The Orkney Local Biodiversity Action Plan

A plan for action to conserve Orkney's Biodiversity

Version 1.3: A targeted action plan for 2018 - 2022

Prepared by Orkney's Biodiversity Steering Group for the Orkney Environment Partnership August 2018

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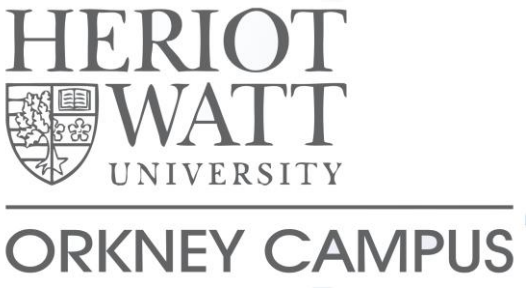
Orkney's Community Biodiversity Project is supported by the following organisations:



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Section 1: Introduction

What is biodiversity?

The term biodiversity means, quite simply, all of life: all the species and genetic variations that exist on earth, from the tiny microscopic organisms that are invisible to the naked eye to the mighty whales that swim in our oceans. Together they form living systems, called ecosystems, which sustain nature and upon which our own survival depends.

Harbour porpoise (photo: SNH)

Why should we conserve biodiversity?

There are strong ethical reasons for conserving biodiversity, rather than treating nature as if it has been designed for our convenience and allowing species to decline in number and distribution until they become extinct. Biodiversity has its own intrinsic value. It also demonstrates a high level of interdependence; this means that impacts on one species can have significant implications for the health and viability of others. The natural environment provides us with a wide range of services and products that support us in our day to day lives and underpin our economy. These are known collectively as ecosystem services. Deterioration or loss of biodiversity jeopardises the continued provision of these services.

What are ecosystem services?

The services we obtain from ecosystems are categorised as:

- Supporting services that maintain the conditions for life on Earth, e.g. the production of atmospheric oxygen by plants; and nutrient cycling by soil invertebrates and bacteria.
- Regulating services, e.g. flood mitigation and water filtration by peatlands, wetlands and soils; and pollination by invertebrates;
- Provisioning services, e.g. food, fuel and fibre.
- Cultural services e.g. recreational, educational and spiritual benefits.

The ecosystem approach is 'a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way, and which recognises that people, with their cultural and varied social needs, are an integral part of ecosystems'.[1]

A healthy ecosystem, like a healthy person, is one where all parts continue to work well individually and together. It has ecological integrity.

An ecosystem approach can be applied at any scale, but it requires joint working and needs policies, plans and actions at different levels and in different sectors to be integrated.

[1] The Convention on Biological Diversity https://www.cbd.int/convention/

Why is biodiversity under threat?

Alongside climate change, biodiversity loss is recognised as a critical global environmental threat. Not only will habitats and species be affected directly by the effects of climate change, but they are also likely to be affected by policy and behavioural shifts in other sectors such as agriculture, transport and energy.[2]

Other pressures that contribute to a decline in biodiversity include:

- Loss of habitat and the resulting degradation of ecosystems;
- Pollution, including nutrient enrichment from diffuse forms of pollution;
- Over exploitation of natural resources;
- Colonisation by Invasive Non-Native Species (INNS) that threaten our native biodiversity and are costly to eradicate or manage.

Biodiversity is inexorably linked to sustainable development, and a rich biodiversity is generally associated with healthy environments. To ensure the survival of our habitats and species, and to pass down a heathy stock of natural assets for future generations, we must accept that we play a defining role in the sustainability and health of our islands. Therefore, we should all afford respect and protection to wildlife, along with the natural landscapes within which we live. It's important that we conserve the habitats and species that are rare or under threat, but equally we should appreciate the value of other, more commonplace biodiversity, and ensure its protection so that future generations can continue to benefit from it.

Common Blue Butterfly

[2] Conserving Biodiversity – The UK Approach (2007) http://jncc.defra.gov.uk/PDF/UKBAP_ConBio-UKApproach-2007.pdf

Restoring damaged ecosystem functions or paying for their loss is far costlier than protecting and enhancing what we have in the first place.[3]

The Orkney Native Wildlife Project

The arrival of the stoat *Mustela erminea* in Orkney has brought the threats posed by INNS into sharp focus. First seen in Orkney in 2010, stoats are now fully established and widely distributed throughout Mainland Orkney, Burray and South Ronaldsay, where they pose a serious threat to Orkney's native wildlife. They are accomplished predators and species that are under threat include the Orkney vole, Hen harrier, Short-eared owl and many other ground nesting birds.

In 2014 Scottish Natural Heritage (SNH) commissioned a report[4], to consider the possible effects of the stoat population on Orkney's native species. The report recommended that removal of the stoat population is the best option to safeguard Orkney's wildlife. As a result, the Orkney Native Wildlife Project (ONWP) has been established, led in partnership by SNH and the Royal Society for the Protection of Birds Scotland (RSPB), and with the generous support of the National Lottery through the Heritage Lottery Fund. In 2017 Orkney Islands Council (OIC) agreed to be a non-financially contributing partner.

A Stoat in Orkney (photo: Christine Hall)

[3] 2020 Challenge for Scotland's Biodiversity (2013) http://www.gov.scot/Resource/0042/00425276.pdf

[4] Stoat on the Orkney Islands – assessing the risks to native species: (2014) SNH Commissioned Report No. 871

The project will address the urgent issue of invasive non-native predators through a major stoat eradication programme. It will also deliver a wide-ranging engagement programme and community consultation and develop activities such as a citizen science programme to help local people to be involved in ensuring Orkney's native wildlife thrives. Finally, it will engage people directly with the delivery of the project and a range of opportunities to engage in monitoring and citizen science. The legacy of the project will be a protected native wildlife which is valued and understood by residents and visitors alike.

The aim of the ONWP is to ensure that the unique native wildlife of the Orkney Islands, is safeguarded for the lasting benefit, not only for residents and visitors, but also for the nation as a whole.

The Orkney Local Biodiversity Action Plan – general outline

The Orkney Local Biodiversity Action Plan 2018-2022 (LBAP) is the third in a series of focused revisions of the original Orkney LBAP (2002). The Audit and Habitat Action Plans from the 2002 Plan provide much of the context to the current Plan and will continue to be relevant to the protection and enrichment of biodiversity in the Orkney Isles. The Plan is set out in three sections:

This, the first section, explains the term 'biodiversity' and provides a brief overview of recent changes to the Biodiversity Action Planning system.

In section two, the main part of the Plan, biodiversity planning in Orkney over the period 2018-2022 is addressed through a set of four themes:

1. Greenspace
2. Farmland
3. Peatland
4. The Marine Environment

Under each theme a range of objectives, targets and actions is identified which will seek to bring benefit to biodiversity in Orkney during the lifetime of this Plan.

Section three comprises the following set of appendices:

Appendix 1: Relevant plans and strategies and recent changes to environmental legislation.
Appendix II: Species considered to be of conservation concern in Orkney.
Appendix III: Biodiversity Action Planning habitats found in Orkney.
Appendix IV: The Aichi goals and targets.

Biodiversity Action Planning – internationally and nationally

In October 2010 officials from 192 countries and the European Union, all signatories to the Convention on Biological Diversity, gathered in Nagoya, Japan to agree how to tackle biodiversity loss. This meeting led to the adoption of the Nagoya Protocol, a global strategic plan for biodiversity 2011-2020. Delegates agreed 20 new targets, the Aichi Targets, for the conservation and sustainable use of biodiversity. These are grouped under 5 main goals:

1. Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society.
2. Reduce direct pressures on biodiversity and promote sustainable use.
3. Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity.
4. Enhance the benefits to all from biodiversity and ecosystem services.
5. Enhance implementation through participatory planning, knowledge management and capacity building.

Appendix IV of this Plan sets out the 20 Aichi targets which have been identified under these goals.

Informed by the Nagoya Conference, during 2011 the European Commission tabled an updated EU 2020 biodiversity strategy entitled Our Life Insurance, Our Natural Capital: an EU Biodiversity Strategy to 2020[5].

The 2020 Challenge for Scotland's Biodiversity is Scotland's response to the Aichi Targets and the European Union's Biodiversity Strategy for 2020. It is a supplement to Scotland's Biodiversity: It's in Your Hands[6]. Together, both documents comprise the Scottish Biodiversity Strategy. The 2020 Challenge document provides greater detail in some areas, responds to the new international targets, and updates some elements of the 2004 document. Scotland's Biodiversity, a route map to 2020[7] sets out six "Big Steps for Nature" and several priority projects which focus on collaborative work which the Scottish Government and a wide range of partners are taking forward to help deliver the 2020 Challenge and to improve the state of nature in Scotland. The Big Steps for Nature are:

1. Ecosystem restoration.
2. Investment in natural capital.
3. Quality greenspace for health and education benefits.
4. Conserving wildlife in Scotland.
5. Sustainable management of land and freshwater.
6. Sustainable management of marine and coastal ecosystems.

Where possible, the Orkney LBAP 2018-2022 will contribute towards the achievement of these Big Steps.

[5] Our Life Insurance, Our Natural Capital: an EU Biodiversity Strategy to 2020 http://ec.europa.eu/environment/nature/biodiversity/comm2006/pdf/EP_resolution_april2012.pdf

[6] Scotland's Biodiversity: it's in your hands (2004). http://www.gov.scot/Publications/2004/05/19366/37239

[7] Scotland's Biodiversity: a route map to 2020 (2015) http://www.gov.scot/Publications/2015/06/8630

The Orkney Wildlife Information and Records Centre

The Orkney Wildlife Information and Records Centre is based in the Orkney Library and Archive, on Kirkwall's Junction Road and provides vital support for biodiversity action planning. Established in 1998, the Centre provides a repository for the collection and dissemination of information relating to Orkney's natural heritage. Data on the County's habitats and species has been recorded over many years, both by voluntary recorders and by other organisations with an interest in the natural environment of Orkney.

Puffballs (photo: Sydney Gauld)

Species records are stored on a database, and habitat information is held on a Geographic Information System (GIS) which can be accessed by planners or consultants to investigate the possible presence of certain species and the potential for 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 all. An extensive library of natural history reference books is available, as well as a range of sampling equipment which may be loaned out to assist with sampling and recording projects.

Recently an online map facility has been developed which can be used to view the distribution of species that are recorded on the Centre's main database, Recorder 6. The online map may be accessed from the Orkney Library and Archive website at http://www.orkneylibrary.org.uk/OBRC/html/Map.htm

Section 2: Biodiversity themes

Theme 1: Greenspace

Greenspace is recognised as a key resource in towns and settlements. Greenspace Scotland defines greenspace as “any vegetated land or water within or adjoining an urban area.”

In biodiversity action planning, the term ‘greenspace’ corresponds well with the broad habitat type Built-up Areas and Gardens. This habitat covers urban and rural settlements and includes urban parkland, domestic gardens, allotments and caravan parks, as well as other man-made structures such as industrial estates, retail parks, waste or derelict ground and transport infrastructure. Some of Orkney’s built up areas also include water features such as burns and ponds.

Urban habitats can be man-made, semi-natural or entirely natural, usually on a small scale. Mature broad-leaved trees are important elements of the urban setting, together with the actual buildings, as these can provide shelter, creating micro-climates and enabling colonisation by a range of species. In some settlements, e.g. Finstown, they also provide foraging areas for bats that roost in nearby buildings.

Bat (photo: SNH)

Gardens provide a mosaic of habitat types including buildings, walls, trees, hedges, flowering plants, lawns and cultivated soil. They are important, in terms of their aesthetic contribution to everyday life, and for the food and cover they afford to garden birds, passage migrants and many invertebrate species. They, and other habitats in built-up areas, provide an everyday link between people and the natural

environment. Gardens support priority species such as the Song thrush which has experienced a massive UK decline in recent years.

Another priority species, the Otter, *Lutra lutra* is known to frequent Kirkwall's Peedie Sea area; this waterbody, a modified saline lagoon, is also a haven for many locally important water birds, including Long tailed duck, *Clangula hyemalis*, Mallard *Anas platyrhynchos* and Mute swan, *Cygnus olor*.

Otter (photo: SNH)

The Peedie Sea, Kirkwall

Further information on this habitat and the species it supports is included in the *Built-up areas and gardens* Habitat Action Plan (HAP) in the original Orkney LBAP (2002) which is available on the Council's website.

As well as providing vital habitat for wildlife, greenspaces provide many benefits to urban communities. Vegetated areas such as woodlands, parks and gardens assimilate and store atmospheric carbon, helping to mitigate climate change; they also reduce the likelihood of flooding by taking up and storing excess rainwater. Access to good quality green space encourages us to be active and spend more time outside, and experiencing the sights, sounds and smells of nature benefits both physical health and mental wellbeing.

Current local status, distribution and extent

Built-up areas contain remnants of other habitats, as well as those man-made habitats that are specific to this local habitat type. Mature trees are an important aspect. Gardens and other habitats in built-up areas are important for their biodiversity – they support two national priority species – and for the familiar, everyday link between people and the natural environment. While very small in terms of the land area of the county, they are important, both in terms of the aesthetic contribution to everyday life, and in terms of the material providing food and cover for passage migrants and garden birds.

Gardens represent a way in which almost everyone can make a contribution to the maintenance of biodiversity through the use of appropriate plants and provision of niches for all forms of life. The great variety of artificial habitat found within gardens could make this an area of great importance to the maintenance of biodiversity.

Towns and smaller settlements include public ‘parkland’ and grassed areas that are managed and maintained by Orkney Islands Council (OIC). These areas have largely been designed and maintained without thought as to how they could contribute to biodiversity objectives.

Trees at Muddiesdale, Kirkwall

The towns and villages of Kirkwall, Stromness, St Margaret’s Hope and Finstown are the main areas where urban habitats are found. Gardens are of course widespread. Especially important are the bigger gardens or designed landscapes, notably Melsetter in Hoy; Balfour Castle in Shapinsay; Trumland and Westness in Rousay; Binscarth in Firth; Woodwick in Evie; and Gyre in Orphir. Happy Valley in Stenness is smaller but no less important in terms of the habitats which have developed within this plantation.

Associated species and their biodiversity conservation status

Species	Common name	UK BAP List	Scottish Biodiversity List	Local priority Species
Pipistrellus pipistrellus.	Pipistrelle bat.	√.	√.	√.
Lutra lutra.	Otter.	√.	√.	√.
Turdus philomelos.	Song thrush.	√.	√.	√.
Bombus distinguendus.	Great yellow bumblebee.	√.	√.	√.
Fumaria purpurea.	Purple ramping fumitory.	√.	√.	√.
Falco tinnunculus.	Kestrel.		√.	√.
Sorex minutus.	Pygmy shrew.			√.
Apodemus sylvaticus.	Wood mouse.			√.
Carduelis chloris.	Greenfinch.			√.
Motacilla alba.	Pied wagtail.			√.
Hirundo rustica.	Swallow.			√.

Prunella modularis.	Dunnock.			√.
Diarsia mendica orkneyensis.	Ingrailed clay moth.			√.
Lamium confertum.	Northern dead-nettle.			√.
Polygonium boreale.	Northern knotgrass.			√.
Angelica archangelica.	Angelica.			√.
Coprinus comatus.	Shaggy ink cap fungus.			√.

Current factors affecting greenspace

Loss of existing features to development, e.g. infill development in town gardens, is leading to the loss of mature trees and flowering shrubs;

Loss of sections of watercourse to culverting;

Use of pesticides in gardens and on timber;

Increasing popularity of garden paving and decking in preference to grass and flower beds;

Litter is a problem, in particular plastics, which are persistent in the environment and may be accidentally ingested by birds and mammals or cause entanglement;

Introduction of alien species such as New Zealand flatworm, *Arthurdendyus triangulatus* and Japanese knotweed, *Fallopia japonica* can damage or destroy native species;

Destruction of bees' and wasps' nests, whether deliberately or accidentally;

Great Yellow Bumblebee (photo: John Crossley)

Damage to wall habitats, e.g. through the use of pesticides and repointing of old walls which support mosses and lichens and provide niches for rock plants and invertebrates;

Large expanses of publicly accessible grass are regularly mown during spring and summer, reducing their potential for biodiversity;

Guidance notes on pond creation are widely available; however, these often encourage the use of aquatic plants which are not native to Orkney. This increases the risk of introducing invasive non-native species (INNS) into the county.

Pond and wetland plants that are native to Orkney are not readily available in the county and people may import them from mainland UK suppliers, again increasing the risk of introducing INNS into the county.

Current actions and opportunities

Tree Preservation Orders are in place to secure retention and replacement of trees within St Margaret's Hope and Finstown. In Kirkwall and Stromness Conservation Areas a similar protective policy operates.

The Council's policy relating to development affecting trees and woodland is set out in Orkney Local Development Plan (2017) Policy 9 *Natural Heritage and Landscape* and its supporting Planning Policy Advice *Trees and Woodland*.

The 'Your Kirkwall' initiative (2018) seeks to identify a shared vision for the town that reflects the views of the community at large. It will highlight projects that people would like to see happen or take forward themselves and will also guide the Council's future planning, design and transport policies for Kirkwall. Once complete the study will replace the existing Kirkwall Urban Design Framework (2009). Feedback from initial consultation has revealed public interest in improving the town's green spaces for their wildlife and amenity value.

Orkney's cool, windy climate and lack of shelter along open pathways can deter people from choosing active means of travel. Appropriate tree and/or shrub planting could help address this issue, whilst providing new habitat opportunities for wildlife.

People are largely aware of wildlife issues and would like to do something positive; however, they are uncertain of what they can do and would welcome advice, for example on the range of plants that they might include in their gardens. There are also opportunities to advise on planting schemes for new development in terms of their biodiversity value. These should include species which encourage fauna and perform well for shelter and/or interest in open spaces.

Action plan objectives:

1. Maintain and, where possible, improve the health and biodiversity value of built up areas and gardens.
2. Involve local people in conservation actions and raise awareness and enjoyment of built up areas and gardens.

Action plan targets:

1. Prepare planting and management guidelines for green spaces by 2022.

2. Increase the involvement of local people in managing green spaces for biodiversity and establish an awareness raising programme by 2022.

National agencies: SNH.

Local partners: OIC, RSPB, Orkney Field Club.

Proposed actions with partners:

1. Endeavour to provide good access to natural and semi-natural environments around settlements through the Orkney Core Paths Plan. **(Lead: OIC)**
2. Identify areas for biodiversity enhancement through the Kirkwall Urban Design Framework, with links to information in the LBAP. **(Lead: OIC)**
3. Identify paths which would benefit from improved shelter, through planting trees and/or shrubs that are appropriate to the location and are beneficial for biodiversity. **(Lead: OIC)**
4. Create a list of nature-friendly plant species for the Council's Development Management team to provide to landscape architects for reference in the design of future developments. **(Lead: OIC)**
5. Make the list of nature-friendly plants available at public events such as Family Day at the Orkney International Science Festival. **(OIC, RSPB)**
6. Work with schools and community groups to identify and establish biodiversity enhancement projects in existing greenspaces. **(RSPB, OIC)**
7. Improve linkages between volunteering groups and opportunities, bringing together groups with suggestions for local projects. **(Lead: OIC)**
8. Make opportunities and contacts more visible to the public, as well as improving links with health and social enterprises. **(Lead: OIC)**
9. Prepare a pond creation guidance leaflet, adapting available guidance to suit an Orkney context. **(Lead: OIC)**
10. Engage with local plant growers / suppliers to investigate the feasibility of establishing a supply of wildflowers, including pond and wetland plants, grown from locally sourced seed. **(Lead: OIC)**
11. Support initiatives to reduce the non-essential usage of single-use products that contain plastics. **(All)**.

Keynote species:

Otter, *Lutra lutra*; Pipistrelle bat, *Pipistrellus pipistrellus*; Song thrush, *Turdus philomelus;* Bumblebees, e.g. Great yellow bumblebee*, Bombus distinguendus;* Broad-leaved trees*.*

References and other information sources

Greenspace Scotland http://www.greenspacescotland.org.uk/greenspace.aspx

Orkney Local Biodiversity Action Plan 2002 http://www.orkney.gov.uk/Service-Directory/L/Local-Biodiversity-Plan.htm

Orkney Local Development Plan http://www.orkney.gov.uk/Service-Directory/O/Orkney-Local-Development-Plan.htm

Theme 2: Farmland

The majority of Orkney's habitats, from upland peat bogs to lowland marshes, are influenced by land management, both past and present. The farmland theme of the LBAP focuses on the lowland habitats, especially grasslands, and the important species they support. The upland habitats are covered in the Peatland theme.

Livestock rearing is the main form of farming activity in Orkney, along with cultivation of arable crops such as barley, bere and oats. Swedes are also grown, mainly for animal fodder, as well as potatoes and other vegetables for human consumption. This mixed style of farming provides rich breeding and feeding areas for a wide range of bird species and Orkney is a particularly important stronghold for waders such as curlew, *Numenius arquata*, lapwing, *Vanellus vanellus*, redshank, *Tringa totanus* and oystercatcher, *Haematopus ostralegus*.

Curlew and Lapwing (photos: Christine Hall)

Natural and semi-natural habitats are an integral component of Orkney's more intensively managed landscapes, where they help maintain ecosystem services such as pollination, water purification, pollution filtration, water storage and regulation, carbon storage and coastal protection. They are often managed through agri-environment schemes to benefit biodiversity.

Farm holdings may include smaller natural or semi-natural areas, which don't meet the criteria for entry in agri-environment schemes and may also have limited agricultural value yet can be important places for wildlife, not least by helping provide connectivity throughout the farmed landscape. Many of these 'corners and corridors' are associated with smaller farms and lower stocking density and may include:

- damp meadows and wetter corners in fields or areas where the soil is relatively poor and stony;
- double fenced boundaries, including drainage ditches;
- rough tracks which provide access to fields, waterbodies or the shore; or
- remnants of the type of natural habitat that was present prior to agricultural improvement of the wider area.

Associated species and habitats

The following table highlights nationally and locally important species found on farmland, summarising their habitat requirements and identifying the habitats present on lowland farmland that supports them. Further information on these habitats is provided in earlier versions of the Orkney LBAP which may be accessed from the Council's website.

Habitats and species that are identified nationally as priorities for conservation in the UK Biodiversity Action Plan (UKBAP) and/or the Scottish Biodiversity List are highlighted in bold.

Nationally and locally important species.	Habitat requirements.	**Nationally** and locally important habitats.
Lapwing, Snipe, Curlew, Redshank, Oystercatcher.	Orkney grasslands support important populations of breeding waders. Each species has its own breeding preferences, based largely on sward height, structure and soil dampness. Lapwing like short grassland with damper areas and edges of pools where chicks feed; while Curlew prefer taller cover found in rough pastures and unimproved meadows.	Wet meadow. Semi-natural grassland. Acid grassland. Improved grassland. Extensive hay / silage crops. Species-rich grassland. **Lowland fens.** Marsh. **Coastal saltmarsh.**
Hen harrier, Short-eared owl.	Hen harrier and Short-eared owl nest on Orkney's moorlands and forage in adjacent lowland farmland. Rough, semi-natural grasslands with good populations of Orkney voles provide important hunting grounds for these species.	Wet meadow. Semi-natural grassland. Acid grassland. Species-rich grassland. Miscellaneous field boundaries.
Corncrake.	Corncrakes need continuous, tall cover from when they arrive in Orkney in May until they leave in September. They use natural cover of plants such as Yellow flag and Meadowsweet, but also inhabit more improved grassland sown for silage or hay.	Miscellaneous field boundaries. Marsh. Wet meadow. Semi-natural grassland. Improved grassland. Extensive hay/silage crops.

