnamed)
	<i>Potamogeton natans</i> community	A9	
	<i>Polygonum amphibium</i> community	A10	
Oligotrophic and dystrophic lakes	Unvegetated freshwater substrates (e.g. silt, sand, gravel and larger mineral particles)	not NVC	Former LBAP habitat is 'Oligotrophic and dystrophic lochs'
	<i>Myriophyllum alterniflorum</i> community	A14	
	<i>Littorella uniflora-Lobelia dortmanna</i> community	A22	
	<i>Isoetes lacustris/ setacea</i> community	A23	
	<i>Juncus bulbosus</i> community	A24	
Ponds	<i>Lemna minor</i> community	A2	Former LBAP habitat is 'Ponds and milldams'. The correspondence between former LBAP habitat and new UKBAP habitat has still to be determined. The occurrence of aquatic NVC communities in Orkney is not well-known
	<i>Polygonum amphibium</i> community	A10	
	<i>Callitriche stagnalis</i> community	A16	
	<i>Ranunculus aquatilis</i> community	A19	
	<i>Ranunculus baudotii</i> community	A21	
	<i>Juncus bulbosus</i> community	A24	
Burns and canalised burns	<i>Potamogeton natans</i> community	A9	
	<i>Ranunculus aquatilis</i> community	A19	
	<i>Ranunculus baudotii</i> community	A21	

UK PRIORITY and Locally Important habitat	HABITAT NAME	NVC Code	Comments
Mountain heaths and willow scrub	<i>Calluna vulgaris</i> - <i>Arctostaphylos uva-ursa</i> heath	H16	Former LBAP habitat is 'Montane habitats' Hoy only, if it does occur
	<i>Calluna vulgaris</i> - <i>Arctostaphylos alpinus</i> heath	H17	
	<i>Calluna vulgaris</i> - <i>Cladonia arbuscula</i> heath	H13	
	Fell-field	not NVC	
	<i>Nardus stricta</i> - <i>Carex bigelowii</i> grass heath	U7	
Inland Rock Outcrop and Scree Habitats	<i>Luzula sylvatica</i> - <i>Geum rivale</i> tall-herb community	U17	Former LBAP habitat is 'Inland Rock'
	<i>Luzula sylvatica</i> - <i>Vaccinium myrtillus</i> tall-herb community	U16	
Built-up areas and gardens			
Maritime cliff and slopes	<i>Armeria maritima</i> - <i>Ligusticum scoticum</i> maritime crevice community	MC2	
	<i>Rhodiola rosea</i> - <i>Armeria maritima</i> maritime cliff ledge community	MC3	
	<i>Stellaria media</i> seabird cliff community	MC7	
Maritime grassland	<i>Festuca rubra</i> - <i>Armeria maritima</i> maritime grassland	MC8	
	<i>Festuca rubra</i> - <i>Holcus lanatus</i> maritime grassland	MC9	
	<i>Festuca rubra</i> - <i>Plantago</i> ssp. maritime grassland	MC10	
Coastal sand dunes	<i>Ammophila arenaria</i> mobile dune community	SD6	
	<i>Elymus farctus boreali-atlanticus</i> foredune community	SD4	
	<i>Calluna vulgaris</i> - <i>Carex arenaria</i> dune heath	H11	
	<i>Ammophila arenaria</i> - <i>Festuca rubra</i> semi-fixed dune community	SD7	
	<i>Carex arenaria</i> dune community	SD10	
	<i>Honkenya peploides</i> - <i>Cakile maritima</i> standline	SD2	
	<i>Leymus arenarius</i> mobile dune community	SD5	
Machair	<i>Ammophila arenaria</i> - <i>Arrhenatherum elatius</i> dune grassland	SD9	
	<i>Carex arenaria</i> dune community	SD10	
	<i>Festuca rubra</i> - <i>Agrostis stolonifera</i> - <i>Potentilla anserina</i> inundation grassland	MG11	
	<i>Festuca rubra</i> - <i>Galium verum</i> dune grassland	SD8	
	<i>Potentilla anserina</i> - <i>Carex nigra</i> dune slack	SD17	

UK PRIORITY and Locally Important habitat	HABITAT NAME	NVC Code	Comments
	<i>Salix repens-Calliargon cuspidatum</i> dune slack	SD15	
Links	<i>Ammophila arenaria-Arrhenatherum elatius</i> dune grassland	SD9	
	<i>Carex arenaria</i> dune community	SD10	
	<i>Carex arenaria-Festuca ovina-Agrostis capillaris</i> dune grassland	SD12	
	<i>Festuca rubra-Agrostis stolonifera-Potentilla anserina</i> inundation grassland	MG11	
	<i>Festuca rubra-Galium verum</i> dune grassland	SD8	
	<i>Potentilla anserina-Carex nigra</i> dune slack	SD17	
Aeolianite	<i>Festuca ovina-Agrostis capillaris-Thymus polytrichus</i> grassland	CG10	CG10 is the likely community - but needs positive identification
Coastal vegetated shingle	<i>Matricaria maritima-Galium aparine</i> standline	SD3	
Coastal strandline	<i>Honkenya peploides-Cakile maritima</i> standline	SD2	
	<i>Matricaria maritima-Galium aparine</i> standline	SD3	
Coastal saltmarsh	<i>Blysmus rufus</i> salt-marsh community	SM19	
	<i>Elymus repens</i> salt-marsh community	SM28	
	<i>Festuca rubra</i> salt-marsh community	SM16	
	<i>Puccinellia maritima</i> salt-marsh community	SM13	
	<i>Ruppia maritima</i> salt-marsh community	SM2	
	<i>Spergularia marina-Puccinellia distans</i> salt-marsh community	SM23	
	<i>Suaeda maritima</i> salt-marsh community	SM9	
	Transitional low-marsh vegetation with <i>Puccinellia maritima</i> , annual <i>Salicornia</i> species and <i>Suaeda maritima</i>	SM10	
Seagrass beds	<i>Zostera</i> communities	SM1	
	Gardens	not NVC	Social criterion only
	Parks and playing fields	not NVC	Social criterion only