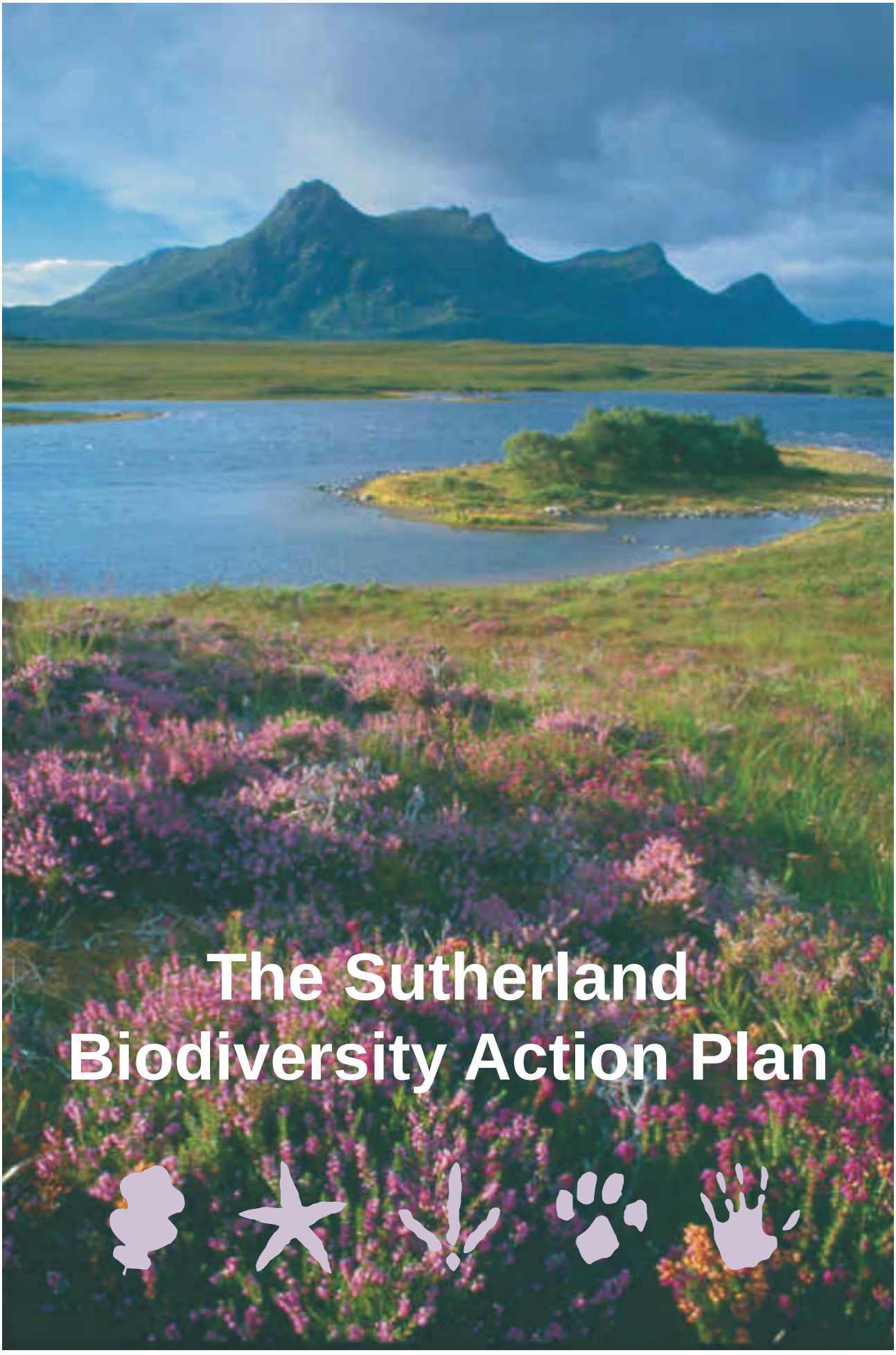

The Sutherland Biodiversity Action Plan

FOREWORD

This Local Biodiversity Action Plan was written by the Sutherland Biodiversity Group (listed below) with help from Issie MacPhail, George Ross, Meg Telfer and Janet Bromham (Sutherland and Highland Biodiversity Officers).

Members:	Representing:
David Bryan	The Sutherland Partnership
Neil Campbell	Assynt Angling Group (freshwater interests)
Ian Evans	Assynt Field Club (ecological interests)
Jon Hollingdale	North Highland Forest Trust (woodland interests)
Nick Joy	Loch Duart Ltd (marine & coastal interests)
John MacMorran	Scottish Crofters Foundation (crofting interests)
Malcolm McCall	Sutherland National Farmers Union (farming interests)
Ian Patterson / Andy Summers	The Highland Council Ranger Service (ranger / tourism interests)
Graeme Sinclair (Chairman)	Scottish Landowners Federation / Reay Forest (moorland / sporting interests)

It forms part of a suite of Local Biodiversity Action Plans produced for the Highland Council area by the Highland Biodiversity Project, a two-year project funded by The Highland Council, Scottish Natural Heritage, Highlands and Islands Enterprise, Caithness and Sutherland Enterprise and RSPB Scotland. The Project receives match funding from the Highlands & Islands Special Transitional Programme.

OCTOBER 2003

Photographs: Laurie Campbell, Donald Mitchell, George Ross, Iain Sarjeant, Andy Summers and the Sutherland Partnership
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SUMMARY

Biodiversity means the variety of life or the richness of nature. This Local Biodiversity Action Plan attempts to set out what is important and valued about the natural environment of Sutherland, in terms of broad habitats and species, and to identify a number of actions and projects that could be undertaken to help protect or enhance it.