Nationally and locally important species.	Habitat requirements.	**Nationally** and locally important habitats.
		Species-rich grassland.
Twite.	Twite feed almost entirely on weed seeds. In the breeding season they feed in unimproved pasture, flower-rich hay fields and roadside verges. In winter they feed on stubbles, winter fodder crops and wild bird cover.	Miscellaneous field boundaries. Extensive hay/ silage crops. **Arable field margins.** Arable crops. Species-rich grassland.
Skylark.	Skylark nest in open fields in vegetation 20-50cm high, which is not too dense. Adults feed on leaves and seeds of crops and weeds, but also insects in spring and summer. Weedy stubbles are a good source of food for them in winter.	Miscellaneous field boundaries. Extensive hay / silage crops. Semi-natural grassland. **Arable field margins.** Arable crops.
Orkney vole.	Orkney voles require areas of semi-natural vegetation, such as rough grassland. They favour ditches and other linear features, as well as wet habitats where grasses, rushes and flowering plants dominate.	Miscellaneous field boundaries. Road verges. Semi-natural grassland. **Arable field margins.** **Lowland fens.** Wet meadow.
Wild flowers; including Ragged robin, Marsh marigold, Grass of Parnassus, Northern fen orchid, Yellow rattle.	Orkney has a range of wild flowers which are considered local priority species, many of which grow in farmland habitats.	Species-rich grassland. Maritime heath. Maritime grassland. **Coastal sand dunes.** **Machair.** Links.
Great yellow bumblebee.	Great yellow bumblebee requires flower-rich habitats including plants such as Red clover, Tufted vetch, Bird's foot trefoil, Marsh woundwort, Knapweed and Yellow rattle.	Species-rich grassland. Maritime grassland. **Coastal sand dunes.** **Machair.** Links.



Orkney Vole (photo: Alastair Skene), Skylark (photo: Christine Hall) and Grass of Parnassus

Current factors affecting farmland biodiversity

Although Orkney's farms support a wide range of wildlife and plants there are a number of factors that can impact on farmland biodiversity.

The vital 'corners and corridors' of smaller, often unmanaged, land on farms have the potential to provide significant ongoing benefit for biodiversity, if they are left as they are or with minor changes to management. These areas are being affected by the current trend towards larger farm units, through activities such as the amalgamation of farms and loss of traditional tracks and double-fenced boundaries, as well as the consolidation of fields within farms. However, regardless of these trends, there are always opportunities to incorporate benefit for biodiversity.

Natural and semi-natural habitats are sensitive to nutrient enrichment and application of fertilisers, dung or slurry generally leads to a loss of plant diversity. Fertiliser, slurry and pesticide drift from adjoining fields encourages the growth of vigorous grasses and coarse weeds, at the expense of wild plants and the effects are cumulative.

Stock grazing is very important for farmland biodiversity, dependent on appropriate stocking density and timing. Over-grazing can lead to reduced plant diversity and poaching which encourages colonisation by coarse weed species. Conversely, agricultural abandonment of wetland areas (reduced grazing or zero management) either allows rushes to over-dominate or grass litter to build up excessively, both choking biodiversity. Heavy stocking during the bird breeding season can result in trampling of birds' nests.

Relatively unproductive areas may be considered for tree planting; however, loss of the biodiversity value of natural or semi-natural habitat generally is not compensated by the gain in tree or scrub cover.

Wildflower mixes sown in gardens or as part of agri-environment schemes will contain seed from other parts of Britain, or even Europe. The use of such seed could result in the loss of local wild plant strains. There is also a risk of introducing wild species which are non-native to Orkney and potentially invasive.

There are strong links between farming activity and the ecological health of the water environment. Water pollution can occur, either as a result of individual spillages of slurry or silage effluent, or from longer-term diffuse inputs of fertiliser or slurry runoff from fields and hard-standings. Watercourses such as lochs, ponds and burns are vulnerable to nutrient enrichment, and pollution can lead to significant changes in their assemblages of flora and fauna. Elevated nutrient levels can encourage the

development of blooms of microscopic phytoplankton, which cause increased water turbidity and reduce the ability of larger water plants (macrophytes) to photosynthesize and grow. Phytoplankton blooms may cause taste and odour problems in drinking water and can also produce substances which are highly toxic to both humans and animals.

Current actions and opportunities

Basic Payment Scheme (BPS) and Less Favoured Area Support Scheme (LFASS) payments to farmers are conditional on observance of a code of good farming practice, including the protection of natural habitats and avoidance of over-grazing.

A number of farms in Orkney include areas of land that are less intensively farmed and are instead managed under the Agri-Environment Climate Scheme (AECS), which forms part of the Scottish Rural Development Programme (SRDP). AECS provides farmers with support payments which are conditional on adherence to the guidelines for each management option. Some of these areas have now been managed under similar schemes for many years, providing continuous benefit for the wildlife they support.

The current SRDP will include at least one more round of AECS applications and five years funding will then be available, going forward. Following the United Kingdom's exit from the European Union, the long-term future of agricultural support payments remains uncertain.

Gulls following the plough (photo: Sydney Gauld)

There are opportunities to raise awareness of the relationships between land management and biodiversity in education, in particular through courses provided by the Orkney College. A level four Rural Skills mixed horticulture and agriculture course is currently offered to school pupils at any time during 4th, 5th and 6th years, with potential to progress further into SV2 or SV3 agriculture courses. Students study livestock and crop farming and there is scope for biodiversity conservation to be incorporated into the syllabus.

There may also be opportunities to work with primary and secondary school teachers to develop farming for biodiversity teaching resources.

The North Isles Landscape Partnership Scheme, which is due to run from 2018-2022, makes provision for a number of biodiversity projects. In particular, there will be a habitat management and restoration project. This will focus on restoration and enhancement of key areas of habitat in the wider countryside and will include a training programme in biodiversity management techniques. Other options include the promotion of farmland biodiversity conservation and water protection at local agricultural shows, the Orkney Nature Festival, the Orkney International Science Festival and through posters at Orkney Auction Mart.

The provision of advice and guidance on no- or low-cost measures can offer potential for farmers and land managers to adjust their land management and enable wildlife to thrive within Orkney's farmed landscape. This could include the preparation of advisory leaflets relating to land management for biodiversity, as well as farm open days where people will be able to view measures which have already been put in place for wildlife conservation and water protection.

Action plan objectives:

1. Maintain and, where possible, improve the health and connectivity of farmland ecosystems.
2. Involve local people in conservation actions, thereby raising awareness and enjoyment of Orkney's farmland ecosystems.

Action plan targets:

1. Biodiversity conservation and water protection guidance for farmland is incorporated in relevant Orkney College courses by 2019.
2. Promote farming for biodiversity at ten public events over the lifetime of the Plan.
3. Organise and deliver five training events or farm open days focussing on land management and biodiversity.

National agencies: Scottish Government Rural Payments and Inspections Directorate (SGRPID), SNH, Scottish Environment Protection Agency (SEPA). Local partners: RSPB, SAC Consulting, OIC, Orkney College, National Farmers Union Scotland (NFUS).

Proposed action with partners:

1. Raise awareness of farming for biodiversity through the education system. **(RSPB, Orkney College, OIC)**

2. Promote the incorporation of low- or no-cost examples of biodiversity conservation and water protection measures into land management practices. **(SNH, SEPA, SGRPID, SAC).**
3. Ensure that good practice examples of biodiversity conservation and water protection measures on farms are highlighted in future farm open days and other training events. **(RSPB, SEPA, Orkney College).**
4. Continue to meet twice a year, as the Farmland Group, to discuss progress on the actions. **(SGRPID, SNH, SEPA, RSPB, NFUS, SAC).**

Keynote species: Lapwing *Vanellus vanellus*, Snipe *Gallinago gallinago*, Curlew *Numenius arquata*, Hen harrier *Circus cyaneus*, Short-eared owl *Asio flammeus*, Corncrake *Crex crex*, Twite *Carduellis flavirostris*, Skylark *Alauda arvensis*, Orkney Vole *Microtus arvalis orcadensis*, Bumblebees, e.g. Great yellow bumblebee *Bombus distinguendus*.

References and other information sources

The Orkney Local Biodiversity Action Plan http://www.orkney.gov.uk/Service-Directory/L/Local-Biodiversity-Plan.htm

The Scotland Rural Development Programme 2014-2020
http://www.gov.scot/Topics/farmingrural/SRDP

Theme 3: Peatland

Large areas of Orkney are overlain by peat deposits of varying depths; these provide the substrate for several habitats which are grouped under the broad habitat types *Bog* and *Dwarf Shrub heath*.

Fen, Marsh and Swamp habitats may also be underlain by peat, but these are addressed in the Farmland theme of the LBAP. The Peatland theme focuses on the habitats *Blanket bog*, *Basin bog* and *Upland heathland* and the species they support.

These habitats cover most of our moorland hills, notably on the islands of Hoy, Rousay and Eday and in parts of the West Mainland. They support some of Orkney's most iconic species.

Peatlands are important storage facilities for carbon; they also help regulate water storage and run-off, as well as providing water purification through filtration. The many tracks through Orkney's 'peat hills' offer access for hill-walking and bird-watching.

Short-eared Owl (photo: Christine Hall)

Bog

Two major types of *Bog* are identified, namely *Blanket bog* and *Raised bog*. Each type is distinctive, but both support peat-forming plant species such as Common cotton-grass and Sphagnum mosses.

Sphagnum Moss

Cottongrass

Key features of Orkney's bog landscape are the many bog pools and lochans which provide nesting sites for Red-throated diver, *Gavia stellata* and also support a number of dragonfly and damselfly species.

Red-throated Diver (photo: Derren Fox)

Almost all bog in Orkney is classified as *Blanket bog*. *Raised bog* consists of a dome of peat, produced entirely by peat growth; however, few examples of true *Raised bog* occur in Orkney, so the term *Basin bog* has been chosen for this HAP. Blanket bog occurs in upland areas, whereas basin bog is found in lowlands.

Much of Orkney's bog habitat has been modified through the cutting and extraction of peat for fuel.

Dwarf shrub heath

In favourable condition, *Upland heathland* is dominated by plant species such as Common heather, *Calluna vulgaris*, Bilberry, *Vaccinium myrtillus*, Crowberry, *Empetrum nigram* and Bell heather, *Erica cinerea* and, in northern areas, Juniper, *Juniperus communis*, is occasionally seen above a heath understorey. It generally grows on well-drained, nutrient-poor land.

Upland heathland is usually found above the upper edge of enclosed agricultural land but also descends to near sea level in northern Scotland. Blanket bog and other mires, grassland, bracken, scrub, trees and woodland, freshwater and rock habitats frequently form mosaics with heathland vegetation in upland situations.

Wet heath is most commonly found in the wetter north and west and, in favourable condition, should be dominated by mixtures of Cross-leaved heath, *Erica tetralix*, Deer grass, *Scirpus cespitosus*, Heathers and Purple moor-grass, *Molinia caerulea*, over an understorey of mosses, often including carpets of *Sphagnum* species.

Key Species on Peatland Habitats

Peatland habitats support a wide range of species and, for some of these, the Orkney populations are of national, or even international importance. Three of our key upland bird species are Hen harrier, *Circus cyaneus* Short-eared owl, *Asio flammeus,* and Red-throated diver. The importance of the Orkney populations of these species is apparent in designations such as the Orkney Mainland Moors Special Protection Area (SPA) which covers much of the moorlands of the west mainland and provides protection for these birds at an international level.

Female Hen Harrier (photo: SNH)

Orkney is a vital stronghold for Hen harrier, with an estimated 83 breeding pairs in 2016. While Hen harriers are declining in other parts of the UK, the Orkney population is remaining stable.

Current factors affecting peatland habitat

Peatland habitats are relatively slow-growing and, when over-grazed, are slow to recover. Moorland bird species rely on adequate vegetation for nesting and for cover from predators

Reclamation and fragmentation has caused much hill land, especially the thinner, drier peats, to be converted into grassland. Higher stocking densities of sheep leads to heavy grazing of heather and other dwarf shrubs, and inappropriate methods of supplementary feeding contribute to the impacts. While cattle are seldom grazed on heath, some remnant heathland areas have been used as sacrificial feeding areas in the autumn, leading to near-destruction of the native plant cover within a few years.

In areas of heathland where extensive sheep grazing is practised, flock management is not necessarily the best for this habitat. Sheep may gather in numbers on drier or relatively sheltered hillsides, exerting heavy grazing pressure on dwarf shrubs and scrub.

The hydrology of basin bogs, i.e. the balance between rainfall and water loss, is critical to their existence; therefore, alteration of drainage is damaging. Major drainage systems in valleys and basins, including much improved agricultural land, as well as basin bogs, has lowered water tables or caused greater seasonal fluctuations, with consequences for the conservation status of these bogs. Although not easily reclaimed, drainage and improvement of surrounding land has affected the fringes of sites, and led to the eventual disappearance of some smaller ones

Fencing of peatland areas, to enable grazing under agri-environment schemes or for claiming subsidies, can cause damage to heath and bog habitat especially if undertaken using machinery when the underlying ground conditions are soft and wet.

When conditions are dry, peatland areas are vulnerable to wildfires. Accidental fires or burning heather at the wrong time of year can cause large fissures in peat and sometimes the loss of underlying soil, as well as the loss of bog mosses and other heathland vegetation. Orkney is currently experiencing an increase in camper van tourism and wild camping; where campers opt to cook on barbecues this can increase the risk of wildfires.

Many accessible areas of peat have been cut over to some extent, although this is not always obvious. Few, if any, basin bogs have not been modified by peat cutting; the deep peat with good burning quality on the more accessible bogs is more cut-over than on upland blanket bog.

At some larger extraction sites, cutting peat across the contour rather than on the level, together with cutting of access roads, has led to erosion and drainage of peat bog. Extensive extraction at the Black Moss of Evrigert in the past has resulted in large areas of bare ground. Without the protective cover of vegetation these areas are easily eroded by wind and rain.

Traditional cutting of peat banks allows for the restoration of cut areas, by careful replacement of heather turves. However, recently there have been examples in Harray and Hoy where peat banks appear to have been cut using a mechanical digger, leaving behind extensive areas of bare ground which are vulnerable to erosion.

Quad bike and trail bike activity is also very damaging and is currently an issue on some moorland hills, notably in Birsay and Orphir.

Development, e.g. of quarries, windfarms, communication masts, access tracks can impact directly on wildlife interests.

Peat landslides occur naturally and cause damage to peatland habitats, loss of biodiversity and depletion of the peatland carbon store. When peat is exposed and dries out, its stored carbon is readily released to the atmosphere. Upland developments, e.g. for wind farms and access tracks, can cause localised erosion, destabilising the peat and making slides more likely. Should climate change lead to more frequent intense rainfall events, increasing numbers of peat slides are likely.

Climate change could also lead to changes in vegetation composition and structure, although any increase in temperature may also be accompanied by increases in rainfall and wind speeds. The future position is unclear but heather, one of the dominant heathland species, does have a relatively wide tolerance of temperature and rainfall, providing the overall climate remains oceanic.

Acidification, tropospheric ozone and nitrogen enrichment caused by atmospheric deposition can lead to vegetation changes including a reduction in the lichen and

bryophyte interest. Nitrogen deposition can increase the likelihood of insect defoliation of upland heathland.

Lichen in heathland

Current actions and opportunities

Glims Moss & Durkadale and Hoy Sites of Special Scientific Interest (SSSI) include areas of *Blanket bog* and *Basin bog.* The Glims Moss & Durkadale site also forms part of the Orkney Mainland Moors SPA and overlaps with the RSPB's Birsay Moors reserve.

SSSIs including *Upland heathland* are Hoy; Rousay; Stromness Heaths & Coasts; Orphir & Stenness Hills; West Mainland Moorlands; Keelylang Hill & Swartabeck Burn; Doomy & Whitemaw Hill in Eday; and Calf of Eday. Site management statements are in place.

The Hoy SSSI is also designated as a SAC and SPA, and part of the site is managed as an RSPB reserve. Orphir & Stenness Hills, West Mainland Moorlands, Keelylang & Swartabeck, Calf of Eday and parts of Rousay are SPAs; and Stromness Heaths & Coasts is an SAC.

Areas of all three peatland habitats are also located within Local Nature Conservation Sites (LNCS). Further information on these sites is provided in the Orkney Local Development Plan 2017 (OLDP) Supplementary Guidance *Natural Environment*.

OLDP Policy 9 *Natural Heritage and Landscape* sets out the Council's policy on designated sites, protected species and the wider biodiversity. This policy also provides a significant degree of protection against commercial peat cutting and, where necessary, makes provision for development proposals to be supported by a peatland management plan, to avoid the unnecessary disturbance, degradation and erosion of peat, soils and the overlying vegetation.

Mull Head in Deerness is a Local Nature Reserve, owned by the Council.

Hoy and part of Orphir & Stenness Hills are within a National Scenic Area (NSA) and part of Hoy SSSI is located within the Hoy Wild Land Area.

Moorland reserves owned by the RSPB include *Upland heath* in Hoy, Rousay and West Mainland.

Three Scottish Wildlife Trust (SWT) reserves include *Upland heath*; these are East Hill, Shapinsay; Harray Road End; and Hill of White Hamars, South Walls.

SNH has carried out Phase 1 vegetation surveys of all SSSIs, and other extensive research into the condition of Orkney's moorland. RSPB has commissioned National Vegetation Classification (NVC) surveys of all its reserves.

The Muirburn Code and its supplement 'Prescribed Burning on Moorland' produced by SGRPID restrict the burning of heather and associated vegetation to specific times of the year and there are clear recommendations against burning of sensitive habitats. Section 75 of the Climate Change (Scotland) Act 2009 brought in an enabling power for the Scottish Ministers to vary but not shorten the permitted times during which muirburn may be made, where they consider it necessary in relation to climate change factors. More recently the Wildlife and Natural Environment (Scotland) Act 2011 has introduced licensing for out of season heather burning. The Muirburn Code Guidance Card (Scottish Government) 2011 provides a summary of essential information in support of the Code.

Scottish Water's abstraction for drinking water purposes is regulated by SEPA and carried out in compliance with the Water Environment (Controlled Activities) (Scotland) Regulations 2011. Scottish Water works directly with SEPA and any other partner agencies to ensure its operational activities remain compliant with regulation.

Groundwater Dependent Terrestrial Ecosystems (GWDTEs) are protected in part by the regulation of abstraction from wells and boreholes under the Water Environment (Controlled Activities) (Scotland) Regulations 2011.BPS and LFASS payments to farmers are conditional on cross compliance and observance of a code of good farming practice, including the protection of natural habitats and avoidance of overgrazing.

The SRDP includes management options which provide annual payments for conserving *Blanket bog* and *Basin bog*, as well as stock reduction and moorland management. Included in the options is the creation of buffer strips to protect sites on or adjacent to in bye land, including improved grassland and arable land.

Guidance on management and entry into agri-environment schemes is provided by SAC Consulting and private agents.SWT has collected the practical aspects of peat bog management together and Scotland has a number of sites where experimental management is going on. This could be of practical value in the Orkney situation.

Little information appears to be available about the composition of the lower layers of *Basin bog* peat or if some are of lacustrine origin. More detailed study of the flora and fauna of local basin bogs would be beneficial.

PeatlandACTION, which is administered by SNH, offers funding to suitable peatland restoration projects. Since 2012 this fund has enabled measures to restore more than 10,000 hectares of degraded peatlands in Scotland.

Activities in and around peatland can impact upon water quality if not managed appropriately. Under Article 7 of the Water Framework Directive, waters used for the abstraction of drinking water are designated as Drinking Water Protected Areas (DWPA). Scottish Water is required to ensure that any proposed activity within peatland areas does not result in deterioration of waters within the DWPA. Scottish Water's Sustainable Land Management (SLM) team should therefore be consulted in advance, at protectdwsources@scottishwater.co.uk in relation to any activities or restoration works to peatlands.

Further information on the biodiversity of peatlands is available in the accompanying habitat descriptions for *Blanket bog*, *Basin bog* and *Upland heathland*.

Action Plan Objective:

Maintain the quality of *Blanket bog, Basin Bog and Upland heath* sites in Orkney and prevent deterioration.

Action plan targets:

1. Establish a project to restore an area of bog peatland by 2022.
2. Upgrade on-site interpretation facilities at Mull Head LNR by 2020.

National agencies: SGRPID, SNH.

Local partners: RSPB, SAC Consulting, OIC, Orkney College, NFUS.

Proposed actions with partners:

1. Undertake a project to restore an area of degraded bog peatland. **(Lead: RSPB).**
2. Undertake peatland restoration advisory events. **(Lead: RSPB).**
3. Arrange an event promoting sustainable peat cutting practices. **(Lead: RSPB).**
4. Prepare advice on fire safety and discuss its incorporation into signage with the Scottish Fire Service and Orkney Local Access Forum. **(Lead: OIC)**
5. Raise awareness of the biodiversity of *Upland heathland*, e.g. by upgrading the on-site interpretation facilities at Mull Head Local Nature Reserve. **(Lead: OIC).**

Keynote species: Hen harrier, *Circus cyaneus*; Short-eared owl, *Asio flammeus*; Golden plover, *Pluvialis apricaria*; Red-throated diver, *Gavia stellata*, Large heath butterfly, *Coenonympha tullia*; Heath carder bee, *Bombus muscorum*, Lichens; Sphagnum mosses; Orchids; Dragonflies and Damselflies.

Large Red Damselfly (photo: SNH)

References and other information sources

The Orkney Local Biodiversity Action Plan http://www.orkney.gov.uk/Service-Directory/L/Local-Biodiversity-Plan.htm

Orkney Local Development Plan http://www.orkney.gov.uk/Service-Directory/O/Orkney-Local-Development-Plan.htm

Blanket Bog habitat description

Blanket bog is a peatland habitat which is confined to cool, wet, typically oceanic climates. It is one of the most extensive semi-natural habitats in the UK and ranges from Devon in the south to Shetland in the north. Peat depth is variable, with an average of 0.5 – 3 m being typical but depths in excess of 5m are not unusual. There is no agreed minimum depth of peat that can support blanket bog vegetation. It includes the EC Habitats Directive priority habitat 'active' *Blanket bog*, the definition of active being given as 'still supporting a significant area that is normally peat forming'.

Blanket bog accumulates in response to the very slow rate at which plant material decomposes under conditions of waterlogging. It is not, however, confined to areas of poor drainage but rather can cloak whole landscapes, even developing on slopes of up to 30^{o}.