Dornoch Firth at Sunset

This plan is divided into two sections, each of which is subdivided into six chapters according to the following broad habitat types: sea & coast; river, loch & wetland; croft & farm land; forest & woodland; mountain & moor; and town & village. The first Section is the new material, the 'Local Biodiversity Action Plan', and it identifies the major issues, lists current projects and suggests future actions for each of these broad habitat types. Section Two contains a very basic biodiversity audit, the supporting information that describes priority habitats and species from both national and local perspectives, again for the six broad habitat types.

The main issues identified in the Sea and Coast section are grouped under the headings 'fishing', 'aquaculture', 'pollution and litter', 'coastal management' and 'wildlife tourism'. Suggested projects include the designation and management of a Marine Reserve within inshore waters in Sutherland; a lobster survey, restocking and v-notching project; raising awareness of priority habitats and species in Environmental Impact Assessments; a project to reduce marine litter; a project to reduce disturbance to beach-nesting birds and the development of Coastal Management Plans.

Under River, Loch and Wetland, the main issues are 'pollution', 'habitat modifications', 'reduction in fish populations', 'flood protection'; 'species introductions' and 'land of awareness'. Future actions include a project to raise awareness of pollution issues and encourage local communities to install reed bed systems; the restoration of riparian habitats and spawning beds; unblocking of some water courses to improve spawning habitats for migratory fish; the management of wetland areas to reduce flooding downstream; the production of a Freshwater Atlas recording the location and condition of all national and local priority species; and a project to monitor and remove mink from North West Sutherland.

The issues facing croft and farm land include 'industry problems' in general, 'lack of agri-environment funding', a 'decline in cattle numbers', a 'loss of boundary features' and, in some areas, 'intensification'. Opportunities for future action include a project to enhance the links between agriculture and biodiversity through tourism and produce marketing; the provision of business advice tailored to the needs of crofters and farmers; the enhancement and increased entry into the Rural Stewardship Scheme; encouraging more local people to rear cattle through the use of demonstration sites; and the provision of training courses on the management of boundary features.

Foindle

Under the Forest and Woodland section, several issues have been identified under the 'management of semi-natural woodlands, coniferous plantations, riparian woodlands, and policy and urban fringe woodlands'. Projects that encourage woodland managers to leave more standing deadwood; raise awareness and encourage woodland managers to plant or regenerate riparian woodlands; and encourage community involvement in the management of coniferous plantations are welcomed.

'Overgrazing and inappropriate burning', the 'balance between moorland and woodland land uses', 'other management issues', 'recreation and path maintenance' and 'renewable energy' have been identified as issues under the Mountain and Moorland section. Suggested projects include a project to tackle the issue of unmanaged muirburning; enhanced support for the production

and implementation of Deer Management Plans; the initiation of local access forums to help manage and provide for access to mountain and moorland areas; and a review of the potential sites for the generation of renewable energy to guide development away from sensitive areas.

Suilven

Finally, under the Town and Village section, 'lack of resources' and 'lack of awareness on biodiversity issues' have been identified as key issues, in addition to the 'threat of fungal infections' and 'road verge and hedge maintenance'. Suggested projects include encouraging local people to garden for wildlife; more 'Know Your Own Patch' initiatives; and the incorporation of biodiversity into future roadside maintenance contracts.

The main partners that will be involved in the delivery of the plan, be they Council departments, agencies, organisations, interest groups, local communities or individuals, are listed in Annex 1, and Annexes 2 and 3 provide a list of references and a glossary.

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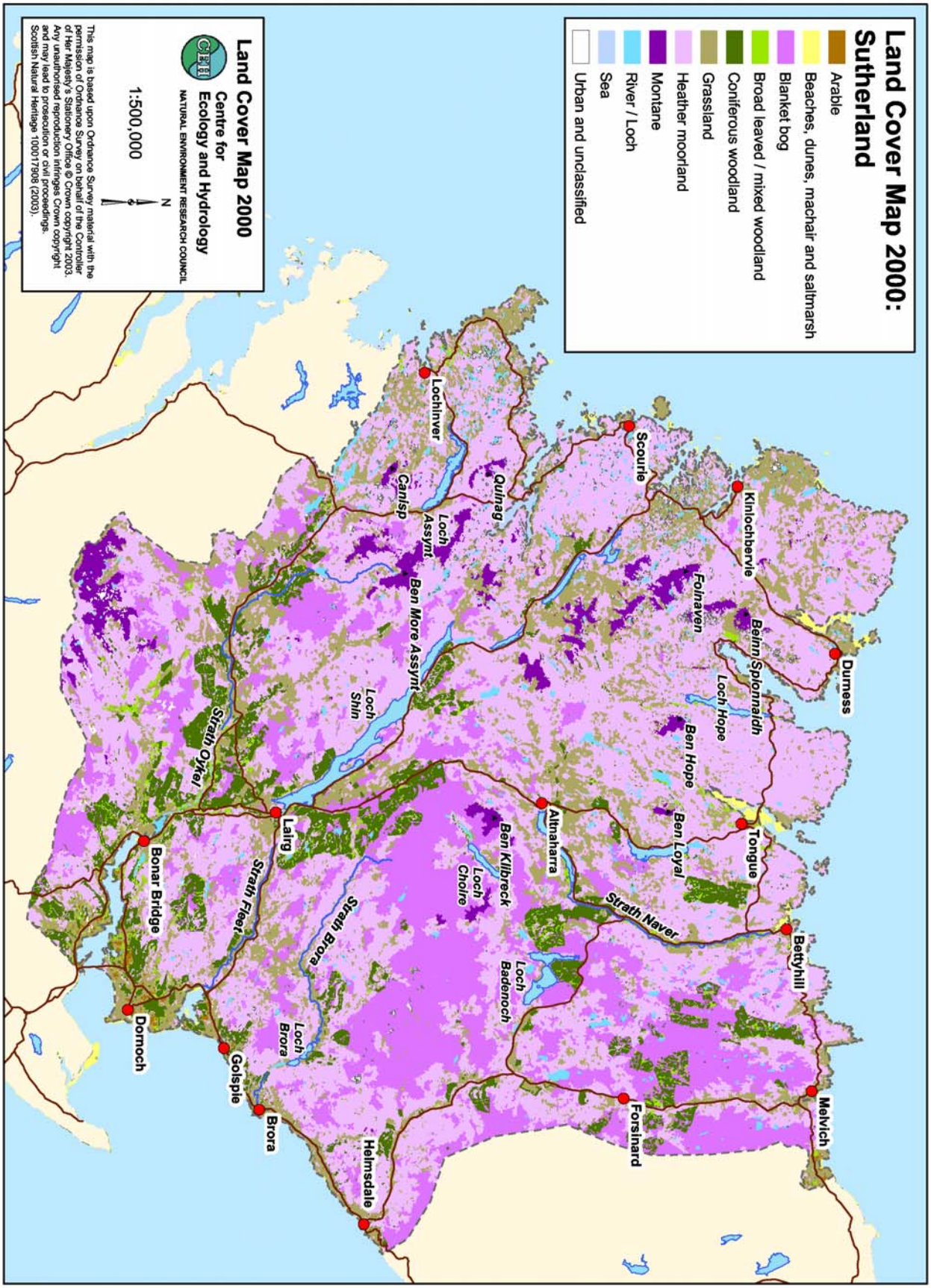
Land Cover Map 2000: Sutherland
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Beaches, dunes, machair and saltmarsh
Blanket bog
Broad leaved / mixed woodland
Coniferous woodland
Grassland
Heather moorland
Montane
River / Loch
Sea
Urban and unclassified
Land Cover Map 2000
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NATURAL ENVIRONMENT RESEARCH COUNCIL
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Lochinver
Scourie
Kinlochbervie
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Quinag
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Loch Shin
Strath Oykel
Altnaharra
Ben Loyal
Tongue
Bettyhill
Lairg
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Strath Naver
Bonar Bridge
Strath Fleet
Strath Brora
Loch Badenoch
Dornoch
Loch Brora
Golspie
Brora
Forsinard
Melvich
Helmsdale