Peat provides the substrate for heathland habitats that are priorities for conservation; it is also a major storage resource for carbon and helps regulate water storage and runoff.

Many of the typical blanket mire species, such as Common heather, Cross-leaved heath, Deer grass, Cotton grass *Eriophorum* species and several of the bog moss *Sphagnum* species, occur throughout much of the range of the habitat, although their relative proportions vary across the country. Other species include Round leaved sundew *Drosera rotundifolia*, Bog asphodel *Narthecium ossifragum*, Lesser twayblade *Listera cordata* and many species of liverwort and mosses, notably Woolly fringe-moss *Racomitrium lanuginosum*. Other communities such as flush, fen and swamp types also form an integral part of the blanket bog landscape. The presence, extent and type of surface patterning are other important features of *Blanket bog*. This can range from a relatively smooth surface, with the only irregularities being those caused by vegetation features, to the extreme patterning associated with suites of bog pools and the intervening ridges. Patterning with bog pools, an important habitat for dragonflies, occur, especially in Hoy.

Most of the larger areas of *Blanket bog* are dissected by burns, often sunken enough to provide almost ravine-like shelter and here the vegetation changes abruptly.

Almost all bog in Orkney is classified as *Blanket bog*; the upper layers are composed of a mixture of dwarf shrubs, sphagnum and Cotton grass species, but sometimes with evidence of sedge peat at deeper levels, although the lowest levels may be too humidified for easy recognition of species. The peat blanket is sometimes shallow but may reach 1m or more, especially where it has slumped at the base of slopes. It would appear that following the initiation of peat in Orkney some 3000 years ago, it spread everywhere except on exceptionally well-drained soils or shell sand deposits. Occasionally excavation will bring up deposits of peat in areas where surface evidence has long since disappeared. Under-sea peat is found in a number of shallow bays.

Current local status, distribution and extent

The Scottish Blanket Bog Inventory (2000), together with a subsequent report on the northern isles (Johnson *et al*, 2001), give detailed information on the extent of various 'mire' vegetation types, together with comparisons with earlier survey data. These mire types equate mainly to the *Blanket bog* habitat but also include a wet heath element of the *Dwarf shrub heath* habitat. Examination of the various data sources suggests a Bog Broad Habitat area of 19,000 ha. There are no estimates for separate areas of *Blanket bog* and *Basin bog* habitats, but *Blanket bog* covers a much greater area in Orkney. RSPB have surveyed 1052 ha on the Birsay Moors and Cottasgarth Reserves, 1350 ha at Hobbister and 380 ha on their North Hoy Reserve.

The area of *Blanket bog* appears to have changed little in historical times, except at the Whitemoss, Tankerness (partly *Basin bog*) where there has been extensive reclamation. However, much has been cut over for peat.

The largest areas of *Blanket bog* occur in the West Mainland and South Hoy. These are found in the big moorland SSSIs of the West Mainland Moorlands, Keelylang and Swartaback, Orphir and Stenness Hills and Glims Moss and Durkadale; also, at Hobbister and Veness but much cut-over with drying and fissures. Much smaller patches occur in Tankerness, Rousay, Eday and Calf of Eday. Measured solely on the Macaulay "0.50 m depth of peat" figure there appears to be some 3,500 ha of Blanket Bog in Hoy, mostly south and east of the line between Santoo Head and Scad Head. Some areas, e.g. close to St John's head, and more or less within the montane zone, are lichen dominated, in which *Cladonia impexa* is the dominant species, yet the average depth of the peat there is > 100 cm.

Smaller areas are distributed throughout the isles, including some small offshore islands, e.g. Auskerry and Linga Holm which have peat cover well in excess of 0.5m depth.

Associated species and their biodiversity conservation status

Species.	Common name.	UK BAP List.	Scottish Biodiversity List.	Local priority Species.
Lepus timidus.	Mountain hare.	√.	√.	√.
Coenonympha tullia.	Large heath.	√.	√.	√.
Circus cyaneus.	Hen harrier.		√.	√.
Asio flammeus.	Short-eared owl.		√.	√.
Gavia stellata.	Red-throated diver.		√.	√.
Falco columbarius.	Merlin.		√.	√.
Pluvialis apricaria.	Golden plover.		√.	√.

Species.	Common name.	UK BAP List.	Scottish Biodiversity List.	Local priority Species.
Calidris alpina.	Dunlin.		√.	√.
Falco tinnunculus.	Kestrel.		√.	√.
Gnaphalium sylvaticum.	Heath cudweed.		√.	√.
Pluvialis apricaria.	Golden plover.		√.	√.
Stercorarius skua.	Great skua.			√.
Sorex minutus.	Pygmy shrew.			√.
Anthus pratensis.	Meadow pipit.			√.
Buteo buteo.	Buzzard.			√.
Gallinago gallinago.	Snipe.			√.
Larus fuscus.	Lesser black-backed gull.			√.
Larus canus.	Common gull.			√.
Numenius phaeopus.	Whimbrel.			√.
Carsia sororiata anglica.	Manchester treble-bar.			√.
Diarsia mendica orkneyensis.	Ingrailed clay.			√.
Apamea zeta assimilis.	Northern arches.			√.
Psyche casta.	A moth.			√.
Dyscia fagaria.	Grey scalloped bar.			√.
Aeshna juncea.	Common hawker.			√.
Chorthippus parallelus.	Meadow grasshopper.			√.
Sympetrum danae.	Black darter.			√.
Libellula quadrimaculata.	Four-spotted chaser.			√.
Pyrrhosoma nymphula.	Large red damsel.			√.
Hilaira pervicax.	A spider.			√.
Erigone capra.	A spider.			√.

Species.	Common name.	UK BAP List.	Scottish Biodiversity List.	Local priority Species.
Neon reticulatus.	A spider.			√
Hypselistes jacksoni.	A spider.			√
Araeoncus humilis.	A spider.			√
Orthilia secunda.	Round-leaved wintergreen.			√
Leiostyla anglica.	A snail.			√
Hammarbya paludosa.	Bog orchid.			√
Drosera anglica.	Great sundew.			√
Sphagnum magellanicum.	Magellanic bogmoss.			√

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Basin Bog habitat description

Basin bog has previously been described as 'raised bog' which is a type of ombrotrophic mire, i.e. a peatland that is fed exclusively by precipitation and is generally found in the valleys of floodplains. *Raised bog*, a national Priority Habitat, consists of a dome of peat which is produced entirely by peat growth and is one of Europe's rarest and most threatened habitats, also one of the most damaged. It is uncertain whether *Raised bog* occurs in Orkney, as local deep peat bogs in lowland basin situations do not appear to be dome-shaped. The term '*Basin bog'* has therefore been chosen to describe them for this HAP.

Deep peat sometimes accumulates in basins and can become much deeper than in *Blanket bog*, up to 5.5m. Lower layers, 2m or more in depth, may be dominated by sedges and include wood fragments. These *Basin bogs* may in turn overlie marl deposits. They may support vegetation, including scarce *Sphagna* species, similar to those found on *Raised bogs*. A local priority plant, Bog myrtle *Myrica gale*, is now known from one site only in Orkney, in Eday. Although the locations of some are well known the Macaulay soil maps show up other unsuspected pockets of peat of *Basin bog* formation. In most cases later accumulations of blanket peat will have spread over the bog, giving it many of the characteristics of *Blanket bog*.

Basin bogs are more complex environments than blanket bogs and richer in species, therefore they are of special interest. In deep peat which has never been cut over and has been too wet to be seriously damaged by muirburn, some of the more unusual species of sphagnum may be found. Peat accumulation also preserves a unique record of plant and animal remains and some atmospheric deposits from which it is possible to assess historic patterns of vegetation and climate change, as well as human land use. Tree remains are often preserved in Orkney bogs.

Current local status, distribution and extent

The total area of *Basin bog* in Orkney has not been estimated; however there has been some loss of the habitat in recent times, especially in Tankerness. Drainage and peat cutting have severely modified some sites.

Three known basin bogs in Orkney have been partially studied; these are the outstanding site at Glims Moss in Birsay which is probably the largest area of uncut *Basin bog* and has frequently been described as a *Raised bog*; the Loons, Birsay which seems to have been cut over at various times in the past; and the White Moss in Tankerness. Others appear to be widely scattered over the West Mainland, with very few in Hoy and elsewhere. An interesting pool and hummock active bog has developed in a hollow enclosed by moraines at the Moss of the Whitestanes near Rackwick in Hoy where the dominant plants are several *Sphagna* species including *S. magellanicum* and other bryophytes (mosses and liverworts). This example is comparable with the western Scottish *Blanket bog* vegetation.

Other basin or lowland peat formations occur at Whitemire, Birsay; Quholm and Cruland, Sandwick; Winksetter, Firth; Caldale, St Ola; Ocklester, Holm; very extensively round Blubbersdale, Stenness; and at many smaller sites including Skaill, Eday and Dale Moss, South Ronaldsay. The character and habitat type of these bogs or acid fens is not clear.

Associated species and their biodiversity conservation status

Basin bogs support a wide range of animals, including many wetland birds and dragonflies. Other rare invertebrates are associated with raised bogs but so far these are not known in Orkney

Species.	Common name.	UK BAP List.	Scottish Biodiversity List.	Local priority Species.
Lepus timidus.	Mountain hare.	√.	√.	√.
Coenonympha tullia.	Large heath butterfly.	√.	√.	√.
Numenius arquata.	Curlew.		√.	√.
Gavia stellata.	Red-throated diver.		√.	√.
Falco columbarius.	Merlin.		√.	√.
Pluvialis apricaria.	Golden plover.		√.	√.
Calidris alpina.	Dunlin.		√.	√.
Gnaphalium sylvaticum.	Heath cudweed.		√.	√.
Stercorarius skua.	Great skua.			√.
Sorex minutus.	Pygmy shrew.			√.
Anthus pratensis.	Meadow pipit.			√.
Buteo buteo.	Buzzard.			√.
Gallinago gallinago.	Snipe.			√.
Larus fuscus.	Lesser black-backed gull.			√.
Larus canus.	Common gull.			√.
Numenius phaeopus.	Whimbrel.			√.
Carsia sororiata anglica.	Manchester treble-bar.			√.
Diarsia mendica orkneyensis.	Ingrailed clay.			√.
Apamea zeta assimilis.	Northern arches.			√.
Psyche casta.	A moth.			√.
Dyscia fagaria.	Grey scalloped bar.			√.

Species.	Common name.	UK BAP List.	Scottish Biodiversity List.	Local priority Species.
Aeshna juncea.	Common hawker.			√.
Chorthippus parallelus.	Meadow grasshopper.			√.
Sympetrum danae.	Black darter.			√.
Libellula quadrimaculata.	Four-spotted chaser.			√.
Pyrrhosoma nymphula.	Large red damsel.			√.
Hilaira pervicax.	A spider.			√.
Erigone capra.	A spider.			√.
Neon reticulatus.	A spider.			√.
Hypselistes jacksoni.	A spider.			√.
Araeoncus humilis.	A spider.			√.
Leiostyla anglica.	A snail.			√.
Myrica gale.	Bog myrtle.			√.
Orthilia secunda.	Serrated wintergreen.			√.
Hammarbya paludosa.	Bog orchid.			√.
Drosera anglica.	Great sundew.			√.
Sphagnum magellanicum.	Magellanic bogmoss.			√.

References and other information sources:

Crawford, R.M.M. (1975). The Loons, Birsay. Contract report for NCC.

Upland Heathland habitat description

In this plan upland heathland is defined as lying below the alpine or montane zone (at about 600-750m) and usually above the upper edge of enclosed agricultural land (generally at around 250-400m but descending to near sea level in northern Scotland). *Blanket bog* and other mires, grassland, bracken, scrub, trees and woodland, freshwater and rock habitats frequently form mosaics with heathland vegetation in upland situations.

Upland heathland in favourable condition is typically dominated by a range of dwarf shrubs such as Common heather, Bilberry, Crowberry and Bell heather. In northern areas Juniper is occasionally seen above a heath understorey. Wet heath is most commonly found in the wetter north and west and, in favourable condition, should be dominated by mixtures of Cross-leaved heath, Deer grass, Common heather and Purple moor-grass, over an understorey of mosses, often including carpets of *Sphagnum* species. This habitat is distinct from blanket mire which occurs on deeper peat and which usually contains frequent occurrence of Hare's tail cotton grass *Eriophorum vaginatum* and characteristic mosses. High quality heaths are generally structurally diverse, containing stands of vegetation with heather at different stages of growth. *Upland heathland* in favourable condition usually also includes areas of mature heather.

An important assemblage of birds is associated with *Upland heathland*. Some forms of heath also have a significant lower plant interest, including assemblages of rare and local mosses and liverworts that are particularly associated with wetter western heaths. They also support a particularly diverse range of invertebrates.

Current local status, distribution and extent

Heathland in Orkney may be defined as 'upland' even though it descends to sea level; it does not support the range of mammals, reptiles and birds that is characteristic of the priority habitat *Lowland heathland*. The plant communities are as described for the national priority habitat. There are overlaps between the national priority habitats *Upland heathland*, *Montane heath* and *Bog*, as well as local priority habitats such as *Maritime heath,* and large areas of vegetation are composed of complex mosaics of different types. The maritime influence extends everywhere to some extent, affecting the composition of plant communities.

Orkney's Upland *heathland* is a prime habitat for an important suite of birds, including Hen harrier and Merlin, *Falco columbarius.* SSSI designation of areas of moorland including upland heath has been based largely on the protection of habitat for these birds and others more associated with blanket bog.

The extent of the *Dwarf shrub heath* Broad Habitat has been put at c. 10,000 ha. In Orkney all of this is *Upland heathland*, apart from those locally important habitats separately identified, i.e. *Treeless woodland and dales*, *Maritime heath*, *Empetrum heath*, *Lichen heath* and *Species-rich heath*. It is not possible to give figures for the extent of these sub-habitats, but their combined extent is thought to be much less than that of the *Upland heathland* component. There has been a large reduction in the area of this habitat in the last 100 years, including considerable losses in the years 1932-85, possibly 44% in the West Mainland and 72% in south Ronaldsay (Bennett 1986). These figures must be treated with caution, since they include other

hill and bog vegetation types, and probably much easily-reclaimed acid grassland and heather/grassland mosaic. The areas of greatest recent loss, in the 1970s and 80s have been on thin peats in East Mainland and Stromness parish.

Large areas of hill vegetation, including *Upland heathland*, are confined to the islands of Hoy, Rousay, Eday and Mainland. On the higher ground throughout, distribution much depends on the degree of slope and its aspect. On steep slopes the peat is thin and well-drained, or even absent, and here true *Upland heathland* is present; while the gentler, cooler slopes retain depths of *Blanket bog* to their feet unless it has been removed by some means. The hills of West Mainland, Rousay, Eday and south Hoy are characterised by a central mass of *Blanket bog* surrounded by heath on the slopes, although in much of the West Mainland the heath element has been lost to agricultural improvement. In north and central Hoy *Montane* habitat dominates the hill tops, surrounded by heath and some *Blanket bog*. On lower ground many, if not most, *Dwarf Shrub Heath* communities overlie shallow peat or even shallow stony soils, as in the North and South Isles, sometimes in very small fragments but also occurring in some large SSSIs.

The key sites are in Hoy; Orphir and Stenness Hills; small parts of the West Mainland Moorlands; Stromness Heaths and Coasts; and Rousay. Other important sites are in Eday and Rothiesholm, Stronsay; some notable remnants occur in East Mainland, Burray and South Ronaldsay.

In sites near the coast, including those listed above, there is a gradation into *Maritime heath*, which is largely dependent on the degree of exposure to sea spray. Other heathland sites absent from this list may be found under other heathland habitat types.

Associated species and their biodiversity conservation status

A feature of the Orkney upland heathlands is the presence of Crowberry, although less dominant than on coastal heaths. True grass species are usually absent within the heath but will occur in flushes, banks and alongside tracks etc., often accompanied by *Fens*, rushes and sedges. Dwarf juniper and ferns may also occur in such breaks in the heath cover. Moorland spotted orchid *Dactylorhiza ericetorum* is usually the most conspicuous flower but the tiny Lesser twayblade orchid *Listera cordata* is virtually confined to this type of habitat. Less frequent but important plant species may include Heath cudweed *Gnaphalium sylvaticum*, Stiff sedge *Carex bigelowii*, Sheep's bit *Jasione montana* (rare in Orkney and confined to coastal acid heath on the Eday sandstones) and some interesting mosses, liverworts and lichens. Where this *Upland heathland* type grades into the sub-alpine heaths of the very exposed tops (*Montane habitat*) an intermediate zone occurs where heather or ling are still the basic vegetation cover, but the most characteristic species is the Alpine bearberry *Arctostaphylos alpinus*.

Frequent flushes (localised upwellings of water) are features of the Orkney heathland. Where they are neutral or base-rich low-growing, sedge-dominated vegetation may locally dominate.

Associated species and their biodiversity conservation status

Species.	Common name.	UK BAP List.	Scottish Biodiversity List.	Local priority Species.
Lepus europaeus.	Brown hare.	√.	√.	√.
Lepus timidus.	Mountain hare.	√.	√.	√.
Anser albifrons.	White-fronted goose.	√.	√.	√.
Alauda arvensis.	Skylark.	√.	√.	√.
Carduelis flavirostris.	Twite.	√.	√.	√.
Numenius arquata.	Curlew.	√.	√.	√.
Bombus muscorum.	Heath carder bee.	√.	√.	√.
Xestia alpicola alpina.	Northern dart.	√.	√.	√.
Juniperus communis ssp. alpina.	Juniper.	√.	√.	√.
Circus cyaneus.	Hen harrier.		√.	√.
Pluvialis apricaria.	Golden plover.		√.	√.
Falco columbarius.	Merlin.		√.	√.
Falco peregrinus.	Peregrine falcon.		√.	√.
Falco tinnunculus.	Kestrel.		√.	√.
Asio flammeus.	Short-eared owl.		√.	√.
Microtus arvalis orcadensis.	Orkney vole.		√.	√.
Gnaphalium sylvaticum.	Heath cudweed.		√.	√.
Buteo buteo.	Buzzard.			√.
Sorex minutus.	Pygmy shrew.			√.
Numenius phaeopus.	Whimbrel.			√.
Gallinago gallinago.	Snipe.			√.
Anas penelope.	Wigeon.			√.

Species.	Common name.	UK BAP List.	Scottish Biodiversity List.	Local priority Species.
Anas crecca.	Teal.			√.
Mergus serrator	Red-breasted merganser.			√.
Larus canus.	Common gull.			√.
Larus fuscus.	Lesser black-backed gull.			√.
Anthus pratensis.	Meadow pipit.			√.
Saxicola torquata.	Stonechat.			√.
Omocestus viridulis.	Common green grasshopper.			√.
Chorthippus parallelus.	Meadow grasshopper.			√.
Apamea zeta assimilis.	Northern arches.			√.
Dyscia fagaria.	Grey scalloped bar.			√.
Carsia sororiata anglica.	Manchester treble-bar.			√.
Diarsia mendica orkneyensis.	Ingrailed clay.			√.
Thera cognate.	Chestnut coloured carpet.			√.
Psyche casta.	A moth.			√.
Perizoma flavofasciata.	Sandy carpet.			√.
Neon reticulatus.	Jumping spider.			√.
Araeoncus humilis.	A spider.			√.
Erigone capra.	A spider.			√.
Meioneta nigripes.	A spider.			√.
Leiostyla anglica.	A terrestrial snail.			√.
Arctostaphylos uva-ursi.	Bearberry.			√.
Sorbus aucuparia.	Rowan.			√.
Primula vulgaris.	Primrose.			√.

Species.	Common name.	UK BAP List.	Scottish Biodiversity List.	Local priority Species.
Melampyrum pratense.	Common cow-wheat.			√.
Dryopteris oreades.	Mountain male fern.			√.
Jasione montana.	Sheep's bit.			√.
Sagina subulata.	Awl-leaved pearlwort.			√.
Dryopteris aemula.	Hay-scented buckler fern.			√.
Salix aurita.	Eared willow.			√.
Senecio sylvaticus.	Wood groundsel.			√.
Rosa spp.	Wild rose.			√.
Salix cinereal.	Grey willow.			√.
Bryum weigelii.	A moss.			√.
Philonotis seriata.	A moss.			√.
Leocobryum glaucum.	A moss.			√.
Odontoschima elongatum	A liverwort.			√.

References and other information sources:

Bennett, A. (1986). An Assessment of Moorland Losses, Orkney. 1932-1985. Unpublished thesis for Hatfield Polytechnic.

Kirkpatrick, A.H, Simpson, I.A., Scott, L., Hanley, N., Oglethorpe, D., Curtis, D.J., Thacker, J.R.M., McCall, D., Watson, A. & Davidson, D.A. 1993. Moorland Audit and Management in the Northern Isles. Contract report for SNH, Edinburgh.

The Muirburn Code and Supplementary Guidance 2017. The Scottish Government.

Theme 4: The Marine Environment

Orkney is an archipelago, a cluster of around 90 islands and smaller skerries, surrounded by clear, relatively shallow water. Located at approximately 59 degrees north, between the North Atlantic and the North Sea, the area is exposed to frequent gales and high energy wave conditions. The channels separating the islands give rise to strong tidal streams, with some, such as Hoy Sound, having tidal races exceeding seven knots. In other areas the complexity of the shoreline affords more protection, and this is especially apparent in Scapa Flow where shelter and limited tidal movement provide calmer conditions and a marine environment that is very different from other parts of Orkney.

With such varied physical conditions, it should come as no surprise to learn that Orkney's marine environment supports a wealth of habitats and species, many of which are identified in Scotland as Priority Marine Features (PMFs) for conservation.

We gain much of our food from the sea and intertidal areas; however, the marine and coastal environment also delivers many additional benefits:

- Dune and links systems, vegetated shingle and saltmarshes provide valuable coastal defence against the erosive forces of high tides and wave action during storms.
- Habitats such as Maerl beds, Flame shell beds, Kelp forests, Horse mussel reefs and Seagrass meadows have been found to be significant storage areas for carbon, commonly known as 'Blue Carbon'.
- The seas around Scotland provide a source of offshore renewable wave, tidal and wind energy.
- Coastal and marine environments are also valued for the recreational, educational and spiritual benefits that they provide.

Issues, opportunities and actions for the Marine Environment

Increasing levels of commercial activity are intensifying the demand on Orkney's marine environment and factors associated with certain types of activity have potential to impact upon biodiversity. These include the physical effects of scallop dredging; damage caused by anchors and moorings; agricultural runoff; pollution from shipping; deposition of fish wastes from aquaculture and interaction with wild fish populations.

Scottish Water's waste water treatment discharges, including discharges to the marine environment, are regulated by SEPA under the Water Environment (Controlled Activities (Scotland) Regulations 2011, which require its waste water treatment operations to remain compliant with the specific consent licence associated with each individual Waste Water Treatment Works. This ensures that any activity, which could result in pollution of the water environment, is controlled and managed.