INTRODUCTION

Introduction to Sutherland

At 6,071 km^2, Sutherland is the largest county in the Highlands, and indeed, the United Kingdom. It is also the most sparsely populated, with a population of 13,778 people. Most people live in scattered settlements along the coasts, and the interior is a vast and open, wild landscape of peatlands, hills, lochs and rivers. The spectacular coastal scenery of the north and west attracts many visitors to the area, and the many islands, bays and sea lochs support a great diversity of marine life.

On land, the flora and fauna changes with the geology, climate and land use as you move from east to west. Lowland farms, crofts and scattered woodlands dominate the narrow strip of fertile land along the East Coast. In Central Sutherland, shooting and fishing are the main land uses, although some areas have been planted with conifers. Along the North and West Coasts, there are many small crofting settlements.

Crofts at Culkein, Assynt

Geology

Sutherland is a geologist's paradise, containing rock formations that span over 2,800 million years and include some of the oldest surface rocks in Britain. This has shaped not only the landscape, which is characterised by vast hills and mountains rising out of flatter peatland, rocks and lochs, but also Sutherland's distinctive flora and fauna.

Much of West Sutherland is underlain by the oldest of these rock types, Lewisian gneiss, which has eroded to form a characteristic mosaic of rocks, low hills, small lochs and peaty areas known as 'knock-and-lochan'. The quartzite-capped giants of Foinaven, Arkle, Suilven, Canisp and Quinag rise up as huge sandstone masses of out of this ancient gneiss floor.

West Sutherland also has areas of limestone, which weathers to produce unusually fertile soils with their own very specific flora. A narrow outcrop of the Durness limestone runs from the North Coast south through the county, forming the steep crags at Stronchrubie and Knockan. At Inchnadamph you can see limestone pavements, underground water systems and caves.

Much of North and Central Sutherland is composed of schists and granulites. The softer schists have weathered to produce vast plains, which over the centuries have been covered in blanket bog. Rising out of this flat landscape are the more resistant rock masses of Ben Hope and Ben Klibreck. The Moine Thrust, running north-south, marks the western edge of this area, providing evidence of immense disturbance of the earth's crust some 400 million years ago.

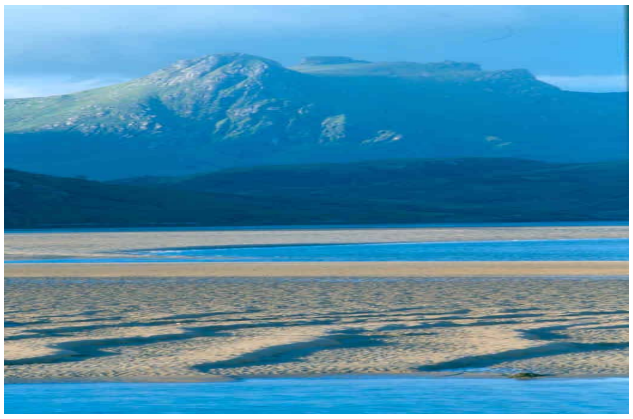
In East Sutherland there are outcrops of younger, sedimentary rocks associated with Old Red Sandstone laid down when the area formed part of a vast freshwater lake known as Lake Orcadie, during the Devonian period. The "Fallen Stack of Portgower" is, in fact, evidence of a submarine landslide triggered by seismic activity on the Helmsdale Fault. This fault separates the more resistant metamorphic and igneous rocks, which form high ground, from the more fertile coastal plain. In the Brora area there are Jurassic rocks, including a coal seam which was once the basis for Brora's industrial growth.

During the last glaciation, Sutherland was covered in ice and stripped of its vegetation and topsoil. Evidence of this process can be seen in the many corries, which have been gouged out of the hills in the North West, and the glacial till or boulder clay, which was deposited in the valleys. Since then, much of the county has been covered in blanket peat, which influences much of the plant life inland. On the Eastern side of the county, there are many meltwater channels and eskers (valley ridges laid down by rivers underneath the ice).

Scree Slopes, Arkle

Climate

West Sutherland experiences a much wetter climate than the East, but temperatures are generally higher due to the moderating effect of the North Atlantic Drift, an oceanic current that starts as the Gulf Stream in the Gulf of Mexico. Central and East Sutherland is in the rain shadow of the hills on the West, and is noticeably drier. However, winter temperatures away from the coast are generally lower and so Mid Sutherland can receive more snow and frost.



Ben Layal

A crucial factor in soil development on the West is the oceanic climate. Rainfall is high, summers are cool and winters are relatively mild. The interaction between climate and the underlying rock and glacial debris determines soil development and, from that, the different types of vegetation that we see today. Altitude too has a profound effect. At higher altitudes average temperatures are much lower, wind speeds are greater, freeze-thaw cycles disturb root systems and recycling of nutrients is much slower. In Sutherland, this altitudinal effect is compressed because of the cool summer temperatures, and consequently we see species or communities at or near sea level that would normally only occur higher up the mountains.

Climate change is an issue of concern these days. However, it should be noted that our climate has been getting progressively warmer since the last glaciation, and that Sutherland's vegetation and animal life has been responding accordingly. This is illustrated by an increase and decline in tree cover.

Human Impact

The third major influence on the wildlife of Sutherland is of course, human impact. When the ice melted, much of Sutherland was slowly colonised by trees, evidence of which can be seen in the deep peat today. Humans cleared much of this woodland and converted it to an agricultural landscape, which continued relatively unchanged for thousands of years.

During the Clearances of the early to mid 19th Century, people were moved off the inland straths to the coasts, to be replaced by vast flocks of sheep. The sheep, in turn, were replaced by deer 'forests', and deer stalking remains the dominant land-use interest in much of inland Sutherland today. Crofting was initiated as a land use, based on small in-bye units augmented by areas of common grazing. The coastal population peaked during the mid 19th Century, and many people left to find work elsewhere. In more recent times, cultivation has almost ceased in West Sutherland in favour of sheep grazing, and the population of East Sutherland has expanded.

From east to west and north to south, the underlying geology, changing climate and human impact has determined the presence and abundance of many of Sutherland's plants and animals. Small cranberry, for example, has a distinctly eastern distribution, whilst dwarf birch is restricted to central parts and black bog rush is generally found to the west.

Crofthouse, Mid Sutherland

Introduction to Biodiversity

What is biodiversity?

Biodiversity, short for 'biological diversity', is a relatively new word that has been coined to express the richness of nature or variety of life. It came into use after the UK government signed up to the Convention on Biological Diversity at the Earth Summit in Rio de Janeiro in 1992.

Crucially, biodiversity is concerned with the relationship of nature and people, and sees the natural world as a vital asset, essential to our survival and quality of life. As a concept, it asks us to use our resources in a sustainable manner, i.e. in a way that doesn't compromise our children's abilities to use them too.

"Biodiversity, our planet's most valuable resource, is on loan to us from our children."

Biological diversity is also part of our cultural heritage - the current distribution and numbers of plant and animal species is, for better or worse, a result of human management. This biological richness is a vital component in the future development of our county. Agriculture, forestry, fishing and fish farming all relate to the natural environment of Scotland, and it is also a major component of the tourism industry.

Small Tortoiseshell

How is this being taken forward nationally?

The UK Biodiversity Steering Group was created to help us meet the commitment agreed at Rio, and in 1995 it published a Report containing action plans to conserve 116 species and 14 habitats, together with recommendations for future biodiversity action plans.

Since then, a further 6 volumes of habitat and species action plans have been published. There are now 45 habitat action plans (HAPs) and 391 species action plans (SAPs), which are being taken forward by government agencies and other large organisations.

Local authorities and others are being encouraged to take local action to promote biodiversity, to complement national action programmes and projects. Under the Highland Biodiversity Project, a plan is being prepared for each area of Highland, focusing on the areas of Caithness, Sutherland, Ross & Cromarty East, Wester Ross, Skye & Lochalsh and Lochaber. Inverness & Nairn and Badenoch & Strathspey are already covered by related initiatives.

What is this plan about?

This plan for Sutherland has been prepared by the Sutherland Biodiversity Group, a group of local people representing a broad range of interests. It sets out what can be done in the next five to ten years. The plan is non-statutory, i.e. it is not legally binding. However, with increased emphasis being placed on biodiversity and related issues by successive governments, it is widely accepted that such plans will become increasingly important in the targeting of resources and setting of priorities.

This plan is not about preservation of the status quo, nor about attempting to turn back the clock thousands of years. We do not live in a pristine wilderness nor could we ever return to such a state. It is about:

- Recognising the importance of biodiversity to our future prosperity and quality of life;
- Ensuring that we adopt or continue with goodpractices that sustain and enhance our biodiversity and amend practices that damage the environment; and
- Identifying opportunities for enhancing our environment to protect our livelihoods and provide a good inheritance for our children.

Many of the land management and other practices discussed in the plan are governed, directly or indirectly, by regulation, legislation and financial support from outwith Sutherland - Inverness, Edinburgh, Westminster and Brussels. A key part of this Biodiversity Action Plan is to identify local issues and opportunities to feed back to the decision makers outwith the county. It will also suggest future projects or amendments to wider policies that reflect local needs and assist good practice.