Following on from completion of Scotland's National Marine Plan, regional marine planning is slowly being rolled out across the 11 Scottish Marine Regions. Marine Planning Partnerships are due to be established and these will have responsibility for preparing statutory regional marine plans. Work is currently underway to establish a Marine Planning Partnership to develop a future Orkney Islands Regional Marine

Plan which will be used to determine development proposals in the marine environment from Mean High Water Springs out to12 nautical miles.

Once the appropriate governance and resourcing arrangements are in place, the first step in the plan making process will be to produce a State of the Environment report which will provide a baseline analysis of what is currently known about the marine environment of our local coastal waters. Through its marine theme the LBAP seeks to add to the available data on the biodiversity of Orkney's marine environment.

Marine litter is a persistent and widespread problem and the evidence is clear to see on many of Orkney's shorelines. The LBAP seeks to support local and national initiatives relating to marine litter and litter in general.

Broad action plan objectives for the marine environment:

- Maintain the extent, distribution and connectivity of marine ecosystems and prevent deterioration.
- Maintain and, where possible, improve the health of marine ecosystems.
- Involve local people in conservation actions and increase awareness and appreciation of marine ecosystems.

Marine Action Plans

The marine theme of the LBAP aims to fulfil these objectives through the accompanying Habitat Action Plans for *Maerl beds*, *Flame shell beds* and *Seagrass beds*, as well as Species Action Plans for Sea trout and Flapper skate. It also includes a Marine Litter Action Plan, as well as a Citizen Science Action Plan to increase awareness and appreciation of the marine environment.

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. Region 2: Orkney. Peterborough, Joint Nature Conservation Committee. (Coastal Directories Series).

Orkney Local Development Plan http://www.orkney.gov.uk/Service-Directory/O/Orkney-Local-Development-Plan.htm

Flame shell beds Habitat Action Plan

Habitat description

Flame shells, *Limaria hians,* are bivalve molluscs with thin oval shells, usually about 2.5 cm in length but occasionally reaching 4 cm. The shell is white in young specimens, becoming whitish-brown with age and has a wavy margin. The edge of the fleshy mantle bears numerous conspicuous red and orange filamentous tentacles which resemble flames. Also known as gaping file shells, they live on the seabed inside nests which they build by weaving together tough threads (byssus) with surrounding materials such as seaweed, maerl, stones and shells. Adjoining nests coalesce to form larger structures containing multiple flame shells. These structures create a habitat that stabilises the sediment and provides an attachment surface for many other organisms including hydroids, bryozoans, ascidians, kelps and seaweeds, as well as scallop spat as it settles from the plankton. A rich diversity of fauna is also found within and below the flame shell bed. This diverse assemblage of organisms adds to the habitat's complexity and provides shelter and feeding grounds for species such as cod and saithe.

Flame Shell (photo: Joanne Porter)

Typically, flame shells are found on mixed substrates of mud, sand, gravel broken shells and stones at depths of 5-100m in sheltered areas of moderate to strong currents. *Flame shell beds* are more likely to form at shallower depths of between 5 and 30m. They are often found in tide-swept narrows such as the entrances or sills of sea lochs and the best-known examples occur within a number of sea lochs on

the west coast of Scotland; however, smaller beds are also known to be present in Orkney waters.

L. hians is an active suspension feeder on phytoplankton, bacteria and detritus and in doing so the beds sequester carbon. Along with their associated species, *Flame shell beds* are likely to be important in terms of their blue carbon storage potential.

Current local status, distribution and extent

The dense construction of *Flame shell beds* means that the animals themselves cannot easily be seen from above the seabed. However, their presence in Orkney has been reported in information from Seasearch volunteers. An MSc group from Heriot-Watt University also detected them in drop down video footage from Scapa Flow during March 2017. Further ground truthing will be necessary to improve current knowledge and understanding of this species.

Associated species and their biodiversity conservation status

Species.	**Common name.**	**UK BAP List.**	**Scottish Biodiversity List / PMF**
Limaria hians.	Flame shell.	√.	√.
Gadus morhua.	Cod.	√.	√.
Pollachius virens.	Saithe / Coalfish.	√.	√.
Hyas araneus.	Great spider crab.		
Crossaster papposus.	Common sunstar.		
Ophiothrix fragilis.	Common brittlestar.		
Ophiocomina nigra.	Black brittlestar.		
Asterias rubens.	Common starfish.		
Buccinum undatum.	Common whelk.		
Pecten maximus.	King scallop.		
Kirchenpaueria pinnata.	A colonial hydroid.		
Nemertesia antennina.	Sea beard, a colonial hydroid.		
Nemertesia ramosa.	A colonial hydroid.		
Plumularia setacea.	Plumed hydroid.		
Phycodrys rubens.	A small red seaweed.		

Current factors affecting the habitat

Flame shell beds are easily damaged by the physical effects of scallop dredging. Anchors and moorings may also cause localised damage.

Deposition of fish wastes and surplus feed from aquaculture cages can have a blanketing effect, blocking the light that is necessary for photosynthesis by attached seaweed species. Chemical therapeutants used to treat caged fish may also have a detrimental effect on *Flame shell bed* species assemblages.

Flame shell beds develop slowly over centuries, are highly vulnerable to damage, and the rate of recovery following removal is extremely slow. As such, they should be treated as a non-renewable resource.

Current actions and opportunities

In Scotland the biotope *Limaria hians* beds in tide-swept sublittoral muddy mixed sediment (SS.SMx.IMx.Lim.) is classed as a Priority Marine Feature (PMF).

The Council's Local Development Plan Policy 12 *Coastal Development* and Supplementary Guidance *Aquaculture* require benthic surveys to be undertaken to inform the location of new aquaculture development. These surveys should identify any presence of priority marine features such as *Flame shell beds*. Any new aquaculture application would be required to demonstrate how it gives due regard to Priority Marine Features, in accordance with SG Aquaculture Development Criterion 2, prior to determination through the various permissions and licencing schemes required to operate a farm.

A recent study by Hood (2016) on a *L. hians* bed off Lyness in Hoy was primarily focused on its standing stock of carbon, but also considered factors such as the size and age of individual animals, as well as nest building behaviour.

By improving our knowledge of the distribution, extent and depth of *Flame shell beds* in Orkney, and identifying the indicator species they support, we would add to current understanding of their importance to other marine species, as well as their long-term pattern of development and capacity to store carbon.

Action plan objective:

Maintain the quality of *Flame shell beds* in Orkney and prevent deterioration.

Action plan target:

1. Undertake a predictive modelling study to identify areas which may support *Flame shell beds* by December 2019.
2. Ground-truth potential *Flame shell beds* identified by the predictive modelling study and map these by December 2023.

National agencies: SNH, SEPA.

Local partners: OIC, ICIT, Seasearch.

Proposed actions with partners:

1. Undertake a predictive modelling study to identify areas within Orkney coastal waters that have potential to support *Flame shell beds*. **(Lead: ICIT)**

2. Undertake a ground truthing project in areas predicted to support *Flame shell beds* and map the distribution and extent of beds found to be present. **(Lead: ICIT)**
3. Take account of any new data on *Flame shell bed* distribution in the State of the Environment Report for the forthcoming Orkney Regional Marine Plan. **(Lead: OIC)**
4. Identify indicator species supported by *Flame shell beds* for further research and monitoring, in order to improve knowledge and understanding of the habitat, including its capacity for blue carbon storage. **(Lead: ICIT)**
5. Identify a list of potential MSc dissertation projects or MPhil research topics relating to *Flame shell beds*. **(Lead: ICIT)**

Keynote species: *Limaria hians.*

References and other information sources

FEAST – Feature Activity Sensitivity Tool http://www.marine.scotland.gov.uk/feast/

Hood, H. 2016 Assessment of *Limaria hians* contribution to the blue carbon resource in Scottish waters. MSc dissertation, Heriot-Watt University

Tyler-Walters, H., James, B., Carruthers, M. (eds.), Wilding, C., Durkin, O., Lacey, C., Philpott, E., Adams, L., Chaniotis, P.D., Wilkes, P.T.V, Seeley, R., Neilly, M., Dargie, J. & Crawford-Avis, O.T. 2016. Descriptions of Scottish Priority Marine Features (PMFs). *Scottish Natural Heritage Commissioned Report No. 406.*

Orkney Local Development Plan http://www.orkney.gov.uk/Service-Directory/O/Orkney-Local-Development-Plan.htm

Maerl Beds Habitat Action Plan

Habitat description

Maerl is a collective term for several species of red seaweed, with hard, chalky skeletons. These form loose subtidal accumulations on the surface of soft sediments. In Orkney two species of red algae form maerl beds: *Phymatolithon calcareum* and *Lithothamnion glaciale*. Unlike most other seaweeds, maerl grows as unattached, rounded nodules or short, branched shapes on the seabed. However, in common with all seaweeds, maerl needs sunlight to grow; therefore, it typically occurs in shallow seas at depths of up to 30m. In favourable conditions maerl can form large and deep beds, i.e. in a fast, tidal flow or where wave action is sufficient to remove fine sediments, but not strong enough to break the brittle maerl branches. Within these beds, layers of dead maerl build up, topped by a thin layer of pink, living maerl.

Goby on Maerl (photo: Penny Martin)

Maerl beds provide an important habitat for many different types of marine life, which can live amongst or attached to the surface of maerl or burrowed in the coarse

underlying gravel of dead maerl. They can be of importance to sustainable fisheries, providing nursery grounds for commercial species of fish and shellfish.

Current local status, distribution and extent

Extensive deposits of maerl have been found in Wyre and Rousay Sounds and deposits are also present around the island of Papa Westray. Data from Marine Nature Conservation Review surveys (JNCC), observations of local divers and the notation of 'Crl' on old Admiralty Charts indicate that maerl is also concentrated in Wide Firth, the Oyce in Stronsay, Gutter Sound, East Graemsay, South Eday Channel and Veantrow Bay.

Maerl beds also influence the nature of some of Orkney's sandy coasts. Both the Wyre and Rousay Sounds and the Papa Westray deposits are located within the Orkney carbonate production area, an internationally important example of a shelf carbonate system. The sand here is rich is calcium carbonate that comes from the eroded shells and skeletons of plants such as maerl and the other animals the habitat supports. The role of *Maerl beds* as an important storage resource for carbon is the focus of current studies in Orkney.

Associated species and their biodiversity conservation status

Species.	Common name.	UK BAP List.	Scottish Biodiversity List / PMF
Pecten maximus.	King scallop.		
Tectura virginea.	White tortoiseshell limpet.		
Patella pellucida.	Blue-rayed limpet.		
Sabella pavonina.	Peacock worm.		
Nemertesia spp.	Colonial hydroids.		
Cruoria cruoriaeformis.	Burgundy maerl paintweed, a red alga.		
Gelidiella calcicole.	A small, creeping red seaweed.		
Gelidium maggsiae.	A red seaweed.		
Halymenia latifolia.	A red seaweed.		
Scinaia turgida.	A red seaweed.		

Current factors affecting the habitat

Due to their fragility, *Maerl beds* are easily damaged by the physical effects of scallop dredging and suction dredging for other bivalves. Anchors and moorings may also cause localised damage.

Water movement during storms can influence the rate of loss of maerl thalli from beds.

Deposition of fish wastes and surplus feed from aquaculture cages can have a blanketing effect, blocking the light that is necessary for photosynthesis. Chemical therapeutants used to treat caged fish may also have a detrimental effect on *Maerl beds* and associated species assemblages.

Structures which impact on coastal processes, e.g. sea defences and marine renewable energy infrastructure, influence sediment transport and deposition and may cause indirect effects on *Maerl beds*.

Maerl beds develop slowly over centuries, are highly vulnerable to damage, and the rate of recovery following removal is extremely slow. As such, they should be treated as a non-renewable resource.

Current actions and opportunities

Two maerl biotopes are found in Orkney waters and are classed as Priority Marine Features (PMF):

1. *Phymatolithon calcareum* maerl beds with *Neopentadactyla mixta* and other echinoderms in deeper infralittoral clean gravel or coarse sand (SS.SMp.Mrl.Pcal.Nmix.).
2. *Lithothamnion glaciale* maerl beds in tide-swept variable salinity infralittoral gravel (SS.SMp.Mrl.Lgla.).

Wyre and Rousay Sounds and an area surrounding Papa Westray are designated as Nature Conservation Marine Protected Areas, due in part to the presence of significant *Maerl beds*.

The Council's Local Development Plan Policy 12 Coastal Development and Supplementary Guidance Aquaculture require benthic surveys to be undertaken to inform the location of new aquaculture development. These surveys should identify any presence of priority marine features such as Maerl beds. Any new aquaculture application would be required to demonstrate how it pays due regard to Priority Marine Features, in accordance with SG Aquaculture Development Criterion 2, prior to determination through the various permissions and licencing schemes required to operate a farm.

The North Isles Landscape Partnership Scheme (NILPS), a programme of projects involving the enhancement, promotion and protection of the built, natural and cultural heritage of the North Isles of Orkney, is scheduled to be delivered throughout the North Isles during 2018-2023. The Scheme includes a project to develop an underwater motion graphics (virtual dive) resource which will demonstrate the importance of the habitats and species of the Wyre and Rousay Sounds MPA.

Methods to determine the depth of *Maerl beds* in the Wyre and Rousay Sounds MPA have been trialled in a research project undertaken at the International Centre for Island Technology.

By improving our knowledge of the distribution, extent and depth of *Maerl beds* in Orkney we would improve current understanding of their importance to other marine

species, their long-term pattern of development, as well as their role as a carbon storage system.

Action plan objective:

Maintain the health of *Maerl beds* in Orkney and prevent deterioration.

Action plan targets:

1. Quantify the blue carbon storage capacity of the Wyre and Rousay Sounds MPA by 2020.
2. Develop a virtual dive project in the Wyre and Rousay Sounds MPA by 2022.

National agencies: SNH, SEPA.

Local partners: OIC, ICIT, Seasearch.

Proposed actions:

1. Continue to map the distribution, extent and depth of *Maerl beds* in Orkney, through collaboration with the Seasearch volunteer project**. (Lead: Seasearch coordinator)**
2. Develop a virtual dive project for the Nature Conservation Marine Protected Areas of the North Isles. **(Lead: OIC)**
3. Develop a method for estimating the storage of blue carbon in the Wyre and Rousay Sounds MPA. **(Lead: ICIT)**
4. Identify a list of potential MSc dissertation projects and/or MPhil research topics relating to *Maerl beds*. **(Lead: ICIT)**

Keynote species: *Phymatolithon calcareum, Lithothamnion glaciale*

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Orkney Local Development Plan http://www.orkney.gov.uk/Service-Directory/O/Orkney-Local-Development-Plan.htm

Seagrass Beds Habitat Action Plan

Habitat description

Seagrasses, *Zostera* spp. are marine flowering plants but they are not actually grasses. They are found in shallow coastal areas around the world, in areas that are afforded at least some shelter from wave action, for example sea lochs, inlets, bays, sounds and lagoons. They occur on sands, mud and gravel, on the lower shore and subtidally, down to 10m in a range of tidal conditions and in full or variable salinity.

Widewall Seagrass with Peacock worm and Lugworm casts (photo: Jenni Kakkonen)

Zostera plant densities typically provide greater than 30% cover of the sea bed (at least 5% is required to qualify as a 'bed'), but plant growth within a bed may be patchy. Also known as seagrass meadows, they can vary in size from 10s of m^2 to several km^2, stabilising sediment through their network of roots, providing food for waterfowl and creating an attachment surface for algae, diatoms, hydroids and sea anemones. They are a preferred habitat for other species such as stalked jellyfish. The underlying sediment supports worms, bivalves and snails while the seagrass leaves provide shelter and nursery areas for commercially important species including crabs, flatfish and pollock.

Seagrass beds provide a natural sea defence by binding sediment and absorbing the energy of incoming waves; they are also an important storage resource for carbon.

Current local status, distribution and extent

Z. marina beds, known locally as ‘mella’ or ‘mallow’ have been recorded along the coasts of Westray, Sanday, Stronsay, Shapinsay and in the inner isles within the Wyre Sound and by Eynhallow. Extensive beds are known to be established within St Peters Pool in Deerness, Widewall Bay in South Ronaldsay, in Finstown Ouse and Bay of Firth, as well as Longhope Bay, Walls. Smaller beds have been recorded along the coast of Graemsay, in Scapa Bay, in Watersound by Burray village, off the south-west coast of Papa Westray and in Tingwall Bay.

The presence of *Seagrass beds* in an area is not always obvious throughout the year as the leaves remain attached until September and thereafter do not reappear until March.

Associated species and their biodiversity conservation status

Species.	Common name.	UK BAP List.	Scottish Biodiversity List/ PMF	Local Priority Species.
Zostera marina.	Eelgrass.		√.	√.
Echinocardium cordatum.	Sea potato.			
Arenicola marina.	Lugworm.			
Lanice conchilega.	Sandmason worm.			
Anemonia viridis.	Snakelocks anemone.			
Pagurus bernhardus.	Hermit crab.			
Carcinus maenas.	Green shore crab.			
Gibbula cineraria.	Grey topshell.			
Hinia reticulata.	Netted dogwhelk.			
Saccharina latissima.	Sugar kelp.			
Chorda filum.	Sea lace.			
Ulva spp.	Sea lettuce.			

Current factors affecting the habitat:

Dredging and bottom trawling 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.

Seagrass beds are sensitive to physical damage, nutrient enrichment and siltation which reduces the amount of sunlight reaching the leaves. Herbicides can also have toxic effects where coastal runoff results in high concentrations, particularly in sediments. Environmental sources of impact include long periods of elevated sea temperature, extremes of rainfall, low levels of insolation and the long-term cycles in

oceanic circulation. These factors will be affected to different degrees by climate change.

Currently UK seagrass populations are considered degraded following significant declines due to fungal 'wasting' disease in the 1920s and 30s. .

Current actions and opportunities:

In Scotland the biotope *Zostera marina* / a*ngustifolia* beds on lower shore or infralittoral clean or muddy sand (SS.SMp.SSgr.Zmar) is classed as a Priority Marine Feature.

The Council's Local Development Plan Policy 12 Coastal Development and Supplementary Guidance Aquaculture require benthic surveys to be undertaken to inform the location of new aquaculture development. These surveys should identify any presence of priority marine features such as *Seagrass beds*. Any new aquaculture application would be required to demonstrate how it pays due regard to Priority Marine Features, in accordance with SG Aquaculture Development Criterion 2, prior to determination through the various permissions and licencing schemes required to operate a farm.

A study by Thomson and Jackson (2014) combined a predictive modelling approach with boat-based surveys to enhance understanding of seagrass distribution in Orkney and inform conservation management. A separate study undertaken by Kakkonen into the biodiversity of seagrass beds at Bay of Firth and Widewall Bay was included as an annex to the report.

Action plan objective:

Maintain the quality of *Seagrass beds* in Orkney and prevent deterioration.

Action plan target:

Investigate all potential *Seagrass bed* sites identified by the predictive modelling study and map the findings by 2020.

National agencies: SNH, SEPA.

Local partners: OIC, ICIT; Seasearch.

Proposed actions:

1. Build on the findings of previous *Zostera* studies, through ground truthing projects, to determine the distribution and extent of *Seagrass beds* in Orkney. **(Lead: ICIT).**
2. Take account of any new data on *Seagrass bed* distribution in the State of the Environment Report for the forthcoming Orkney Regional Marine Plan. **(Lead: OIC).**
3. Identify indicator species supported by *Seagrass beds*, for further research and monitoring. **(Lead: ICIT).**
4. Undertake surveys to explore the potential presence of non-native species, e.g. *Diadumene lineata*, the orange striped green sea anemone. **(Lead: ICIT).**
5. Identify a list of potential MSc dissertation projects or MPhil research topics relating to *Seagrass beds*. **(Lead: ICIT).**

Keynote species: *Zostera marina.*

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Flapper Skate Species Action Plan

Characteristics

Recent studies have shown that the Common skate, *Dipturus batis* complex, is in fact two species: the Flapper skate, *Dipturus intermedius* and the Blue skate, *D. flossada*. The Flapper skate is predominantly recorded in Scottish waters, whilst the Blue skate is found further south in the UK.

The Flapper skate is the largest skate in European waters and can grow up to 3m in length. It has a long, pointed snout and its upper side is brownish green with lighter spots (although not all specimens have these). There is a row of 12-18 thorns along the tail. Young skate have a black underside which fades to paler grey or cream as the fish ages. The pelvic fins in males are modified to create claspers for the transfer of sperm. Like sharks, the skate is an elasmobranch (a cartilaginous fish) and has no swim bladder; instead the fish maintains buoyancy with large livers, rich in oil.

Flapper Skate (photo: Dan Wise)

Habitat

Typically, Flapper skate inhabit shallow coastal waters and shelf seas up to 200m water depth, but they are occasionally found down to 600m. In Orkney the species does not appear to show a preference in terms of water depth, and sightings have been recorded from a few metres to 50m and deeper. Orkney skate also display a wide range of habitat preference. On many occasions they have been observed in

areas of strong tidal water flow; however, they have also been recorded close to the numerous wrecks of Scapa Flow, where tidal flow is weak. The majority of sightings have been over sediment based seabeds where the substrate ranges from sands to broken shells; however, records show that the skate also ranges over bedrock and boulders, as well as appearing at the sea surface.

Feeding

An opportunistic feeder and scavenger, this species feeds on worms, sand eels, crabs, molluscs and flat fish on the sea bed. It is also known to hunt fish and smaller elasmobranchs within the water column.

Current local status, distribution and extent

Once found throughout Scottish waters, the Flapper skate has now disappeared from the Irish Sea and all but the far north of the North Sea. Orkney appears to be a stronghold for the species, providing a key refuge, as evidenced by the numbers of skate egg cases which are routinely found washed up on local shorelines, as well as local fish sightings, captures and reports from divers of egg cases found *in situ*. During 2017 over 10,900 egg cases were collected from Orkney shorelines. However, owing to the cryptic nature and low level of existing data surrounding the species there is very little accurate knowledge regarding the life cycle of this fish.

Current factors affecting the species

Although previously abundant in north-west Europe, since the early part of the 20th century skate populations around the British Isles have undergone a significant decline due to overfishing and the *D. batis* complex is now classified as Critically Endangered on the International Union for Conservation of Nature (IUCN) Red List. Research has shown that Flapper skate prefers spending long periods of time in small geographical areas, rarely undertaking migrations, therefore increasing the risk of impact from anthropogenic activities such as fishing and development.

Other threats to the species include:

Non-targeted fishing, i.e. the capture of adult and juvenile fish as bycatch in all types of towed fishing equipment, as well as static equipment such as gillnets and longline fisheries. Egg cases are also vulnerable to capture and damage by towed equipment.

Loss of habitat and feeding areas through widespread seabed damage caused by towed fishing gear.

Predation by seals.

The impacts of electrical /magnetic subsea equipment, including power cables, on skate and other elasmobranchs remain uncertain.

Current actions and opportunities

Today both species of the *D. batis* complex are Prohibited Species in commercial fisheries, with no targeting, retaining, transhipping or landing permitted. They are key species in the UK Biodiversity Action Plan with management plans in place to

encourage expansion of their range and numbers. In Scotland the Flapper skate is identified as a Priority Marine Species for conservation.