Major gaps and constraints

A major constraint to the production of this plan was the lack of a biodiversity audit summarising available information on habitats and species for Sutherland. The Highlands lack a properly funded and staffedBiological Record Centre, and there are enormous gaps in our knowledge of the biodiversity of Sutherland.

A major obstacle to land managers wishing to undertake biodiversity projects is the complexity of environmental and forestry grant schemes, as well as the lack of resources available for agri-environmental works.

How much can we do locally?

It is true that some of the most pressing threats to the biological richness of Sutherland may seem to be due to forces that are out of our control. Examples include global climate change, changes to agricultural support mechanisms, shipping and West Atlantic oil exploration. Some species, notably salmon, cetaceans and migratory birds, may be threatened by actions taken in other parts of their range.

Solutions to these problems must be agreed at national and even international levels. However, this should encourage us to do the best we can within those activities that we do control, or from using our voice to call on those who could make national and international agreements.

Whilst we have divided the Plan into six broad habitat types for administrative reasons, the land and water of Sutherland should be managed together. That said, we should be careful of generalising for an area the size of Sutherland, what might improve biodiversity in Central Sutherland may not be applicable for the East Coast. As a guiding principle, land managers are encouraged to consider the impacts actions have on all the habitats within the river catchment.

Ox-eye daisy

Next steps

This plan has been prepared under the auspices of the Highland Biodiversity Project, which is a two-year project led by The Highland Council, Scottish Natural Heritage, Highlands & Islands Enterprise, Caithness & Sutherland Enterprise and RSPB Scotland. The partner organisations have agreed to work towards a second phase of the Highland Biodiversity Project focusing on the delivery of a range of Highland-wide projects and initiatives, and it is hoped that this second phase could begin in 2004. In the meantime, it is envisaged that the partners listed above and in the 'Future Actions' sections of this report will work towards the delivery of many of the outputs suggested in the 'Future actions' sections.

SECTION 1: BIODIVERSITY ACTION PLAN

Vision statement

"The use by man of the land and water of Sutherland will be guided by the concept that our grandchildren shall inherit a better countryside than we possess today."

Key biodiversity objectives for Sutherland

- Ensure that all habitats are managed in a way that takes account of their wildlife interests.
- Undertake a biodiversity audit of the wildlife of Sutherland, starting with a literature search to identify gaps in our knowledge and draw together existing regional and local recording projects.
- Raise awareness of the biodiversity of Sutherland, facilitate easy access to information about important species and habitats, and encourage the collection of further information.
- Encourage nature-based tourism through the provision of local facilities and services.
- Discourage the import of new species into the area unless the species was indigenous and can offer a positive contribution to the current biodiversity.
- Identify threatened species and / or areas, and encourage their conservation.
- Encourage and support small and large community-led biodiversity projects to enhance local habitats and ensure they are adequately resourced and publicised.
- Enhance biodiversity in Sutherland by supporting the diversification and improvement of woodlands, and the improved habitat management of rivers and open moorland.

Key biodiversity targets for Sutherland

The Sutherland Biodiversity Group has suggested one key target for each broad habitat type, listed below.

- To work with local communities towards the designation and management of a Marine Reserve within inshore waters in Sutherland.
- To map the distribution of all national and local priority freshwater species and habitats, and manage all of Sutherland's watercourses accordingly.
- To enable up to 50% of Sutherland's farm and croft land to be managed for biodiversity under agri-environment schemes such as the Rural Stewardship Scheme or Whole-Farm Agreements.
- To bring 1000 ha of native woodland into management (e.g. by reducing grazing), and expand the native woodland area by a further 1000 ha through natural regeneration.
- To bring 50% of Sutherland's moorland into positive management under an agreed deer management plan, muirburning plan or management agreement.
- To encourage five of the larger towns and villages in Sutherland to undertake an audit of their wildlife.
- To use the whole 400,000 acres of the Dornoch Firth basin as a model for the practice and demonstration of prudent land use throughout the Highlands involving crofters, farmers, foresters, water bailiffs and stalkers.
- To complete coverage of the Highland Council Ranger Service within Sutherland by securing a ranger post in North Sutherland.

General actions

A number of future actions have been suggested for each broad habitat, but there were a few suggestions arising from the consultation exercise that are more general ideas or common to many habitats, and they are listed below.

- Undertake scientific research to support anecdotal evidence of local people regarding the environmental impacts of certain activities, to be used to demonstrate the need for changes in use or to build an enhanced case for funding for local projects.

- Employ a biodiversity education officer for one year to hold a workshop roadshow in the village halls for children and adults, raise awareness of local wildlife and get feedback on how attitudes are changing.
- Employ at least one permanent full-time biodiversity officer or ecologist within The Highland Council to make significant long-term improvements.
- Hold one-day workshops for crofters, farmers, shepherds and keepers on various subjects relating to biodiversity.
- Produce an annual newspaper for Sutherland biodiversity issues.
- Encourage dog owners to keep dogs on leads to reduce disturbance to ground-nesting birds, and introduce 'dog toilets' at the entrance to community parks and woodlands, backed up by hefty fines for owners that permit their dogs to foul recreational areas.

What can you do

Everyone can do their bit for biodiversity and the environment, whether it is on the farm or croft, in the garden or down at the shops! Here are some examples of how you can help:

Get involved

- Find out about your local environment and take part in local environmental projects.
- Become one of the BTCV Scotland's Highland volunteers (British Trust for Conservation Volunteers)
- Join your local Field or Bird Club, and take part in surveys or projects.
- Send all wildlife records to the Highland Biological Recording Group.
- Keep biodiversity high on the political agenda by writing to your MSP, MP or MEP.

Reduce pollution

- Dispose of hazardous substances wisely.
- Pick up litter and encourage people not to drop litter.
- Use less bleach and harmful cleaning products at home and in the garden.
- Use biodegradable cleaning products and washing powder.
- Don't flush non-biodegradable items down the toilet.

Garden for wildlife

- Compost all your garden and vegetable waste.
- Buy alternatives to peat based products.
- Plant native species that will provide food and shelter all year round for wildlife.
- If you have space, dig a pond.
- Leave a 'wild bit' - long grass, nettles and other weeds can be good for butterflies.
- Grow your own vegetables, and grow to organic principles.
- Put up nest boxes and bat boxes, and build log or stone piles for insects.

Don't forget the larger, global issues such as reducing waste and using less energy:

Reduce waste

- Buy products that will last as long as possible, with as little packaging as possible.
- Re-use your shopping bags and take a strong bag with you when you go shopping.
- Re-use and recycle things as much as possible.
- Buy recycled and locally sourced products when you can.
- Make sure any wood products you buy carry an accredited certification logo, such as the FSC (Forestry Stewardship Council).

Use less energy

- Reduce heat loss by insulating your house well.
- Use low-energy light-bulbs and turn the TV off when you're not watching it.
- Buy energy efficient appliances when you renew old ones.
- Try to use your car as little as possible.

1.1 SEA AND COAST

Introduction

Sutherland has a highly indented coastline extending, as the cormorant flies, for some 80 miles in the west and north and 40 miles in the south-east. Long and deep sea lochs like Loch Eriboll, Loch Inchard, Loch Laxford and Loch a' Chairn Bhain in the north and west contrast with the shallower waters of Loch Fleet and the Dornoch Firth in the south-east. Much of the coastline is rocky, with off-shore islands. There are substantial cliffs at Stoer, on Handa and around Cape Wrath, and the north and west coasts support large areas of maritime heath. In contrast, broad sandy bays occur at Sandwood, Balnakeil and Brora, and the mudflats at Loch Fleet and the Kyle of Tongue provide good feeding grounds for wading birds.

Strathy Beach

Biodiversity objectives

- To work towards local control and sustainable management of inshore fisheries around the coast of Sutherland.
- To encourage all users of the marine resource to work together to reduce any potentially damaging opertations.
- To encourage the fish farming industry to demonstrate a measurable reduction in negative environmental impacts.
- To work with local communities towards the designation and management of a Marine Reserve within inshore waters in Sutherland.

Specific habitats discussed in Section 2

The sea
Beaches, dunes & machair
Coastal cliffs & heaths

Key issues

A. Fishing

Kinlochbervie Harbour

Issues: A major challenge in managing inshore waters is to accommodate all those fishing it and to ensure the maintenance of stocks. Many commercially fished species such as herring and cod have undergone population crashes in the last fifty years, threatening both biodiversity and employment. There are concerns surrounding the damage to the seabed, spawning grounds and bottom dwelling flora and fauna caused by inshore trawling and scallop dredging, the effects of pollutants on planktonic diversity and the resulting impact on the food web, and the potential danger to marine mammals of accidental capture and drowning in fishing nets or creels.

Opportunities: One opportunity to address this issue and enhance the biodiversity of our inshore waters is for conservation organisations to work with fishermen's organisations towards the sustainable management of inshore fisheries. In sensitive areas, low impact harvesting methods should be encouraged. Examples include scallop diving rather than dredging, and techniques such as escape panels (to allow undersized crustaceans to escape) and biodegradable catches in creels to reduce ghost fishing (where creels or pots are lost at sea, but continue to trap shellfish and crustaceans).

Current projects: There is some interest in seabed "ranching" of scallops and crustaceans through Several Orders (allocation of the fishing rights for a specific species e.g. scallops, mussels, within a defined area to one person).

The Highland Shellfish Management Organisation is in the process of applying for a Regulating Order for the Highland Coastline, which will help local fishermen to manage the fishing effort within their inshore waters. It has also supported two new posts

in North Highland to develop local shellfish management plans and projects to maintain and enhance the shellfish stock.

Oyster Farming

Future action:

- Investigate a reputed decline in the lobster catch during the last 10 years, and undertake a restocking and v-notching project (Highlands & Islands Fishermen's Association, local fishermen).

B. Aquaculture

Issues: There are concerns throughout Scotland and the UK about the environmental impacts of fish farming. Issues include the escape of farmed fish and interbreeding with wild fish, the transfer of sea lice between farmed fish and wild salmon and trout, the impact of fish faeces and medicine residues on the seabed and immediate environment, and the impact of acoustic devices to deter seals and cetaceans.

Opportunities: Area Management Agreements between fish farming and wild fisheries interests have been drawn up to reduce potential conflicts. Aquaculture Framework Plans have been prepared for Loch Eriboll, Loch Inchard and Eddrachillis Bay to help site finfish and shellfish farms away from areas where they are likely to conflict with other interests. Automated feeders and feedback loops will help to reduce uneaten fish food entering the marine environment.

Current projects: Some fish farming enterprises use seal scarers that have a very low noise output so as to minimise impact on cetaceans, and fallow cage sites for a longer period than the usual six weeks, to prevent a build-up of faeces on the seabed. Codes of good practice exist and all new aquaculture developments must ordinarily undertake an Environmental Impact Assessment, which should identify any potentially damaging operations and ways of mitigating them.

Future action:

- Ensure all Environmental Impact Assessments take account of impacts on local and national priority habitats and species (Crown Estate, The Highland Council, Scottish Natural Heritage, fish farm companies and environmental consultants).