The Orkney Skate Trust (OST), a local voluntary group, has been actively collecting data on local Flapper skate since 2004. The Trust records information on skate egg cases observed *in situ* by divers, as well as empty cases that are washed ashore. Skate sightings are also recorded, along with environmental data from divers and other sea users. An effective tag and release angling programme is also in operation within Orkney waters; this project continues to capture a range of data on the local Flapper skate population and has enabled the establishment of a DNA database. On the west coast of Scotland, the area round the Isle of Mull, Sound of Jura and the Firth of Lorne also retains a significant Flapper skate population and DNA analysis aims to determine how similar the genetic identity of these fish is to the Orkney population. Some areas, e.g. Scapa Flow, are better researched than others, and there is currently a shortfall of information from the North Isles.

The North Isles Landscape Partnership Scheme (NILPS), a programme of projects involving the enhancement, promotion and protection of the built, natural and cultural heritage of the North Isles of Orkney, is scheduled to be delivered throughout the North Isles during 2018-2023. Proposed natural heritage projects include a programme of tag and release Flapper skate angling, the use of a Remotely Operated underwater Vehicle (ROV) and recording of skate egg cases found on North Isles beaches. With collaboration between the voluntary diver recording group, Seasearch, and the Orkney Skate Trust, as well as opportunities for community involvement, the Scheme would present a good opportunity to increase the submission of marine species records for Flapper skate and provide finer resolution habitat data.

Action plan objective:

Maintain and, where possible, enhance current populations of Flapper skate in Orkney waters.

Action plan target:

Establish a programme to record and analyse Flapper skate data from the waters surrounding the North Isles by December 2019.

National agencies: SNH, SEPA.

Local partners: Orkney Skate Trust, Seasearch, ICIT; OIC.

Proposed actions:

1. Undertake a tag and release project for Flapper skate within North Isles waters. **(Lead: OIC)**
2. Undertake a project to record Flapper skate egg cases found on North Isles shorelines. **(Lead: OIC)**
3. Continue to collect and collate data on Flapper skate from other areas of Orkney by:
    a. Recording egg cases, both in situ and washed ashore.
    b. Recording skate sightings reported by seafarers, divers and detected by remote underwater cameras. **(Lead: Orkney Skate Trust)**

4. Continuing the tag and release project throughout other parts of Orkney, with increased focus on Scapa Flow. **(Lead: Orkney Skate Trust)**
5. Undertake habitat surveys of areas displaying higher densities of Flapper skate records, as part of targeted surveys by SCUBA divers and the use of remote video technology. **(Lead: Orkney Skate Trust)**
6. Continue to develop a DNA database for Flapper skate populations in Orkney, using tissue from adult captures and stranded egg cases containing embryos. **(Lead: Orkney Skate Trust)**

References and other information sources

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Egg Cases found in Evie (photo: David Barclay)

Sea Trout Species Action Plan

Characteristics

The Sea trout, *Salmo trutta,* is an anadromous species, i.e. fish are born in freshwater, then migrate to the sea as juveniles where they grow into adults before migrating back to freshwater to spawn. It is the migratory form of the fresh water Brown trout. In the British Isles this species can grow up to about 1m in length and over 10kg in weight; however individual sizes vary widely between populations. As juvenile fish, they are characterised by the presence of red or orange spots on their flank, mostly above the lateral line. Those fish destined to become Sea trout change their colouration to silver as they prepare for downstream migration and during spring they enter the sea as silvery smolts. Some of these return to spawn in fresh water as mature adults between May and November of their first year at sea, whilst others return to overwinter in fresh water as juveniles, also known as ‘finnock’, and may not spawn at this time. These fish return to the sea, coming back to the burns to spawn in subsequent years. Spawning occurs in late autumn and many Sea trout will spawn several times during their lifetime. On their return to the rivers and burns they gradually darken to a reddish brown and male fish develop a hook or ‘kype’ on their lower jaws.

Sea Trout (photo: Michael Wilson)

In a study of freshwater burns entering Scapa Flow, Thomson and Lyndon (2018) found that nutrient availability plays a key role in determining the age at which trout smolt, with smolting occurring at an earlier age in the more nutrient-rich and productive burns.

Habitat

Sea trout spawn in burns and lochs with unobstructed access to the sea, laying their eggs in benthic accumulations of gravel known as redds. While at sea they tend to remain close to the coast, often favouring estuaries. However, in Orkney, the lack of true estuarine habitat means that the transition to full salinity water is more abrupt. Some venture further afield, and Scottish fish have been captured as far away as Denmark.

Feeding

Sea trout feed on a variety of other animals, from crustaceans and molluscs to other small fish, especially sprat, sand eels and juvenile herring.

Current local status, distribution and extent

The Orkney Trout Fishing Association (OTFA) has monitored several key Sea trout populations in Orkney since 2004. Around 80 burns have now been surveyed by electrofishing, with Sea trout being found in the following:

- the Burn of Eyrland in Stenness;
- the Bu Burn and the Mill (Kirbister) Burn in Orphir;
- the Graemeshall Burn in Holm;
- the Burns of Voy (Ocklester) and Quoykea (Sebay) in Toab;
- the Burns of Wideford and Gill in St Ola;
- the Burns of Rennibister, Rossmyre, Binscarth and Holland (Burness) in Firth;
- the Burn of Cruan (Isbister) in Rendall;
- the Burns of Woodwick and Desso (Aikerness) in Evie;
- the Mill Burn in Stromness; and
- the Whaness, Lyrawa, Mill, Ore and Rackwick Burns in Hoy.

Data from these studies indicate that juvenile density in Sea trout burns varies between sites and between years but tends to occur within the range of 0 to just over 3 trout per square metre of burn.

Thomson (2015) identified 36 separate Brown trout populations comprising fish aged up to 5+ years, with evidence of anadromy detected in 23 populations. Smolt size was found to vary directly with stream size, although age reflected growth rates in each population. On average, smolts were smaller and younger compared to other Scottish populations.

Current factors affecting the species

National fishery catch data suggest that overall stocks are highly variable but may be declining in many parts of the UK. Like other salmonids, Sea trout are affected by poor water quality, over abstraction, historic over fishing, habitat degradation, barriers to migration, increased predation and genetic introgression due to hybridisation with introduced fish. They are also vulnerable to the effects of climate change, e.g. rising temperatures, ocean acidification and changes in food availability.

In Orkney, key factors are identified as the availability of suitable spawning habitat in freshwater burns and the potential for interaction with farmed salmonids once the

fish enter their marine phase. Spawning burns in Orkney have been significantly modified over the years, mainly through agricultural development and the associated need to drain land. However, evidence from the OTFA electrofishing programme indicates that, over time, even straightened burns can support healthy numbers of young trout. During 2012 a project undertaken to enhance spawning habitat in the Bu Burn, Orphir was funded by the Scapa Flow Landscape Partnership Scheme.

In some parts of the Scottish west coast wild fish interests/managers are expressing concern over the potential contributory effect of sea lice on farmed fish to local wild fish populations, in addition to the many other factors affecting the survival of wild salmonids. Wild Sea trout, in particular juvenile fish entering the sea from spawning burns, are vulnerable to infection by the sea lice species *Lepeophtheirus salmonis*. Heavy lice burdens can compromise the future viability of individual infected fish and have potential to impact on Sea trout at the population level. Sealice are naturally occurring parasites which are routinely present in low numbers within fish populations; however, the intensive nature of aquaculture creates the potential for large numbers of lice larvae to become concentrated within certain areas, increasing the risk of infection in wild fish. Data collected throughout the west coast of Scotland showed that the proportion of individual Sea trout with sea louse burdens above a level known to cause physiological stress increased with the mean weight of salmon on the nearest fish farm and decreased with distance from that farm.

The extent to which Sea trout populations are affected is not clear and will depend on movements of both lice and Sea trout populations, which are currently not well understood. The larval stages of sea lice are planktonic, occupying the upper layers of the water column. Site specific factors including tidal currents, prevailing wind and local topography, can have a significant impact on the direction and extent of lice dispersal.

There is limited data on the population status of Sea trout in Orkney; therefore, further studies would seek to improve current knowledge and understanding to support impact assessment and monitoring.

Current actions and opportunities

The Sea trout is listed as a Priority Species in the UK Biodiversity Action Plan and the Scottish Biodiversity List. In its marine phase it is also included on the list of Priority Marine Features (PMF).

Planning control, i.e. the requirement for planning permission, for marine fish farming extends from mean high water springs to 12 nautical miles (the limit of territorial waters). The Orkney Local Development Plan, Policy 12, provides the statutory planning policy framework that informs the determination of fish farm planning applications. Currently, the jurisdiction of local development plans, in relation to fish farming, extends out to the 3-nautical mile limit. Policy 12 is supported by the Supplementary Guidance *Aquaculture* which provides detailed information to support policy implementation and a spatial strategy to guide the location of new fish development.

Marine Scotland is the regulatory authority in relation to sea lice monitoring in farmed fish and the Scottish Environment Protection Agency (SEPA) licences the use of chemicals to treat sealice infestation.

There are currently two aquaculture companies operating in Orkney waters and both have expressed a desire to participate in an independently run research project with the aim of improving knowledge and understanding of Sea trout status in Orkney. The Orkney Trout Fishing Association would also welcome further research into the issue.

The findings of the project would inform the State of the Environment Report for the forthcoming Orkney Islands Regional Marine Plan.

Action to better understand the interaction between fish farming and Sea trout has been prioritised in this SAP because of the recent significant growth and planned growth of the fish farming industry in Orkney and the identified increased risk to Sea trout. This action will be developed and taken forward as an independent study, in collaboration with relevant stakeholders.

Action plan objectives

1. Increase knowledge and understanding of Sea trout populations in Orkney waters.
2. Maintain and, where possible, enhance Sea trout populations in Orkney waters.

Action plan targets

1. By March 2019, complete a review of the available literature regarding pressures affecting Sea trout in Orkney waters .
2. By June 2019 agree a brief for a Sea trout research project.
3. Agree funding and commence the project by September 2019.
4. Complete the project and present its findings by December 2020.

National agencies: SNH, SEPA, Marine Scotland, Crown Estate.

Local partners: OIC, ICIT, OTFA, Cooke Aquaculture, Scottish Sea Farms.

Proposed actions:

1. Undertake a review of available literature on the pressures affecting Sea trout populations, to identify information gaps. **(Lead: OIC)**
2. Investigate the potential aims and scope of a population study to increase understanding of the abundance and distribution of Sea trout in Orkney coastal waters. **(Lead: OIC)**
3. Design and undertake a research study, which will help determine how sea lice burdens in wild Sea trout are influenced by proximity to farmed salmonid species in Orkney waters. **(Lead: OIC)**
4. Update Supplementary Guidance Aquaculture to take account of the findings of the project report. **(Lead: OIC)**
5. Take account of the findings of the project report in the State of the Environment Report for the forthcoming Orkney regional marine plan. **(Lead: OIC)**

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Marine Litter Action Plan

Marine litter is a global problem which poses an ever-increasing threat to the organisms which inhabit the world's marine environment. Much of the waste is resistant to degradation and, if not physically removed, accumulates year on year.

Plastic waste accounts for a large percentage of marine litter and causes harm to marine life in several ways. It can cause entanglement and drowning, or animals may eat it mistaking it for their usual prey species. Puffins, *Fratercula arctica,* have been recorded feeding plastic to their chicks.

Marine Litter at No. 1 barrier (photo: Eileen Summers)

Plastics are durable, lightweight, cheap and versatile and they have replaced many traditional materials such as metal, glass and wood. Unfortunately, these features also make them the most pervasive, persistent and hazardous form of litter in the marine environment. Plastics at sea break down much more slowly than plastics exposed to weathering on land, mainly because temperatures at sea are generally lower, and this slows down the degradation process; estimations of plastic degradation at sea range from 450 to 1,000 years. However, plastics may never fully degrade; they simply break down into smaller and smaller fragments and ultimately into microscopic plastic particles and fibres, becoming available to marine animals of all sizes, from giant whales to microscopic zooplankton. Once eaten, the fragments are not digested but instead remain in the stomach cavity, reducing the animal's capacity for food items and causing slow starvation. Chemicals leaching from plastic can become assimilated into the tissues of marine animals, accumulating in their fatty tissues and becoming more concentrated in higher levels of the food chain. Top predators such as whales, dolphins and seals are particularly vulnerable to bioaccumulation.

OSPAR monitors and assesses plastics in the stomachs of beached northern fulmars, *Fulmarus glacialis*, as one of its indicators of environmental quality. Fulmars are abundant and widespread seabirds known to regularly ingest litter. Although the birds forage near the water surface their stomachs may also contain items from deeper water, or items that may be indirectly ingested through their prey. Over 90% of Fulmars found dead around the North Sea have been found to have plastic in their stomachs and, currently, 58% have more than 0.1g of plastic in their stomachs, exceeding OSPAR's long-term goal of 10%. This reflects the abundance of floating litter in their environment. There has been no significant change in the amount of plastic in fulmar stomachs over the past ten years.

Orkney participates in the North Sea Fulmar Project with local volunteers collecting beached fulmar corpses. The project is enabled locally by RSPB, with dead fulmars stored at a storage facility at the Harbour Authority Buildings at Scapa prior to sending the birds to Wageningen University, Holland for analysis.

The Ellen McArthur Foundation is a registered charity which works with business, government and academia to accelerate the transition to a circular economy and stop plastics becoming waste and entering the ocean in the first place. A circular economy is an alternative to a traditional linear economy (make, use, dispose) in which we keep resources in use for as long as possible, extract the maximum value from them whilst in use, then recover and regenerate products and materials at the end of each service life. The Foundation has concluded that more than 8 million tonnes of plastics enter the ocean each year.

Current actions and opportunities

KIMO's Fishing for Litter is an initiative that aims to reduce marine litter by involving one of the key stakeholders, the fishing industry. Participating vessels are given hard-wearing bags to collect marine litter that is caught in their nets during normal fishing activities. Filled bags are deposited in participating harbours on the quayside where they are moved by harbour staff to a dedicated skip or bin for disposal. There

are currently 15 harbours participating in the scheme; these include Lerwick in Shetland and Scrabster in Caithness.

The Scottish Government launched Scotland's first Marine Litter Strategy in 2014. The Strategy aims to reduce litter entering the sea and recognises that any marine litter, including plastics poses a potential risk to the environment, economy and society. The Strategy includes continued support for the Fishing for Litter initiative.

Bag the Bruck is a local clean-up initiative which takes place annually during April. Around 50 beaches and shorelines are targeted by over 1,000 volunteers and over a period of 9 days many tonnes of litter are collected, bagged and removed for disposal. Established in 1993 by Environmental Concern Orkney (ECO), Bag the Bruck is now administered by members of another local group, Outdoor Orkney. The Council lends its support by picking up and disposing of the waste that is collected.

Bag the Bruck waste collected in Sanday (photo: Emma Neave-Webb)

Another scheme, Pick up 3 Pieces (PU3P), was started and continues to be led by Orkney schoolchildren who want to take responsibility for removing litter from local beaches. Founded in 2013, the scheme encourages people to pick up three pieces of litter whenever they visit a shore. The litter can be deposited in dedicated bins or, preferably, can be taken home for disposal.

More recently, Classes 6 and 7 at Glaitness Primary School have been learning about sustainability and how the goods we consume affect the environment. They have decided to follow in the footsteps of Ullapool Primary School whose initiative 'Nae Straw at Aw' has resulted in Ullapool becoming the first village in Scotland that is free of single use plastic straws. Class 6 have written to Orkney hotels, bars and cafes to invite them to end their use of single use plastic straws and offer a paper alternative or no straw at all to their customers. They have designed a poster that businesses can display in order to share with their customers their decision to take part in the 'Kirkwall's Last Straw' initiative.

When fishing gear has been lost, dumped or abandoned it continues to trap marine animals; this is described as ‘ghost fishing’. Nets, long lines, creels or any man-made devices designed to catch fish or shellfish are considered capable of ghost fishing when unattended. Caught fish die and in turn attract scavengers which may also become trapped, thus perpetuating the problem. Ghost Fishing UK runs an annual diving operation to remove underwater marine debris from Scapa Flow.

An Orcadians Going Green Facebook public group has been established which offers tips on more sustainable lifestyles and encourages people to collect marine litter.

Orkney Islands Council provides a variety of ways for residents and businesses to recycle waste. These include the provision of bins for the fortnightly collection of recyclate as well as a number of recycling centres. Information on what can and cannot be recycled is available from the Council’s website. A more recent development is the quarterly publication of ‘Garbology’, a newsletter on all things to do with recycling in Orkney.

During 2016 sediment samples taken from selected sandy beaches surrounding Scapa Flow were analysed for microplastic particles and fibres. Analysis of the samples found similar levels of microplastic contamination to those in samples from the Clyde and the Firth of Forth. The study concluded that relative remoteness and a comparatively small island population are not predictors of lower microplastic pollution. This is an on-going project, samples have been collected in 2016 (published manuscript) and in 2017 and 2018.

The North Isles Landscape Partnership Scheme (2018-2022) includes a project for an annual litter removal scheme on each of the populated North Isles.

Action plan objective:

Contribute towards national and international efforts to address marine litter.

Action plan target:

Establish annual litter removal schemes in each of the populated North Isles by 2019.

National agencies: SEPA, Clean-up Scotland, RSPB.

Local partners: OrkneyZeroWaste, Outdoor Orkney; OIC.

Proposed actions:

1. Continue to support local clean-up initiatives for the collection and disposal of marine litter. **(All)**
2. Establish an annual litter removal scheme on each of the populated North Isles. **(Lead: OIC)**
3. Support initiatives to reduce the non-essential usage of single-use products that contain plastics. **(All)**
4. Raise awareness on the collection of fulmar corpses for the North Sea plastics study. **(Lead: RSPB)**

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Ellen McArthur Foundation https://www.ellenmacarthurfoundation.org/

Ghost Fishing UK http://www.ghostfishing.org/

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North Sea Fulmar Project www.wur.eu/plastics-fulmars and https://www.wur.nl/en/Research-Results/Research-Institutes/marine-research/show-marine/Less-plastic-in-stomachs-of-fulmars.htm

Orcadians Going Green https://www.facebook.com/groups/1241526815991329/permalink/1252565354887475/

OSPAR: Plastic particles in fulmar stomachs in the North Sea https://oap.ospar.org/en/ospar-assessments/intermediate-assessment-2017/pressures-human-activities/marine-litter/plastic-particles-fulmar-stomachs-north-sea/

Pick Up 3 Pieces https://www.facebook.com/PickUpThreePieces/

Plastic waste and marine wildlife https://www.wur.nl/en/Research-Results/Research-Institutes/marine-research/show-marine/Plastic-waste-in-the-Sea.htm

Recycling in Orkney http://www.orkney.gov.uk/Service-Directory/R/Recycling.htm

WRAP and the circular economy http://www.wrap.org.uk/about-us/about/wrap-and-circular-economy

Marine Citizen Science Action Plan

Increasing numbers of people work in Orkney's marine environment, e.g. in the inshore fishing, aquaculture and marine renewables industries, and they are well placed to record sightings of marine species and their behavioural traits.

Fish Farm and other Marine activity (photo: Scottish Sea Farms)

The use of smart phones is widespread, offering opportunities to capture data in situ and send it to a central location. The Orkney Wildlife Information Advice and Records Centre (OWIARC) is the final destination for species records. Information received in this way could also form the basis for future MSc dissertation topics, e.g. for students studying at Heriot Watt's ICIT Stromness campus and could also contribute towards Knowledge Exchange targets.

A citizen science project such as this has potential to improve our understanding of species which are new to, or rare in Orkney, e.g. by recording evidence of any northwards progression of species due to warming sea conditions. It also has potential to improve our knowledge of more commonly seen species.

National agencies: SNH, Marine Scotland.

Local partners: ICIT, OIC.

Action plan objective:

Involve local people in conservation actions and increase awareness and appreciation of marine ecosystems.

Action plan target:

Devise a simple recording method that is usable in the setting of a working vessel at sea by 2019.

Proposed actions with partners:

1. Encourage members of the public to submit species records and observations to the Orkney Wildlife Information and Records Centre. **(OIC, ICIT)**

2. Devise a simple recording method that is usable in the setting of a working vessel at sea. **(OIC, ICIT)**
3. Create a key card identification guide and/or app for specific marine species. **(Lead: ICIT)**
4. Publicise the information collated in schools and at public events such as the Orkney Nature Festival. **(OIC, ICIT)**
5. Encourage public participation in local events such as the Orkney International Science Festival. **(OIC, ICIT)**

OIC Pilot Launch (photo: Orkney Islands Council)

Summary of the Orkney LBAP 2018-2022 actions

Greenspace

1. Endeavour to provide good access to natural and semi-natural environments around settlements through the Orkney Core Paths Plan. **(Lead: OIC)**
2. Identify areas for biodiversity enhancement through the Kirkwall Urban Design Framework, with links to information in the LBAP. **(Lead: OIC)**
3. Identify paths which would benefit from improved shelter, through planting trees and/or shrubs that are appropriate to the location and are beneficial for biodiversity. **(Lead: OIC)**
4. Create a list of nature-friendly plant species for the Council's Development Management team to provide to landscape architects for reference in the design of future developments. **(Lead: OIC)**
5. Make the list of nature-friendly plants available at public events such as Family Day at the Orkney International Science Festival. **(OIC, RSPB)**
6. Work with schools and community groups to identify and establish biodiversity enhancement projects in existing greenspaces. **(RSPB, OIC)**
7. Improve linkages between volunteering groups and opportunities, bringing together groups with suggestions for local projects. **(Lead: OIC)**
8. Make opportunities and contacts more visible to the public, as well as improving links with health and social enterprises. **(Lead: OIC)**
9. Prepare a pond creation guidance leaflet, adapting available guidance to suit an Orkney context. **(Lead: OIC)**
10. Engage with local plant growers / suppliers to investigate the feasibility of establishing a supply of wildflowers, including pond and wetland plants, grown from locally sourced seed. **(Lead: OIC)**
11. Support initiatives to reduce the non-essential usage of single-use products that contain plastics. **(All)**.