Salmon Farming Loch Eriboll

C. Pollution and litter

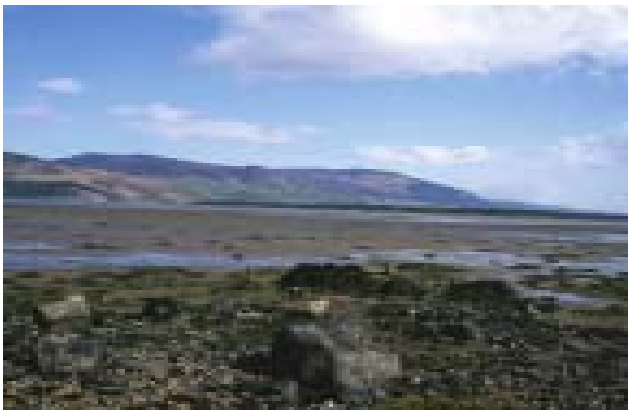
Issues: Sewage, litter and run-off from the land are all potential contaminants, which could cause harm to marine habitats or species. However, with a reduction in point source pollution from pipe outfalls, water quality is improving and the greatest threats are now from diffuse sources such as agricultural run-off. Marine litter (from fly tipping and marine users, etc.) may be a hazard to coastal and marine life and an eyesore. Plastic bags, containers and discarded fishing line and nets can cause particular damage as they are not biodegradable, and some local communities regularly organise 'beach clean-ups'.

Opportunities: Marine pollution and litter can be reduced by educating and encouraging people to dispose of their waste responsibly. Enhanced awareness of practices that minimise waste, better provision for recycling and help with legal disposal are needed.

Current projects: Estuarine and coastal waters are monitored and classified by Scottish Environmental Protection Agency. Harbour authorities providing berthing facilities provide for the collection of waste. Marine litter leaflets have been produced by the Highland Council and the Marine Conservation Agency in the last five years.

Future action:

- Identify a lead partner, with a budget, to tackle the problem of marine litter, and employ local contractors to carry out the works. Place recycling facilities at harbours and raise awareness of marine issues (The Highland Council, Scottish Environmental Protection Agency, marine users).



D. Coastal management

Issues: Erosion from rises in the sea level and man-made influences such as sand extraction and recreational pressures from bikes or camp fires threaten beach, dune and machair habitats. These 'soft' coastal habitats are dynamic and mobile - they absorb wave energy, reducing the impact of erosion from the sea. If the sand is removed or the covering vegetation damaged, the buffering effect of the dune system may be lost, exposing the land behind to the forces of the sea. Machair habitats are easily damaged and slow to repair, so rapid changes in management that don't take this into account should be avoided. Both over and under-grazing are potentially damaging, and care should be taken to avoid erosion from poaching or trampling.

Loss of coastal heath to agricultural intensification or forestry is less of a threat today, but we should strive to protect and manage the areas we have left, as they are important in international terms. Many of the cliff tops are no longer grazed, as farmers and crofters have fenced them off to reduce the loss of livestock. Uncontrolled muirburning is a big problem in parts of north and west Sutherland, and is considered in more detail in the Mountain and Moor section.

Opportunities: In sensitive areas, problems caused by unrestricted access, sand extraction or inappropriate grazing levels could be tackled through enhanced management, and restoration (marram planting for dune fixing) works undertaken where required. For coastal heaths, land managers could be encouraged to graze some areas lightly and training could be provided in muirburning and related issues.

Future actions:

- Improve signage and rope-off areas to prevent unwitting disturbance to beach-nesting birds such as little terns and ringed plovers (land owners, rangers, Scottish Natural Heritage).
- Raise awareness of issues surrounding rare species of bees and wasps, and protect isolated populations from habitat loss or spraying.

Scourie Wildlife Hide

E. Wildlife tourism

Issues: There has been a recent increase in wildlife tourism, with shore-based cetacean watching and boat trips out to Handa Island, Faraid Head, Cape Wrath and along many of the sea lochs attracting many visitors.

Opportunities: The Scottish Marine Wildlife Tour Operators produced a code of good practice entitled 'Navigate With Nature' and the Moray Firth Partnership has developed The Dolphin Space Programme to minimise conflicts between marine wildlife and power boats. Assuming boat operators adhere to these recommendations, this is thought to have minimal negative impacts on marine life.

Current projects: The Highland Council Ranger Service undertake shore-based wildlife watching tours to view marine mammals and sea birds. A leaflet entitled 'Where to Watch Whales and Dolphins Around the North Highland Coast' is currently being prepared.

F. Wider issues

Issues: The Pentland Firth and the Minch are major shipping lanes, and there is a risk of ships running aground. Dredging for navigational purposes and aggregate extraction cause damage to the seabed. The Cape Wrath area is used by the Ministry of Defence as a bombardment range, and large portions of the Minch are used by the Royal Navy in submarine exercises. The effects of military and sonic activities on breeding seabird colonies and marine mammals is not known. Pressures for further renewable energy developments through wave, tidal and wind power are increasing. Climate change is likely to increase both storm intensity and frequency, leading to coastal erosion. There may be an increased pressure to improve coastal defences, particularly in the main settlements.

Opportunities: The Highland Council is currently lobbying to re-route shipping out of the Minch. All large proposals will have to undergo an Environmental Impact Assessment, which should identify the threats they pose to the biodiversity of the area, and ways to mitigate them. Consideration needs to be given to ideas such as managed retreat (allowing some areas to flood to protect others) in coastal zone management plans.

Future actions:

- Monitor sea level rise & develop coastal management plans.
- Ensure the impacts on national and local priority habitats and species are considered in all future Environmental Impact Assessments.

1.2 RIVER, LOCH & WETLAND

Introduction

The landscape of Sutherland is studded with freshwater lochs, ranging upwards in size to the 18 mile long Loch Shin. Lochs are particularly numerous on the gneiss in the west, where Assynt and Eddrachillis alone muster over 1,000. These lochs are fed and drained to the sea by many miles of rivers and burns. Marshes and wet meadows occupy the flood plains of some of the larger rivers. The variation in size, depth and geographical setting of these water bodies has given rise to a varied and distinctive flora and fauna. Social and economic use of Sutherland's rivers and lochs for diverse purposes such as hydro-electric generation, township water supply, flour mills, salmon smolt rearing and angling have all harnessed and influenced the quality or quantity of the water. Land management within the catchment also has an effect.