Farmland

1. Raise awareness of farming for biodiversity through the education system. **(RSPB, Orkney College, OIC)**
2. Promote the incorporation of low- or no-cost examples of biodiversity conservation and water protection measures into land management practices. **(SNH, SEPA, SGRPID, SAC).**
3. Ensure that good practice examples of biodiversity conservation and water protection measures on farms are highlighted in future farm open days and other training events. **(RSPB, SEPA, Orkney College).**
4. Continue to meet twice a year, as the Farmland Group, to discuss progress on the actions. **(SGRPID, SNH, SEPA, RSPB, NFUS, SAC).**

Peatland

1. Undertake a project to restore an area of degraded bog peatland. **(Lead: RSPB).**
2. Undertake peatland restoration advisory events. **(Lead: RSPB).**

3. Arrange an event promoting sustainable peat cutting practices. **(Lead: RSPB).**
4. Prepare advice on fire safety and discuss its incorporation into signage with the Scottish Fire Service and Orkney Local Access Forum. **(Lead: OIC)**
5. Raise awareness of the biodiversity of *Upland heathland*, e.g. by upgrading the on-site interpretation facilities at Mull Head Local Nature Reserve. **(Lead: OIC).**

The Marine Environment

1. Undertake a predictive modelling study to identify areas within Orkney coastal waters that have potential to support *Flame shell beds***. (Lead: ICIT)**
2. Undertake a ground truthing project in areas predicted to support *Flame shell beds* and map the distribution and extent of beds found to be present. **(Lead: ICIT)**
3. Take account of any new data on *Flame shell bed* distribution in the State of the Environment Report for the forthcoming Orkney Regional Marine Plan. **(Lead: OIC)**
4. Identify indicator species supported by *Flame shell beds* for further research and monitoring, in order to improve knowledge and understanding of the habitat, including its capacity for blue carbon storage. **(Lead: ICIT)**
5. Identify a list of potential MSc dissertation projects or MPhil research topics relating to *Flame shell beds*. **(Lead: ICIT)**
6. Continue to map the distribution, extent and depth of *Maerl beds* in Orkney, through collaboration with the Seasearch volunteer project**. (Lead: Seasearch coordinator)**
7. Develop a virtual dive project for the Nature Conservation Marine Protected Areas of the North Isles. **(Lead: OIC)**
8. Develop a method for estimating the storage of blue carbon in the Wyre and Rousay Sounds MPA. **(Lead: ICIT)**
9. Identify a list of potential MSc dissertation projects and/or MPhil research topics relating to *Maerl beds*. **(Lead: ICIT)**
10. Build on the findings of previous *Zostera* studies, through ground truthing projects, to determine the distribution and extent of *Seagrass beds* in Orkney. **(Lead: ICIT).**
11. Take account of any new data on *Seagrass bed* distribution in the State of the Environment Report for the forthcoming Orkney Regional Marine Plan. **(Lead: OIC).**
12. Identify indicator species supported by *Seagrass beds*, for further research and monitoring. **(Lead: ICIT).**
13. Undertake surveys to explore the potential presence of non-native species, e.g. *Diadumene lineata*, the orange striped green sea anemone. **(Lead: ICIT).**
14. Identify a list of potential MSc dissertation projects or MPhil research topics relating to *Seagrass beds*. **(Lead: ICIT).**
15. Undertake a tag and release project for Flapper skate within North Isles waters. **(Lead: OIC)**
16. Undertake a project to record Flapper skate egg cases found on North Isles shorelines. **(Lead: OIC)**

17. Continue to collect and collate data on Flapper skate from other areas of Orkney by:
    a. Recording egg cases, both in situ and washed ashore.
    b. Recording skate sightings reported by seafarers, divers and detected by remote underwater cameras. **(Lead: Orkney Skate Trust)**
18. Continuing the tag and release project throughout other parts of Orkney, with increased focus on Scapa Flow. **(Lead: Orkney Skate Trust)**
19. Undertake habitat surveys of areas displaying higher densities of Flapper skate records, as part of targeted surveys by SCUBA divers and the use of remote video technology. **(Lead: Orkney Skate Trust)**
20. Continue to develop a DNA database for Flapper skate populations in Orkney, using tissue from adult captures and stranded egg cases containing embryos. **(Lead: Orkney Skate Trust)**
21. Undertake a review of available literature on the pressures affecting Sea trout populations, to identify information gaps. **(Lead: OIC)**
22. Investigate the potential aims and scope of a population study to increase understanding of the abundance and distribution of Sea trout in Orkney coastal waters. **(Lead: OIC)**
23. Design and undertake a research study, which will help determine how sea lice burdens in wild Sea trout are influenced by proximity to farmed salmonid species in Orkney waters. **(Lead: OIC)**
24. Update Supplementary Guidance Aquaculture to take account of the findings of the project report. **(Lead: OIC)**
25. Take account of the findings of the project report in the State of the Environment Report for the forthcoming Orkney regional marine plan. **(Lead: OIC)**
26. Continue to support local clean-up initiatives for the collection and disposal of marine litter. **(All)**
27. Establish an annual litter removal scheme on each of the populated North Isles. **(Lead: OIC)**
28. Support initiatives to reduce the non-essential usage of single-use products that contain plastics. **(All)**
29. Raise awareness on the collection of fulmar corpses for the North Sea plastics study. **(Lead: RSPB)**
30. Encourage members of the public to submit species records and observations to the Orkney Wildlife Information and Records Centre. **(OIC, ICIT)**
31. Devise a simple recording method that is usable in the setting of a working vessel at sea. **(OIC, ICIT)**
32. Create a key card identification guide and/or app for specific marine species. **(Lead: ICIT)**
33. Publicise the information collated in schools and at public events such as the Orkney Nature Festival. **(OIC, ICIT)**
34. Encourage public participation in local events such as the Orkney International Science Festival. **(OIC, ICIT)**

Section 3: Appendices

Appendix I: Relevant plans and strategies and recently introduced environmental legislation

The land use planning system

The planning system is used to make decisions about the future development of land in our towns, settlements and the wider countryside. It considers where development should happen and where it should not, as well as how development affects its surroundings. The system balances different interests to make sure that land is used and developed in a way that creates high quality, sustainable places.[8] Key planning outcomes for Scotland are:

- A successful **sustainable place** supporting economic growth, regeneration and the creation of well-designed places;
- A **natural resilient place** – helping to protect and enhance our natural and cultural assets and facilitating their sustainable use;
- A **low carbon place** – reducing our carbon emissions and adapting to climate change;
- A **connected place** – supporting better transport and digital connectivity.

There are three main parts to the planning system:

Development Plans set out how places should change into the future.

Development Management is the process for making decisions on planning applications in line with the policies and proposals of the Development Plan.

Enforcement is the process which makes sure that development is carried out correctly, and which can be used to take action when it has not.

The Council has a statutory duty to prepare a Local Development Plan (LDP) which establishes its policies and proposals for the use and development of land in Orkney over a five-year period and beyond. The current Orkney Local Development Plan covers the period 2017 until 2021 and may be accessed from the Council website at http://www.orkney.gov.uk/Service-Directory/O/Orkney-Local-Development-Plan.htm

The LDP includes policies on Natural heritage designations; Protected species; Wider biodiversity and geodiversity; The water environment; Peat and soils; and Trees and woodland. Additional information to help planning stakeholders fully consider the wildlife and environmental implications of proposals which require planning permission is provided in Supplementary Guidance *Natural Environment* at http://www.orkney.gov.uk/Service-Directory/D/natural-environment.htm

[8] The planning system in Scotland. https://beta.gov.scot/policies/planning-architecture/

The marine planning system

Scotland's National Marine Plan was published in 2015; its vision is for '*Clean, Healthy, Safe, Productive and Biologically Diverse marine and coastal environments, managed to meet the long-term needs of nature and people***.**' A suite of marine habitats and species, classed as Priority Marine Features (PMF) has been identified which forms a basis for enabling the management of Scotland's seas so that they can continue to be biologically diverse.

Recent developments in marine environmental legislation

In July 2014, Scottish Ministers designated a suite of 30 Nature Conservation Marine Protected Areas (NCMPA), using powers granted under the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009. The NCMPA network in Scotland's seas is designed to conserve a selection of marine habitats and species and geodiversity (the variety of landforms and natural processes that underpin marine landscapes). Orkney has three NCMPAs – the Wyre and Rousay Sounds and Papa Westray sites are within 12 nautical miles of the coast and North-west Orkney NCMPA is an offshore site.[9]

During 2016 the Scottish Government consulted on 15 new proposed Special Protection Areas (pSPA) in Scottish waters, three of which are located around Orkney; these are the Pentland Firth pSPA, Scapa Flow pSPA, and North Orkney pSPA. These marine areas are identified as being important foraging areas for many of our breeding seabirds as well as migratory birds that return each year, in some cases travelling thousands of miles to over-winter.[10]

The Pilot Pentland Firth and Orkney Waters Marine Spatial Plan was adopted in 2016. Developed jointly by Marine Scotland, Orkney Islands Council and Highland Council the Plan sets out an integrated planning policy framework to guide marine development, activities and management decisions, whilst ensuring the quality of the marine environment is protected. The Plan is used by the Marine Scotland Licensing Operations Team as a material consideration in the determination of marine licensing and section 36 consent applications within the Pentland Firth and Orkney Waters area and is also used by Orkney Islands Council in the determination of Works Licence applications.

Regional marine planning is slowly being rolled out across the 11 Scottish Marine Regions. It is intended that a Marine Planning Partnership will be established in each region with responsibility for preparing a statutory regional marine plan. Work is currently underway to establish an Orkney Islands Marine Planning Partnership to develop a future Orkney Islands Regional Marine Plan which will be used to determine development proposals in the marine environment from Mean High Water Springs out to12 nautical miles. Once the appropriate governance and resourcing arrangements are in place, the first step in the plan making process will be to

[9] https://www.nature.scot/professional-advice/safeguarding-protected-areas-and-species/protected-areas/national-designations/marine-protected-areas/scotlands-marine-protected

[10] http://www.gov.scot/Topics/marine/marine-environment/mpanetwork/marinespas

produce a State of the Environment report. This will provide a baseline analysis of what is currently known about the marine environment of our local coastal waters.

Community planning

Every local authority area in Scotland is required to have a community planning partnership. Community planning involves councils and other public bodies working with local communities, businesses, charities and voluntary groups. Together they plan and co-ordinate action and resources to deliver better services to improve the lives of local people.

The Orkney Partnership is the lead body for joint working in Orkney. The Orkney Partnership Board is at the centre of the structure and has oversight of its shared challenges. It is assisted by an Executive Group, while three Delivery Groups lead each of the Board's strategic priorities:

- Strong Communities.
- Living Well
- Vibrant Economy

The Orkney Partnership Board members are:

The Orkney Community Plan 2017-2020 describes what the Partnership aims to achieve, working together, over and above what is achievable as individual organisations. It also incorporates the Local Outcomes Improvement Plan that has been agreed with the Scottish Government. The Community Plan shares a vision with Orkney's Local Development Plan:

"*By 2030, Orkney will be a first-choice location for people to live and work. Orkney will have nationally significant training and investment opportunities. Orkney will attract visitors from around the world to admire its natural environment, heritage and cutting-edge business and industrial facilities. Above all, Orkney will be the place to enjoy and exceptional quality of life, a fulfilling career and a sustainable lifestyle*."

River Basin Management Planning

River Basin Management Planning (RBMP) protects and improves Scotland's water environment for the benefit of people, wildlife and the economy. In Scotland, two areas are identified through RBMP – the Scotland river basin district and the Solway Tweed river basin district. Orkney forms part of the Scotland river basin district[11].

Much of the water environment in Scotland is in good condition. However, there are still significant problems affecting water quality, physical condition, water flows and levels and the migration of wild fish. Invasive non-native species are also damaging aquatic plant and animal communities. The river basin management plans set out a range of actions to address those impacts.

The plans are produced every six years by SEPA on behalf of the Scottish Government. They cover actions for all responsible authorities in Scotland and summarise:

- The state of the water environment
- Pressures affecting the quality of the water environment, where it is in less than good condition;
- Actions to protect and improve the water environment.
- A summary of outcomes following implementation.

The current river basin management plan for the Scotland river basin district covers the period 2015-2027. It identifies areas where Orkney's water environment is under pressure, as well as proportionate actions that will be taken to address these pressures. Implementation of these actions will support and enhance biodiversity.

Biodiversity and rural development policy

The Scottish Rural Development Programme 2014-2020[12] delivers Pillar 2 of the EU Common Agricultural Policy (CAP). It funds economic, environmental and social measures for the benefit of rural Scotland. The key purpose of the SRDP is to achieve sustainable economic growth in Scotland's rural areas and its main priorities are:

- Enhancing the rural economy.
- Supporting agricultural and forestry businesses.
- Protecting and improving the natural environment.

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[11] Scotland River Basin Management Plan 2015-2018 https://www.sepa.org.uk/media/163445/the-river-basin-management-plan-for-the-scotland-river-basin-district-2015-2027.pdf

[12] http://www.gov.scot/Topics/farmingrural/SRDP

- Addressing the impact of climate change.
- Supporting rural communities.

The Agri-Environment Climate Scheme (AECS), forms part of Pillar 2 and provides farmers with support payments which are conditional on adherence to the guidelines for each management option. The current SRDP will include at least one more round of AECS applications and five years funding will then be available, going forward.

Following the United Kingdom's exit from the European Union, the long-term future of agricultural support payments remains uncertain.

National strategies which influence biodiversity

Scotland's Land Use Strategy

Scotland's Land Use Strategy[13] is a key commitment of Section 57 of the Climate Change (Scotland) Act 2009. A first Strategy was laid in Parliament in 2011 with a requirement that this is reviewed every five years. The use of an ecosystems approach has been more widely promoted, following publication in 2011 of an information note on Applying an Ecosystems Approach to Land Use. This note summarises three key steps which are important when using an ecosystems approach:

- Considering natural systems.
- Taking account of the services, that ecosystems provide; and
- Involving people.

Following a period of review and consultation the Land Use Strategy 2016-2021 was published in March 2016. This, the second Strategy, retains the long-term Vision; three objectives relating to the economy, environment and communities; and the suite of ten Principles for Sustainable Land Use to guide policy and decision making. It contains activities for the 5-year period, including themes such as agriculture, Scottish Rural Development Programme, forestry and the uplands, as well as land use decision-making at a local level.

The Scottish Pollinator Strategy

Pollinators are an integral part of our biodiversity. If we lose the pollination services provided by insects such as bees and flies, we risk damaging not only plants and animals but agricultural yields, our economy and our well-being. However, many of our pollinators are under threat. Current pressures include land-use changes, land management, pesticides, pollution, invasive non-native species, diseases and climate change[14].

[13] http://www.gov.scot/Topics/Environment/Countryside/Landusestrategy

[14] IPBES. (2016). Summary for policymakers of the assessment report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services on pollinators, pollination and food production. Bonn, Germany.

The Technical Annex to the Pollinator Strategy for Scotland 2017-2027[15] sets out the evidence currently available on threats to Scotland's pollinators (the honey bee, species of bumblebee, solitary bee and hoverfly) and declines in their abundance or distribution.

The Strategy provides Scotland's response to these threats and identifies five objectives:

- To make Scotland more pollinator friendly, halting and reversing the decline in native pollinator populations.
- To improve our understanding of pollinators and their pollinating service.
- To manage the commercial use of pollinators to benefit native pollinators.
- To raise awareness and encourage action across sectors.
- To monitor and evaluate whether pollinators are thriving.

The associated Implementation Plan sets out the key activities, projects and initiatives that are needed in Scotland to deliver a healthy future for pollinators.

[15] https://www.nature.scot/pollinator-strategy-2017-2027

Appendix II: Species considered to be of conservation concern in Orkney

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
VERTEBRATES				
Mammals				
Apodemus sylvaticus.	Wood mouse.	Terrestrial mammal.	No.	No.
Balaenoptera acutorostrata (baleen whales group).	Minke whale.	Sea mammal.	Yes.	Yes.
Balaenoptera borealis.	Sei whale.	Sea mammal.	Yes.	Yes.
Balaenoptera musculus.	Blue whale.	Sea mammal.	Yes.	Yes.
Balaenoptera physalus.	Fin whale.	Sea mammal.	Yes.	Yes.
Delphinus delphis (small dolphins group).	Common dolphin.	Sea mammal.	Yes.	Yes.
Erinaceus europus.	West European hedgehog.	Terrestrial mammal.	Yes.	Yes.
Globicephala melas (toothed whales group).	Long-finned pilot whale.	Sea mammal.	Yes.	Yes.
Grampus griseus (small dolphins group).	Risso's dolphin.	Sea mammal.	Yes.	Yes.
Halichoerus grypus.	Grey seal.	Sea mammal.	No.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Hyperoodon ampullatus.	Northern bottlenose whale.	Sea mammal.	Yes.	Yes.
Lagenorhynchus acutus (small dolphins group).	Atlantic white-sided dolphin.	Sea mammal.	Yes.	Yes.
Lagenorhynchus albirostris (small dolphins group).	White-beaked dolphin.	Sea mammal.	Yes.	Yes.
Lepus europaeus.	Brown hare.	Terrestrial mammal.	Yes.	Yes.
Lepus timidus.	Mountain hare.	Terrestrial mammal.	Yes.	Yes.
Lutra lutra lutra.	European otter.	Terrestrial mammal.	Yes.	Yes.
Megaptera novaeangliea.	Humpback whale.	Sea mammal.	Yes.	Yes.
Mesoplodon bidens.	Sowerby's beaked whale.	Sea mammal.	Yes.	Yes.
Microtus arvalis orcadensis.	Orkney vole.	Terrestrial mammal.	Yes.	No.
Neomys fodiens.	Water shrew.	Terrestrial mammal.	No.	No.
Orcinus orca (toothed whales group).	Killer whale.	Sea mammal.	Yes.	Yes.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Phoca vitulina.	Common seal.	Sea mammal.	Yes.	Yes.
Phocoena phocoena.	Harbour porpoise.	Sea mammal.	Yes.	Yes.
Physeter catodon (toothed whales group).	Sperm whale.	Sea mammal.	Yes.	Yes.
Pipistrellus nathusii.	Nathusius' pipistrelle bat.	Terrestrial mammal.	Yes.	No.
Pipistrellus pipistrellus.	Pipistrelle bat.	Terrestrial mammal.	Yes.	No.
Plecotus auritus.	Brown long-eared bat.	Terrestrial mammal.	Yes.	Yes.
Rattus rattus.	Black rat, ship rat.	Terrestrial mammal.	Yes.	No.
Sorex minutus.	Pygmy shrew.	Terrestrial mammal.	No.	No.
Stenella coeruleoalba.	Striped dolphin.	Sea mammal.	Yes.	Yes.
Tursiops truncates.	Bottle-nosed dolphin.	Sea mammal.	Yes.	Yes.
Ziphius cavirostris.	Cuvier's beaked whale.	Sea mammal.	Yes.	Yes.
Amphibians				
Bufo bufo.	Common toad.	Amphibian.	Yes.	Yes.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Fishes				
Anguilla Anguilla.	European eel.	Bony fish.	Yes.	Yes.
Ammodytes marinus.	Lesser sandeel.	Bony fish.	Yes.	Yes.
Ammodytes tobianus.	Lance sandeel.	Bony fish.	Yes.	No.
Brosme brosme.	Torsk.	Bony fish.	No.	No.
Cetorhinus maximus.	Basking shark.	Shark/skate/ray.	Yes.	Yes.
Clupea harengus (commercial marine fish group).	Herring.	Bony fish.	Yes.	Yes.
Dipturus cf. intermedia.	Flapper skate.	Shark/skate/ray.	Yes.	Yes.
Gadus morhua.	Cod.	Bony fish.	Yes.	Yes.
Hippoglossus hippoglossus.	Atlantic halibut.	Bony fish.	Yes.	Yes.
Lamna nasus.	Porbeagle shark.	Shark/skate/ray.	Yes.	Yes.
Leucoraja naevus.	Cuckoo ray.	Shark/skate/ray.	No.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Lophius piscatorius.	Angler fish, Sea monkfish.	Bony fish.	Yes	Yes.
Merlangius merlangus.	Whiting.	Bony fish.	Yes.	Yes.
Merluccius merluccius.	European hake.	Bony fish.	Yes.	Yes.
Molva molva.	Ling.	Bony fish.	Yes.	Yes.
Pleuronectes platessa.	Plaice.	Bony fish.	Yes.	Yes.
Pomatoschistus minutus.	Sand goby.	Bony fish.	No.	No.
Prionace glauca.	Blue shark.	Shark/skate/ray.	Yes.	Yes.
Raja clavate.	Thornback ray.	Shark/skate/ray.	Yes.	No.
Salmo salar.	Atlantic salmon.	Bony fish.	Yes.	Yes.
Salmo trutta.	Brown / sea trout.	Bony fish.	Yes.	Yes.
Scomber scombrus.	Atlantic mackerel.	Bony fish.	Yes.	Yes.
Sebastes viviparous.	Norway haddock.	Bony fish.	Yes.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Squalus acanthias.	Spiny dogfish, spurdog .	Shark/skate/ray.	Yes.	Yes.
Squatina squatina.	Monkfish, angel shark.	Shark/skate/ray.	Yes.	Yes.
Trisopterus esmarkii.	Norway pout.	Bony fish.	Yes.	No.
Reptiles				
Caretta caretta.	Loggerhead turtle.	Turtle.	Yes.	Yes.
Dermochelys coriacea (marine turtles group).	Leatherback turtle.	Turtle.	Yes.	Yes.
Birds				
Accipiter nisus.	Sparrowhawk.	Bird.	No.	No.
Acrocephalus pallustris.	Marsh warbler.	Bird.	Yes.	Yes.
Acrocephalus schoenobaenus.	Sedge warbler.	Bird.	No.	No.
Alauda arvensis.	Skylark.	Bird.	Yes.	Yes.
Alca torda.	Razorbill.	Bird.	No.	No.
Anas acuta.	Pintail.	Bird.	No.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Anas clypeata.	Shoveler.	Bird.	No.	No.
Anas crecca.	Teal.	Bird.	No.	No.
Anas Penelope.	Wigeon.	Bird.	No.	No.
Anas platyrhynchos.	Mallard.	Bird.	No.	No.
Anas querquedula.	Garganey.	Bird.	Yes.	No.
Anas Strepera.	Gadwall.	Bird.	No.	No.
Anser albifrons subspecies *flavirostris.*	Greenland white-fronted goose.	Bird.	Yes.	Yes.
Anser anser.	Greylag goose.	Bird.	No.	No.
Anser fabalis.	Bean goose.	Bird.	Yes.	No.
Anthus petrosus.	Rock pipit.	Bird.	No.	No.
Anthus pratensis.	Meadow pipit.	Bird.	No.	No.
Aquilla chrysaetos.	Golden eagle.	Bird.	Yes.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Arenaria interpres.	Turnstone.	Bird.	No.	No.
Asio flammeus.	Short-eared owl.	Bird.	Yes.	No.
Asio otus.	Long-eared owl.	Bird.	No.	No.
Aythya farina.	Pochard.	Bird.	Yes.	No.
Aythya fuligula.	Tufted duck.	Bird.	No.	No.
Aythya marila.	Greater scaup.	Bird.	Yes.	Yes.
Branta leucopsis.	Barnacle goose.	Bird.	Yes.	No.
Bucephala clangula.	Goldeneye.	Bird.	No.	No.
Buteo buteo.	Buzzard.	Bird.	No.	No.
Calidris alba.	Sanderling.	Bird.	No.	No.
Calidris alpine.	Dunlin.	Bird.	Yes.	No.
Calidris maritima.	Purple sandpiper.	Bird.	Yes.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Carduellis cannabina.	Linnet.	Bird.	Yes.	Yes.
Carduellis chloris.	Greenfinch.	Bird.	No.	No.
Carduellis flavirostris.	Twite.	Bird.	Yes.	Yes.
Carduellis spinus.	Siskin.	Bird.	Yes.	No.
Cepphus grille.	Black guillemot.	Bird.	No.	No.
Charadrius hiaticula.	Ringed plover.	Bird.	No.	No.
Circus aeruginosus.	Marsh harrier.	Bird.	Yes.	No.
Circus cyaneus.	Hen harrier.	Bird.	Yes.	No.
Clangula hyemalis.	Long-tailed duck.	Bird.	No.	No.
Coturnix coturnix.	Quail.	Bird.	No.	No.
Corvus corax.	Raven.	Bird.	No.	No.
Corvus cornix.	Hooded crow.	Bird.	Yes.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Corvus monedula.	Jackdaw.	Bird.	No.	No.
Crex crex.	Corncrake.	Bird.	Yes.	Yes.
Cygnus Cygnus.	Whooper swan.	Bird.	Yes.	No.
Cygnus olor.	Mute swan.	Bird.	No.	No.
Delichon urbica.	House martin.	Bird.	No.	No.
Emberiza schoeniclus.	Reed bunting.	Bird.	Yes.	Yes.
Erithacus rubecula.	Robin.	Bird.	No.	No.
Falco columbarius.	Merlin.	Bird.	Yes.	No.
Falco peregrinus.	Peregrine.	Bird.	Yes.	No.
Falco tinnunculus.	Kestrel.	Bird.	Yes.	No.
Fratercula arctica.	Puffin.	Bird.	No.	No.
Fringilla montifringilla.	Brambling.	Bird.	Yes.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Fulmarus glacialis.	Fulmar.	Bird.	No.	No.
Gallinago gallinago.	Snipe.	Bird.	No.	No.
Gavia arctica.	Black-throated diver.	Bird.	Yes.	Yes.
Gavia immer.	Great northern diver.	Bird.	Yes.	No.
Gavia stellata.	Red-throated diver.	Bird.	Yes.	No.
Haematopus ostralegus.	Oystercatcher.	Bird	No	No
Haliaeetus albicilla	White-tailed eagle	Bird	Yes	No
Hirundo rustica	Swallow	Bird	No	No
Hydrobates pelagicus	Storm petrel	Bird	Yes	No
Lagopus lagopus	Willow ptarmigan	Bird	No	No
Lagopus lagopus scoticus	Red Grouse	Bird	Yes	Yes
Larus argentatus	Herring gull	Bird	Yes	Yes

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Larus canus.	Common gull.	Bird.	No.	No.
Larus fuscus.	Lesser black-backed gull.	Bird.	No.	No.
Larus marinus.	Great black-backed gull.	Bird.	No.	No.
Larus ridibundus.	Black-headed gull.	Bird.	Yes.	No.
Limosa lapponica.	Bar-tailed godwit.	Bird.	Yes.	No.
Limosa limosa.	Black-tailed godwit.	Bird.	Yes.	Yes.
Melanitta fusca.	Velvet scoter.	Bird.	No.	No.
Mergus serrator.	Red-breasted merganser.	Bird.	No.	No.
Miliaria calandra subsp. *calandra / clanceyi.*	Corn bunting.	Bird.	Yes.	Yes.
Morus bassanus.	Gannet.	Bird.	No.	No.
Motacilla alba.	Pied wagtail.	Bird.	No.	No.
Numenius arquata.	Curlew.	Bird.	Yes.	Yes.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Numenius phaeopus.	Whimbrel.	Bird.	No.	No.
Oceanodroma leucorhoa.	Leach's petrel.	Bird.	Yes.	No.
Oenanthe oenanthe.	Wheatear.	Bird.	No.	No.
Phalacrocorax aristotelis.	Shag.	Bird.	No.	No.
Phalacrocorax carbo.	Cormorant.	Bird.	No.	No.
Phalaropus lobatus.	Red-necked phalarope.	Bird.	Yes.	Yes.
Phylloscopus trochilus.	Willow warbler.	Bird.	No.	No.
Plectrophenax nivalis.	Snow bunting.	Bird.	Yes.	No.
Pluvialis apricaria.	Golden plover.	Bird.	Yes.	No.
Podiceps auritus.	Slavonian grebe.	Bird.	Yes.	No.
Podiceps grisegena.	Red-necked grebe.	Bird.	Yes.	No.
Porzana porzana.	Spotted crake.	Bird.	Yes.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Prunella modularis.	Dunnock.	Bird.	No.	No.
Puffinus puffinus.	Manx shearwater.	Bird.	Yes.	No.
Rallus aquaticus.	Water rail.	Bird.	No.	No.
Regulus regulus.	Goldcrest.	Bird.	No.	No.
Riparia riparia.	Sand martin.	Bird.	No.	No.
Rissa tridactyla.	Kittiwake.	Bird.	No.	No.
Saxicola torquata.	Stonechat.	Bird.	No.	No.
Scolopax rusticola.	Woodcock.	Bird.	Yes.	No.
Somateria mollissima.	Eider.	Bird.	No.	No.
Stercorarius parasiticus.	Arctic skua.	Bird.	Yes.	Yes.
Stercorarius skua.	Great skua.	Bird.	No.	No.
Sterna albifrons.	Little tern.	Bird.	Yes.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Sterna hirundo.	Common tern.	Bird.	Yes.	No.
Sterna paradisaea.	Arctic tern.	Bird.	Yes.	No.
Sterna sandvicensis.	Sandwich tern.	Bird.	Yes.	No.
Sturnus vulgaris.	Common starling.	Bird.	Yes.	Yes.
Tadorna tadorna.	Shelduck.	Bird.	No.	No.
Tachybaptus ruficollis.	Little grebe.	Bird.	No.	No.
Tringa totanus.	Redshank.	Bird.	No.	No.
Turdus iliacus.	Redwing.	Bird.	Yes.	No.
Turdus philomelos.	Song thrush.	Bird.	Yes.	Yes.
Uria aalge.	Guillemot.	Bird.	No.	No.
Vanellus vanellus.	Lapwing.	Bird.	Yes.	Yes.
INVERTEBRATES				

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Ants				
Myrmica ruginodis.	A red ant.	Ant.	No.	No.
Bees				
Bombus distinguendus.	Great yellow bumblebee.	Bee.	Yes.	Yes.
Bombus muscorum.	Heath carder.	Bee.	Yes.	Yes.
Andrena tarsal.	Tormentil mining bee.	Bee.	Yes.	Yes.
Wasps				
Dolichovespula sylvestris.	Tree wasp.	Wasp.	No.	No.
Dolichovespula norvegicus.	Norwegian wasp.	Wasp.	No.	No.
Paravespula vulgaris.	Common wasp.	Wasp.	No.	No.
Nematus stichi.	A sawfly.	Sawfly.	No.	No.
Beetles				

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Agabus paludosus.	A water beetle.	Beetle.	No.	No.
Apion ryei.	A weevil.	Beetle.	No.	No.
Brychius elevates.	Crawling water beetle.	Beetle.	No.	No.
Cercyon depressus.	A water beetle.	Beetle.	Yes.	No.
Cercyon melanocephalus.	A water beetle.	Beetle.	Yes.	No.
Cercyon quisquilius.	A water beetle.	Beetle.	Yes.	No.
Chaetarthria seminulum.	A scavenger water beetle.	Beetle.	No.	No.
Choleva glauca.	Fungus beetle.	Beetle.	No.	No.
Chrysolina crassicornis.	A leaf beetle.	Beetle.	No.	No.
Coelambus novemlineatus.	A water beetle.	Beetle.	No.	No.
Cryptopleurum minutum.	A water beetle.	Beetle.	Yes.	No.
Elodes minuta.	A water beetle.	Beetle.	Yes.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Enochrus quadripunctatus.	A water beetle.	Beetle.	Yes.	No.
Helophorus griseus.	A water beetle.	Beetle.	Yes.	No.
Hybius aenescens.	A water beetle.	Beetle.	No.	No.
Hydraena britteni.	A small water beetle.	Beetle.	No.	No.
H. gracilis.	A water beetle.	Beetle.	No.	No.
Hydrophilus piceus.	Great silver water beetle.	Beetle.	No.	No.
Hydroporus longicornis.	A water beetle.	Beetle.	No.	No.
Hydroporus melanarius.	A water beetle.	Beetle.	No.	No.
Hydroporus obsoletus.	A water beetle.	Beetle.	No.	No.
Hydroporus umbrosus.	A water beetle.	Beetle.	No.	No.
Notiophilis rufipes.	A ground beetle.	Beetle.	No.	No.
Pelophila borealis.	A ground beetle.	Beetle.	No.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Potamonectes griseostriatus.	A water beetle.	Beetle.	No.	No.
Rhagonycha elongate.	A soldier beetle.	Beetle.	No.	No.
Stictonectes Lepidus.	A water beetle.	Beetle.	No.	No.
Trechus fulvus.	A ground beetle.	Beetle.	No.	No.
Tropiphorus terricola.	Brown weevil.	Beetle.	No.	No.
Butterflies				
Argynnis aglaja scotica.	Dark green fritillary.	Butterfly.	No.	No.
Coenonympha tulia.	Large heath.	Butterfly.	Yes.	Yes.
Polyommatus Icarus.	Common blue.	Butterfly.	No.	No.
Caddis flies				
Ylodes reuteri.	A caddis fly.	Caddis fly.	No.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Damselflies and Dragonflies				
Aeshna juncea.	Common hawker.	Dragonfly.	No.	No.
Cordulegaster boltonii.	Golden-ringed dragonfly.	Dragonfly.	No.	No.
Enallagma cyathigerum.	Common blue damselfly.	Damselfly.	No.	No.
Ischnura elegans.	Blue-tailed Damselfly.	Damselfly	No.	No.
Libellula quadrimaculata.	Four-spotted chaser.	Dragonfly	No.	No.
Pyrrhosoma nymphula.	Large red damselfly.	Damselfly.	No.	No.
Sympetrum danae.	Black darter.	Dragonfly.	No.	No.
Mayflies				
Baetis muticus.	A mayfly.	Mayfly.	No.	No.
Siphlonurus lacustris.	A mayfly.	Mayfly.	No.	No.
Flies				

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Aphrosylus raptor.	A dolichopodid fly.	Fly.	No.	No.
Delia caledonica.	A fly.	Fly.	No.	No.
Neoascia geniculate.	A hoverfly.	Fly.	No.	No.
Neoascia obliqua.	A hoverfly.	Fly.	No.	No.
Orthonevra geniculate.	A hoverfly.	Fly.	No.	No.
Platycheirus podagratus.	A hoverfly.	Fly.	No.	No.
Rhamphomyia morio.	A fly.	Fly.	No.	No.
Tipula limbate.	A cranefly.	Fly.	Yes.	No.
Stoneflies				
Dinocras cephalotes.	A stonefly.	Fly.	No.	No.
Grasshoppers				

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Chorthippus parallelus.	A meadow grasshopper.	Grasshopper.	No.	No.
Omcestus viridulus.	Common green grasshopper.	Grasshopper.	No.	No.
Tetrix undulata.	A grasshopper.	Grasshopper.	No.	No.
Moths				
Agrotis vestigialis.	Archer's dart.	Moth.	No.	No.
Amphipoea oculea.	Ear moth.	Moth.	Yes.	Yes.
Amphipyra tragopoginis.	Mouse moth.	Moth.	Yes.	Yes.
Apamea zeta assimilis.	Northern arches.	Moth.	No.	No.
Apamea remissa.	Dusky brocade.	Moth.	Yes.	Yes.
Aporophyla lutulenta.	Northern deep-brown dart.	Moth.	No.	Yes.
Arctia caja.	Garden tiger.	Moth.	Yes.	Yes.
Brachylomia viminalis.	Minot shoulder-knot.	Moth.	Yes.	Yes.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Carsia sororiata anglica.	Manchester treble-bar.	Moth.	No.	No.
Celaenia haworthii.	Haworth's minor.	Moth.	Yes.	Yes.
Chesias legatella.	The streak.	Moth.	Yes.	Yes.
Ecliptopera silaceata.	Small phoenix.	Moth.	Yes.	Yes.
Entephria caesiata.	Grey mountain carpet.	Moth.	Yes.	Yes.
Entephria flavicinctata.	Yellow-ringed carpet.	Moth.	No.	No.
Eudonia alpine.	A moth.	Moth.	No.	No.
Eupithecia venosata ochraceae.	Netted pug.	Moth.	No.	No.
Euxoa cursorial.	Coast dart.	Moth.	No.	No.
Dasypolia temple.	Brindled ochre.	Moth.	Yes.	Yes.
Diarsia mendica orkneyensis.	Ingrailed clay.	Moth.	No.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Diarsia rubi.	Small square-spot.	Moth.	Yes.	Yes.
Dyscia fagaria.	Grey scalloped bar.	Moth.	No.	No.
Graphiphora augur.	Double dart.	Moth.	Yes.	Yes.
Hepialus humili.	Ghost moth.	Moth.	Yes.	Yes.
Hydraecia micacea.	Rosy rustic.	Moth.	Yes.	Yes.
Mesoligia literosa.	Rosy minor.	Moth.	Yes.	Yes.
Orthonama vittata.	Oblique carpet.	Moth.	Yes.	Yes.
Orthosia gracilis.	Powdered quaker.	Moth.	Yes.	Yes.
Parasemia plantaginis insularum.	Wood tiger.	Moth.	No.	No.
Perizoma flavofasciata.	Sandy Carpet.	Moth.	No.	No.
Psyche casta.	A moth.	Moth.	No.	No.
Saturnia pavonia.	Emperor.	Moth.	No.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Scotopteryx xhenopodiata.	Shaded broad-bar.	Moth.	Yes.	Yes.
Spilosoma lubricipeda.	White ermine.	Moth.	Yes.	Yes.
Stilbia anomala.	The anomalous.	Moth.	Yes.	Yes.
Thera cognate.	Chestnut-coloured carpet.	Moth.	No.	No.
Thera juniperata orcadensis.	Juniper carpet.	Moth.	No.	No.
Udea uliginosalis.	A moth.	Moth.	No.	No.
Xanthia icteritia.	The sallow.	Moth.	Yes.	Yes.
Xestia agathina.	Heath rustic.	Moth.	Yes.	Yes.
Xestia alpicola alpine.	Northern dart.	Moth.	Yes.	Yes.
Xestia castanea.	Neglected rustic.	Moth.	Yes.	Yes.
Xylena exsoleta.	Sword-grass.	Moth.	Yes.	Yes.
Millepedes				

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Nanogona polydesmoides.	A millipede.	Millipede.	No.	No.
Spiders				
Agyneta cauta.	Money spider.	Spider.	No.	No.
Agyneta conigera.	Money spider.	Spider.	No.	No.
Araeoncus crassiceps.	Money spider.	Spider.	No.	No.
Araeoncus humilis.	A spider.	Spider.	No.	No.
Baryphyma trifrons.	Money spider.	Spider.	No.	No.
Bathyphantes approximates.	Money spider.	Spider.	No.	No.
Centromerus arcanus.	Money spider.	Spider.	No.	No.
Clubiona comta.	A spider.	Spider.	No.	No.
Drepanotylus uncatus.	Money spider.	Spider.	No.	No.
Erigone arctica.	Money spider.	Spider.	No.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Erigone capra.	A spider.	Spider.	No.	No.
Erigone longipalpis.	Money spider.	Spider.	No.	No.
Halorates reprobus.	Money spider.	Spider.	No.	No.
Hilaira excise.	Money spider.	Spider.	No.	No.
Hilaira frigida.	Money spider.	Spider.	No.	No.
Hypselistes jacksoni.	A spider.	Spider.	No.	No.
Hilaira pervicax.	A spider.	Spider.	No.	No.
Hyposinga pygmaea.	A spider.	Spider.	No.	No.
Jacksonella falconeri.	A spider.	Spider.	No.	No.
Latithorax Faustus.	Money spider.	Spider.	No.	No.
Lepthyphantes minutus.	A spider.	Spider.	No.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Lepthyphantes whymperi.	Money spider.	Spider.	No.	No.
Leptorhopterum robustum.	Money spider.	Spider.	No.	No.
Lophomma punctatum.	Money spider.	Spider.	No.	No.
Mecynargus (Rhaebothorax) morulus.	Money spider.	Spider.	No.	No.
Meioneta beata.	Money spider.	Spider.	No.	No.
Meioneta nigripes.	A spider.	Spider.	No.	No.
Minyriolus pusillus.	Money spider.	Spider.	No.	No.
Neon reticulatus.	Jumping spider.	Spider.	No.	No.
Nesticus cellulanus.	Comb-footed cellar spider.	Spider.	No.	No.
Ozyptila atomaria.	Crab spider.	Spider.	No.	No.
Ozyptila trux.	Crab spider.	Spider.	No.	No.
Pelecopsis nemoralis.	Money spider.	Spider.	No.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Pirata piraticus.	A wolf spider.	Spider.	No.	No
Poeciloneta variegate.	Money spider.	Spider.	No.	No.
Robertus arundineti.	Comb-footed spider.	Spider.	No.	No.
Scotinotylus evansi.	Money spider.	Spider.	No.	No.
Silometopus ambiguous.	Money spider.	Spider.	No.	No.
Trichopterna thorelli.	Money spider.	Spider.	No.	No.
Typhochrestus digitatus.	Money spider.	Spider.	No.	No.
Walckeneria clavicornis.	Money spider.	Spider.	No.	No.
Walckeneria clavicornis.	Money spider.	Spider.	No.	No.
Walckeneria dysderoides.	A spider.	Spider.	No.	No.
Walckeneria vigilax.	Money spider.	Spider.	No.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Pseudoscorpions				
Neobisium carcinioides.	A pseudoscorpion.	Crustacean.	No.	No.
Worms & Leeches				
Chaetopterus variopedatus.	A tube-dwelling polychaete.	Worm.	No.	No.
Hirudo medicinalis.	Medicinal leech.	Leech.	Yes.	No.
Ophelia bicornis.	An estuarine polychaete.	Worm.	No.	No.
Molluscs				
Amauropsis islandicus.	A gastropod.	Mollusc.	Yes.	No.
Atrina fragilis.	Fan mussel.	Mollusc.	Yes.	Yes.
Cerastoderma glaucum.	Lagoonal cockle.	Mollusc.	No.	No.
Devonia perrieri.	A marine mollusc.	Mollusc.	Yes.	No.
Hydrobia acuta subsp*. neglecta.*	A brackish water snail.	Mollusc.	Yes.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Hancockia uncinate.	A sea slug.	Mollusc.	Yes.	No.
Leiostyla anglica.	A terrestrial snail.	Mollusc.	No.	No.
Lymnaea peregra.	A snail (near-involute form).	Mollusc.	No.	No.
Manzonia crassa.	A small marine gastropod.	Mollusc.	Yes.	No.
Margaritifera margaritifera.	A freshwater pearl mussel.	Mollusc.	Yes.	Yes.
Modiolus modiolus.	Horse mussel.	Mollusc.	No.	No.
Mya arenaria.	Sand gaper.	Mollusc.	No.	No.
Nucella lapillus.	Dog whelk.	Mollusc.	No.	No.
Okenia leachii.	A sea slug.	Mollusc.	Yes.	No.
Ostrea edulis.	Native oyster.	Mollusc.	Yes.	Yes.
Theodoxus fluviatalis.	River nerite.	Mollusc.	Yes..	No

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Simnia patula.	A marine snail.	Mollusc.	Yes.	No.
Vertigo lilljeborgi.	A terrestrial snail.	Mollusc.	No.	No.
Crustaceans				
Nephrops norvegicus.	Norway lobster.	Crustacean.	No.	No.
Palinurus elephas.	Crayfish / spiny lobster.	Crustacean.	Yes.	Yes.
Cnidarians (sea anemones)				
Scolanthus callimorphus.	Worm anemone.	Cnidarian.	No.	No.
Haliclystus auricula.	Stalked jellyfish.	Cnidarian.	Yes.	Yes.
Ventromma halecioides.	A hydroid.	Cnidarian.	Yes.	No.
Echinoderms (sea urchins)				
Strongylocentrotus droebachiensis.	Northern sea-urchin.	Echinoderm.	No.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
PLANTS				
Algae				
Cladophora sauteri.	A green alga.	Alga.	No.	No.
Fucus distichus.	A brown alga.	Alga.	Yes.	Yes.
Lithothamnion coralloides.	Coral maerl.	Alga.	Yes.	Yes.
Lithothamnion glaciale.	A maerl algae.	Alga.	No.	No.
Phymatolithon calcareum.	Common maerl.	Alga.	Yes.	Yes.
Fungus				
Clavaria zollingeri.	A fairy club.	Fungus (non-lichenised).	No.	No.
Coprinus comatus.	Shaggy ink cap.	Fungus (non-lichenised).	No.	No.
Hygrocybe calyptriformis.	Pink meadow cap.	Fungus (non-lichenised).	No.	No.
Langermannia gigantean.	Giant puffball.	Fungus (non-lichenised).	No.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Microglossum olivaceum.	Earth-tongue.	Fungus (non-lichenised).	Yes.	Yes.
Wawelia microspore.	A fungus.	Fungus (non-lichenised).	No.	No.
Lichens				
Alectoria sarmentosa vexillifera.	A lichen.	Lichen.	No.	No.
Calicium corynellum.	A lichen.	Lichen.	Yes.	No.
Caloplaca cerinella.	A lichen.	Lichen.	No.	No.
Caloplaca ferruginea.	A lichen.	Lichen.	Yes.	No.
Caloplaca ochracea.	A lichen.	Lichen.	Yes.	No.
Catapyrenium cinereum.	A lichen.	Lichen.	No.	No.
Cladonia fragilissima.	A lichen.	Lichen.	No.	No.
Lobaria pulmonaria.	Lungwort.	Lichen.	Yes.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Lecidea confluens.	A lichen.	Lichen.	No.	No.
Melaspilea interjecta.	A lichen.	Lichen.	Yes.	No.
Nephroma laevigatum.	Kidney lichen.	Lichen.	Yes.	No.
Peltigera scabrosa.	A dog lichen.	Lichen.	Yes.	No.
Psorotichia schaereri.	A lichen.	Lichen.	No.	No.
Ramalina fraxinea.	Cartilage lichen.	Lichen.	Yes.	No.
Schaereria fuscocinerea.	A lichen.	Lichen.	No.	No.
Stringula taylorii.	A lichen.	Lichen.	Yes.	No.
Toninia lobulate.	A lichen.	Lichen.	No.	No.
Liverworts				
Barbilophozia atlantica.	A liverwort.	Bryophyte.	No.	No.
Calypogeia azurea.	A liverwort.	Bryophyte.	No..	No

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Eremonotus myriocarpus.	A liverwort.	Bryophyte.	No.	No.
Gymnomitrium crenulatum.	A liverwort.	Bryophyte.	No.	No.
Herbertus stramineus.	A liverwort.	Bryophyte.	No.	No.
Jungermannia polaris.	Arctic flapwort.	Bryophyte.	Yes.	No.
Jungermannia subelliptica.	A liverwort.	Bryophyte.	No.	No.
Leiocolea fitzgeraldiae.	A liverwort.	Bryophyte	No.	No.
Lepidozia pearsonii.	A liverwort.	Bryophyte.	No.	No.
Odontoschisma elongatum.	A liverwort.	Bryophyte.	No.	No.
Plagiochila carringtonii.	A liverwort.	Bryophyte.	No.	No.
Plagiochila spinulosa.	A liverwort.	Bryophyte.	No.	No.
Porella obtusata.	A liverwort.	Bryophyte.	No.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Riccia cavernosa.	A liverwort.	Bryophyte.	No.	No.
Mosses				
Amblyodon dealbatus.	A moss.	Bryophyte.	No.	No.
Brachythecium mildeanum.	A moss.	Bryophyte.	No.	No.
Bryum weigelii.	A moss.	Bryophyte.	No.	No.
Bryum calophyllum.	Blunt bryum / Matted bryum.	Bryophyte.	Yes.	Yes.
Campylopus schimperi.	A moss.	Bryophyte.	No.	No.
Campylopus subulatus.	A moss.	Bryophyte.	No.	No.
Dicranella crispa.	A moss.	Bryophyte.	No.	No.
Distichium inclinatum.	A moss,	Bryophyte.	No.	No.
Ditrichum flexicaule.	Bendy dictrichum.	Bryophyte.	Yes.	No.
Dreplanocladus lycopodioides.	A moss.	Bryophyte.	No.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Leucobryum glaucum.	A moss.	Bryophyte.	No.	No.
Microbryum rectum.	Upright pottia.	Bryophyte.	Yes.	No.
Orthothecium rufescens.	A moss.	Bryophyte.	No.	No.
Philonotis seriata.	A moss.	Bryophyte.	No.	No.
Sphagnum austinii.	A moss.	Bryophyte.	No.	No.
Sanionia orthothecioides.	St Kilda hook-moss.	Bryophyte.	Yes.	No.
Sphagnum magellanicum.	A moss.	Bryophyte.	No.	No.
Tortula protobryoides.	Tall pottia.	Bryophyte.	Yes.	No.
Stoneworts				
Chara aspera.	Rough stonewort.	Bryophyte.	No.	No.
Chara baltica.	Baltic stonewort.	Bryophyte.	Yes.	Yes.
Chara canescens.	Bearded stonewort.	Bryophyte.	Yes.	Yes.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Chara curta.	Lesser bearded stonewort.	Bryophyte.	No.	No.
Chara muscosa.	Mossy stonewort.	Bryophyte.	No.	No.
Chara rudis.	Rugged stonewort.	Bryophyte.	Yes.	No.
Tolypella glomerate.	Clustered stonewort.	Bryophyte.	No.	No.
Tolypella nidifica.	Bird's nest stonewort.	Bryophyte.	Yes.	Yes.
Vascular Plants				
Ajuga pyramidalis.	Pyramidal bugle.	Vascular plant.	Yes.	Yes.
Ammophila arenaria.	Marram.	Vascular plant.	No.	No.
Annagallis arvensis.	Scarlet pimpernel.	Vascular plant.	Yes.	No.
Angelica archangelica.	Angelica.	Vascular plant.	No.	No.
Arctostaphyllos alpinus.	Alpine bearberry/ Black blueberry.	Vascular plant.	No.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Arctostaphylos uva-ursi.	Bearberry.	Vascular plant.	No.	No.
Aster tripolium.	Sea aster.	Vascular plant.	No.	No.
Avena fatua.	Wild oat.	Vascular plant.	No.	No.
Avena strigose.	Bristle oak, black oak.	Vascular plant.	No.	No.
Betula pubescens.	Downy birch.	Vascular plant.	No.	No.
Bolboschoenus maritimus.	Sea club-rush.	Vascular plant.	No.	No.
Briza media.	Quaking-grass.	Vascular plant.	No.	No.
Callitriche hermaphroditica.	Autumnal water-starwort.	Vascular plant.	No.	No.
Caltha palustris.	Marsh marigold/ king cup.	Vascular plant.	No.	No.
Calystegia soldanella.	Sea bindweed.	Vascular plant.	No.	No.
Carex capillaris.	Hair sedge.	Vascular plant.	No.	No.
Carex diandra.	Lesser tussock sedge.	Vascular plant.	No.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Carex flacca.	Glaucous sedge.	Vascular plant.	No.	No.
Carex maritima.	Curved sedge.	Vascular plant.	Yes.	Yes.
Carex riparia.	Great pond-sedge.	Vascular plant.	No.	No.
Carex riparia x rostrate.	Hybrid sedge.	Vascular plant.	No.	No.
Carum carvi.	Caraway.	Vascular plant.	Yes.	Yes.
Catabrosa aquatic.	Whorl-grass.	Vascular plant.	No.	No.
Catapodium marinum.	Stiff sand grass.	Vascular plant.	No.	No.
Centaurea cyanus.	Cornflower.	Vascular plant.	Yes.	Yes.
Chamaemelum nobile.	Chamomile.	Vascular plant.	Yes.	Yes.
Chrysanthemum segetum.	Corn marigold.	Vascular plant.	No.	No.
Coeloglossum viride.	Frog orchid.	Vascular plant.	Yes.	Yes.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Cornus suecica.	Dwarf cornel.	Vascular plant.	No.	No.
Corylus avellane.	Hazel.	Vascular plant.	No.	No.
Dactylorhiza purpurella.	Northern fen orchid.	Vascular plant.	No.	No.
Dactylorhiza sp.	Spotted orchids.	Vascular plant.	No.	No.
Diphasiastrum alpinum.	Alpine clubmoss.	Vascular plant.	No.	No.
Draba incana.	Hoary whitlowgrass.	Vascular plant.	Yes.	No.
Drosera longifolia.	Great sundew.	Vascular plant.	No.	No.
Dryas octopetala.	Mountain avens.	Vascular plant.	No.	No.
Dryopteris aemula.	Hay-scented buckler-fern.	Vascular plant.	No.	No.
Dryopteris oreades.	Mountain male-fern.	Vascular plant.	No.	No.
Equisetum pratense.	Shady horsetail.	Vascular plant.	No	No.
Eriophorum latifolium.	Broad-leaved cottongrass.	Vascular plant.	No.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Erodium cicutarium.	Common stork's bill.	Vascular plant.	No.	No.
Eupatorium cannabinum.	Hemp agrimony.	Vascular plant.	No.	No.
Euphorbia helioscopia.	Sun spurge.	Vascular plant.	Yes.	No.
Euphrasia atroviolacia.	An eyebright.	Vascular plant.	No.	No.
Euphrasia farhaidensis.	An eyebright.	Vascular plant.	No.	No.
Euphrasia foulaensis.	An eyebright.	Vascular plant.	No.	No.
Euphrasia heslop-harrisonii.	An eyebright.	Vascular plant.	Yes.	Yes.
Euphrasia marshallii.	An eyebright.	Vascular plant.	Yes.	Yes.
Euphrasia ostenfeldii.	An eyebright.	Vascular plant.	Yes.	Yes.
Euphrasia rotundifolia.	An eyebright.	Vascular plant.	Yes.	Yes.
Euphrasia (as yet unnamed).	An eyebright.	Vascular plant.	No.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Fallopia convolvulus.	Black bindweed.	Vascular plant.	Yes.	No.
Festuca arenaria.	Rush-leaved fescus.	Vascular plant.	No.	No.
Fragaria vesca.	Wild strawberry.	Vascular plant.	No.	No.
Fritillaria meleagris.	Snakes-head fritillary.	Vascular plant.	No.	No.
Fumaria bastardii.	Tall ramping fumitory.	Vascular plant.	No.	No.
Fumaria capreolata.	White ramping fumitory.	Vascular plant.	Yes.	No.
Fumaria densiflora.	Dense flowered fumitory.	Vascular plant.	No.	No.
Fumaria purpurea.	Purple ramping fumitory.	Vascular plant.	Yes.	Yes.
Galium sterneri.	Limestone bedstraw.	Vascular plant.	No.	No.
Gentianella campestris.	Field gentian.	Vascular plant.	Yes.	Yes.
Gnaphalium sylvaticum.	Heath cudweed.	Vascular plant.	Yes.	No.
Goodyera repens.	Creeping lady's-tresses.	Vascular plant.	No.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Hammarbya paludosa.	Bog orchid.	Vascular plant.	No.	No.
Hieracium orcadense.	Hawkweed.	Vascular plant.	No.	No.
Hierochloë odorata.	Holy-grass.	Vascular plant.	Yes.	No.
Hymenophyllum wilsonii.	Wilson's filmy-fern.	Vascular plant.	No.	No.
Hyoscyamus niger.	Henbane.	Vascular plant.	Yes.	No.
Isoetes lacustris.	Quillwort.	Vascular plant.	No.	No.
Jasione montana.	Sheeps' bit.	Vascular plant.	No.	No.
Juncus balticus.	Baltic rush.	Vascular plant.	No.	No.
Juniperis communis.	Juniper.	Vascular plant.	Yes.	Yes.
Loiseleuria procumbens.	Trailing azalea.	Vascular plant.	No.	No.
Lupinus nootkatensis.	Nootka lupin.	Vascular plant.	No.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Lychnis flos-cuculi.	Ragged robin.	Vascular plant.	No.	No.
Lycopodium annotinum.	Interrupted clubmoss.	Vascular plant.	No.	No.
Medicago sativa ssp. Falcata.	Sickle medick.	Vascular plant.	No.	No.
Melampyrum pratense.	Common cow-wheat.	Vascular plant.	No.	No.
Mertensia maritima.	Oyster plant.	Vascular plant.	No.	No.
Myrica gale.	Bog myrtle.	Vascular plant.	No	No.
Ophioglossum azoricum.	Small adder's-tongue.	Vascular plant.	No.	No.
Orchis mascula.	Early purple orchid.	Vascular plant.	No.	No.
Orthilia secunda.	Serrated wintergreen.	Vascular plant.	No.	No.
Oxyria digyna.	Mountain sorrel.	Vascular plant.	No.	No.
Parnassia palustris.	Grass-of-Parnassus.	Vascular plant.	No.	No.
Phegopteris connectilis.	Beech fern.	Vascular plant.	No.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Pimpinella saxifrage.	Burnet-saxifrage.	Vascular plant.	No.	No.
Plantago media.	Hoary plantain.	Vascular plant.	Yes.	No.
Platanthera bifolia.	Lesser butterfly orchid.	Vascular plant.	Yes.	Yes.
Poa alpine.	Alpine meadow-grass.	Vascular plant.	No.	No.
Polygonum boreale.	Northern knotgrass.	Vascular plant.	No.	No.
Polystichum lonchitis.	Holly fern.	Vascular plant.	Yes.	Yes.
Populus tremula.	Aspen.	Vascular plant.	No.	No.
Potamogeton filiformis.	Slender pondweed.	Vascular plant.	No.	No.
Potamogeton friesii.	Flat-stalked pondweed.	Vascular plant.	No.	No.
Potamogeton lucens.	Shining pondweed.	Vascular plant.	No.	No.
Potamogeton praelongus.	Long-stalked pondweed.	Vascular plant.	No.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Potamogeton pusillus.	Lesser pondweed.	Vascular plant.	No.	No.
Potamogeton x zizii.	A hybrid pondweed.	Vascular plant.	No.	No.
Primula scotica.	Scottish primrose.	Vascular plant.	Yes.	No.
Primula veris.	Cowslip.	Vascular plant.	No.	No.
Pseudorchis albida.	Small white orchid.	Vascular plant.	Yes.	Yes.
Pyrola rotundifolia ssp. Rotundifolia.	Round-leaved wintergreen.	Vascular plant.	No.	No.
Ranunculus hederaceus.	Ivy-leaved water-crowfoot.	Vascular plant.	No.	No.
Rorippa islandica.	Northern yellow-cress.	Vascular plant.	No.	No.
Rosa tomentosa.	Harsh downy-rose.	Vascular plant.	Yes.	No.
Rubus chamaemorus.	Cloudberry.	Vascular plant.	No.	No.
Rubus septentrionalis.	Bramble.	Vascular plant.	No.	No.
Ruppia cirrhosa.	Spiral tasselweed.	Vascular plant.	Yes.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Sagina subulate.	Awl-leaved pearlwort.	Vascular plant.	No.	No.
Salicornia europaea agg.	Common glasswort.	Vascular plant.	No.	No.
Salix aurita.	Eared willow.	Vascular plant.	No.	No.
Salix cinereal.	Grey willow.	Vascular plant.	No.	No.
Salix myrsinites.	Myrtle-leaved willow.	Vascular plant.	Yes.	Yes.
Salix phylicifolia.	Tea-leaved willow/ rice.	Vascular plant.	No.	No.
Salix phylicifolia x repens = x schraderiana.	Hybrid willow.	Vascular plant.	No.	No.
Samolus valerandi.	Brookweed.	Vascular plant.	No.	No.
Saussurea alpine.	Alpine saw-wort.	Vascular plant.	No.	No.
Saxifraga aizoides.	Yellow saxifrage.	Vascular plant.	No.	No.
Saxifraga oppositifolia.	Purple saxifrage.	Vascular plant.	No.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Saxifraga stellaris.	Starry saxifrage.	Vascular plant.	No.	No.
Scandix pecten-veneris.	Shepherd's needle.	Vascular plant.	No.	Yes.
Schoenoplectus lacustris.	Bullrush.	Vascular plant.	No.	No.
Schoenoplectus tabernaemontani.	Glaucos bulrush.	Vascular plant.	No.	No.
Schoenus nigricans.	Black bog-rush.	Vascular plant.	No.	No.
Scutellaria galericulata.	Skull-cap.	Vascular plant.	No.	No.
Senecio sylvaticus.	Wood groundsel.	Vascular plant.	No.	No.
Sherardia arvensis.	Field madder.	Vascular plant.	Yes.	No.
Silene acaulis.	Moss campion.	Vascular plant.	No.	No.
Sinapsis alba.	White mustard.	Vascular plant.	Yes.	No.
Sinapsis arvensis.	Charlock.	Vascular plant.	Yes.	No.
Sorbus aucuparia.	Rowan.	Vascular plant.	No.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Stachys arvensis.	Field woundwort.	Vascular plant.	Yes.	No.
Stellaria holostea.	Greater stitchwort.	Vascular plant.	No.	No.
Taraxacum europhyllum.	Dandelion.	Vascular plant.	No.	No.
Taraxacum fulvicarpum.	Dandelion.	Vascular plant.	No.	No.
Taraxacum fulvicarpum.	Dandelion.	Vascular plant.	No.	No.
Taraxacum landmarkii.	Dandelion.	Vascular plant.	No.	No.
Taraxacum orcadense.	Dandelion.	Vascular plant.	No.	No.
Taraxacum rubellum.	Dandelion.	Vascular plant.	No.	No.
Taraxacum subnaevosum.	Dandelion.	Vascular plant.	No.	No.
Taraxacum tanylepis.	Dandelion.	Vascular plant.	No.	No.
Thalictrum alpinum.	Alpine meadow-rue.	Vascular plant.	No.	No.

SCIENTIFIC NAME	COMMON NAME	TAXON	SCOTTISH BIODIVERSITY LIST	UK BAP LIST
Trientalis europaea.	Chickweed wintergreen.	Vascular plant.	No.	No.
Vaccinium uliginosum.	Bog blueberry.	Vascular plant.	No.	No.
Viola tricolor.	Wild pansy.	Vascular plant.	Yes.	No.
Zostera marina.	eelgrass/ common grass-wrack.	Vascular plant.	No.	No.

Appendix III: BAP categories of terrestrial, freshwater and marine habitat found in Orkney - Revised 2012

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 YEW WOODLAND.	Upland oakwood.	Not present.	**Upland birchwoods.** * Upland willow scrub. **Wet woodlands.** *Broad-leaved plantations and policy woodlands **.**
		Upland birchwoods.	**Present.**	
		Lowland mixed deciduous woodland.	Not present.	
		Upland mixed ashwoods.	Not present.	
		Wet woodlands.	**Present.**	
		Wood pasture and parkland.	Not present.	
		Traditional orchards.	Not present.	
2.	CONIFEROUS WOODLAND.	Native pine woodlands.	Not present.	Conifer plantation.
3.	BOUNDARY AND LINEAR FEATURES.	**Hedgerows.**	**Present.**	*Miscellaneous field boundaries. *Road verges. **Hedgerows.** Stone and earth boundary features.
4.	ARABLE AND HORTICULTURE.	**Arable field margins.**	**Present.**	**Arable field margins.** *Arable crops.
		Open mosaic habitats on previously developed land.	Not present.	
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.	

No.	Broad Habitat Type	UK Priority Habitats	UK Priority Habitat Occurrence in Orkney	Local Habitats **UK Priority=Bold** Locally important =*
7.	CALCAREOUS GRASSLAND.	**Upland calcareous grassland.**	**Present.**	**Upland calcareous grassland.**
		Lowland calcareous grassland	**Present.**	**Lowland calcareous grassland.**
		Limestone pavements.	Not present.	
		Calaminarian grasslands.	Not present.	
8.	ACID GRASSLAND.	**Lowland dry acid grassland.**	**Present.**	**Lowland dry acid grassland.**
		***Juncus squarrosus-Festuca ovina* grassland.**	**Present.**	Acid grassland. ***Juncus squarrosus-Festuca ovina* grassland.**
		***Nardus stricta-Gallium saxatile* grassland.**	**Present.**	***Nardus stricta-Gallium saxatile* grassland.**
9.	BRACKEN.	Bracken.	Not present.	
10.	DWARF SHRUB HEATH.	**Upland heathland.**	**Present.**	**Upland heathland.**
		Lowland heathland.	**Present.**	**Lowland heathland.** *Treeless woodland and dales. *Maritime heath. *Empetrum heath. *Lichen heath. *Species rich heath.
11.	FEN, MARSH AND SWAMP.	**Lowland fens.**	**Present.**	**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.**
		Coastal and floodplain grazing marsh.	Not present.	*Marsh.
12.	BOG.	**Lowland raised bog.**	**Present.**	*Basin bog.
		Blanket bog.	**Present.**	**Blanket bog.**

No.	Broad Habitat Type	UK Priority Habitats	UK Priority Habitat Occurrence in Orkney	Local Habitats **UK Priority=Bold** Locally important =*
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.	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.	
		Inland rock outcrop and scree habitats.	**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.	**Present.**	**Machair.** *Links. *Aeolianite.
		Coastal vegetated shingle.	**Present.**	**Coastal vegetated shingle.** *Coastal strandline. Storm beach.

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.	Littoral chalk.
		Sabellaria alveolata reefs.	Not Present.	*Sabellaria alveolata* reefs.
21.	LITTORAL SEDIMENT.	**Intertidal mudflats.**	**Present.**	Littoral mud.
		Sandy shores.	**Present.**	Littoral sand.
		Coastal saltmarsh.	**Present.**	**Coastal saltmarsh.**
		Seagrass beds.	**Present.**	**Seagrass beds.**
		Intertidal boulder communities.	**Present.**	**Intertidal boulder communities.**
	LITTORAL SEDIMENT.	**Blue mussel beds (*Mytilus edulis*).**	**Present.**	**Blue mussel beds (*Mytilus edulis*).**

NO.	BROAD HABITAT TYPE	UK/Scottish Priority Habitat within Broad Habitat Type	Occurrence in Orkney	LBAP Specific Habitat Type UK Priority=Bold
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.
		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.
		Estuarine rocky habitats.	Not present.	
		Fragile sponge & anthozoan communities on subtidal rocky habitats.	Not present.	**Tide-swept infralittoral rock.** Tide-swept kelp. Very tide-swept faunal turf. Tide-swept faunal turf. Tide- and wave-swept faunal turf.
		Serpulid reefs.	Not present.	**Estuarine rocky habitats.** **Fragile sponge & anthozoan communities on subtidal rocky habitats.** **Serpulid reefs.**

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.	**Sheltered muddy gravels.**	**Present.**	Circalittoral sandy mud.
		Seagrass beds.	**Present.**	**Seagrass beds (*Zostera marina*).** *Ruppia* meadows.
		Saline lagoons and environs.	**Present.**	**Saline lagoons** Variable salinity fucoids. Low salinity sublittoral mud. Low salinity sublittoral mixed sediment. Low salinity infra-littoral rock. Circalittoral coarse sediment. Sublittoral sands and fine sand. Infralittoral mixed sediment. Sparse *Modiolus modiolus.* Circalittoral mixed sediment
	INSHORE SUBLITTORAL			

NO.	BROAD HABITAT TYPE	UK/Scottish Priority Habitat within Broad Habitat Type	Occurrence in Orkney	LBAP Specific Habitat Type UK Priority=Bold
23.	SEDIMENT.	**Inlets, enclosed and sheltered bays and sublittoral sand, fine sand and mud.**	**Present.**	Brittlestar beds. **Sublittoral sands and gravel.**
		Infralittoral mixed sediment.	**Present.**	Offshore gravely mud. **Mud habitats in deep water.** **(Mud in deep water).** **Sublittoral sands and gravel.**
		Sublittoral sands and gravel.	**Present.**	
		Maerl beds.	**Present.**	**Maerl beds.**
		Horse mussel beds.	**Present.**	**Horse mussel beds (*Modiolus modiolus* beds).**
		File shell beds.	**Present.**	**Flame shell beds (*Limaria hians* beds).**
24.	OFFSHORE.	**Cold-water coral reefs.**	Not present.	**Cold-water coral reefs (*Lophelia pertusa* reefs).**
		Mud habitats in deep water.	**Present.**	**Mud habitats in deep water (Offshore circalittoral mud).**
		Carbonate mounds.	Not present.	**Carbonate mounds.**

NO.	BROAD HABITAT TYPE	UK/Scottish Priority Habitat within Broad Habitat Type	Occurrence in Orkney	LBAP Specific Habitat Type UK Priority=Bold
		Deep-sea sponge communities.	Not present.	**Deep-sea sponge communities.**
		Seamount communities.	Not present.	**Seamount communities.**

Appendix IV: The Aichi goals and targets

Listed below are the 20 targets agreed by the 193 signatories to the Convention for Biological Diversity (CBD) at the COP10 in Nagoya in October 2010. These targets form the framework for biodiversity conservation for the next 10 years, until 2020. The 20 targets are grouped under 5 main goals. The following extract from the CBD website lists the targets in brief outline.

Strategic Goal A:

Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society

Target 1

By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

Target 2

By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.

Target 3

By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio-economic conditions.

Target 4

By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.

Strategic Goal B:

Reduce the direct pressures on biodiversity and promote sustainable use.

Target 5

By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.

Target 6

By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place

for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

Target 7

By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

Target 8

By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

Target 9

By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.

Target 10

By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.

Strategic Goal C:

Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity.

Target 11

By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.

Target 12

By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

Target 13

By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

Strategic Goal D:

Enhance the benefits to all from biodiversity and ecosystem services.

Target 14

By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.

Target 15

By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

Target 16

By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.

Strategic Goal E:

Enhance implementation through participatory planning, knowledge management and capacity building.

Target 17

By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.

Target 18

By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.

Target 19

By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.

Target 20

By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.