Achness Falls, Invercassley

Biodiversity objectives

- To maintain and enhance clean, natural water throughout Sutherland's watercourses and wetlands, and restore migratory fish stocks towards 1960s levels.
- To map the distribution of all national and local priority freshwater species and habitats, and manage all of Sutherland's watercourses accordingly.
- To make future developers aware of the biodiversity of freshwaters within Sutherland, and ensure there is no damage to the freshwater environment.
- To undertake a speedy and effective response to the occurrence of unwanted invaders such as mink.

Specific habitats discussed in Section 2

Rivers & Lochs
Wetlands

Key Issues

A. Pollution

Issues: Agricultural and forestry run-off, fish farming and leakage from septic tanks are potential sources of nutrient enrichment, which is detrimental to our rivers and lochs. Incorrect use of fertilisers, herbicides, pesticides and sheep dip can all have a serious effect on rivers and lochs.

Opportunities: In recent years, forestry techniques have improved and opportunities exist to restructure existing plantations to reduce any detrimental effects on freshwaters. Farmers and crofters must continue to be vigilant and adhere to legislation and existing codes of good practice regarding the use of chemicals.

Future actions:

- Raise awareness of pollution issues through education, training and practical demonstration projects (Scottish Environmental Protection Agency, Scottish Executive Environment & Rural Affairs Department, Scottish Agricultural College, Farming & Wildlife Advisory Group, farmers and crofters).
- Encourage local sewage systems involving reed beds in small villages to protect waterways (Scottish Environmental Protection Agency, Scottish Water, the Highland Council, community councils).

Ben Loyal from Loch an Hahel

B. Habitat modifications

Issues: River and lochside developments, bank engineering, gravel extraction, water supply schemes and hydropower projects alter erosion and sedimentation patterns. Road works and winter maintenance in particular can interfere with the movement of animals, especially fish. Some watercourses have been modified to improve drainage or to create fishing pools for salmon or trout, but straightening out natural meanders increases the water flow and can result in a deposition of sediment that can smother the spawning beds of salmon or trout, and damage freshwater pearl mussel populations.

In some areas, wetland and waterside vegetation has been lost due to land drainage, flood defence, bank protection works, cultivation, forestry or heavy grazing by cattle, sheep or deer. Overgrazed or heavily trampled river banks are susceptible to erosion during floods.

Opportunities: When carrying out in-stream or riverside works, care must be taken not to modify the structure and patterns of water flow to the detriment of freshwater habitats and species. Particular attention should be paid to culverts beneath roads and forest tracks in order to maintain water flow. Fencing the banks, planting deep-rooted trees such as willow and alder and installing water troughs will help to stabilise the riversides. Land managers and the public should be made aware of the good works that have already taken place, and of further works that can be done to improve riparian habitats along river and stream banks.

Current projects: Some estates in Sutherland already undertake works to improve the riparian habitat along river and stream banks. Catchment Management Plans and detailed habitat surveys have been undertaken in several systems and a list of recommendations produced to improve freshwater productivity.

The River Oykel is part of a large bid for EU LIFE funding being drawn together for designated rivers by the Association of District Salmon Fishery Boards, with support from Scottish Natural Heritage and the Scottish Executive. The Kyle of Sutherland Board has suggested a programme of habitat improvement measures including the restructuring of commercial forestry in riparian areas, the planting of broadleaves on one of the main tributaries and the blocking of hill drains to enhance water quality and reduce siltation of the spawning beds, with help from the Forestry Commission and other land owners.

In conjunction with several estates, RSPB Scotland and the Highland Council Ranger Service have installed islands on lochs in north and west Sutherland to provide enhanced nesting sites for black-throated divers.

Future actions:

- Undertake the works identified in the various Catchment Management Plans, and encourage land managers to work together over the production and implementation of further Catchment Management Plans (West Sutherland Fisheries Trust, District Fishery Boards, land owners, Scottish Natural Heritage).
- estore or stabilise river banks where current erosion is destroying spawning grounds or the natural movement of fish (as above).
- Clean and restore silted or overgrown spawning grounds for both salmon and trout, and clean out culverts and blocked burns (as above).
- Identify culverts that currently block fish migration through their design, and make them ‘fish friendly’ (West Sutherland Fisheries Trust, District Fishery Boards, the Highland Council, Forestry Commission, land owners).

Allt Nan Uamh with Braebag Behind, West Sutherland

C. Reduction in fish populations

Issues: Numbers of salmon and trout have been declining due to many factors including habitat modifications and the loss of spawning beds.

Opportunities: In addition to the habitat improvements mentioned above, there are opportunities to improve fish populations through restocking projects. Restocking with salmon and trout should be managed to retain the genetic purity of the populations.

Current projects: One hatchery has been recommissioned and another built for the rearing of trout and salmon to an un-fed fry stage. The trout are being put out on hill lochs where natural spawning is scarce and numbers have declined, and the salmon are being returned to the rivers of their origins on an annual basis. The West Sutherland Fisheries Trust is undertaking an ongoing project to provide baseline information on fish populations and measure the success or otherwise of restoration efforts. Fish captured in river estuaries are tagged, measured, weighed and sea lice counts made prior to release. This aids to tracing fish movements and the sea lice counts assist in comparison to fish farm locations.

Future action:

- Raise awareness amongst visiting anglers of where and what method of fishing is allowed (West Sutherland Fisheries Trust, District Fishery Boards, land owners).

D. Flood protection

Issues: The projected increase in flood frequency and intensity due to climate change is likely to heighten the demand for flood relief works. Hard engineering solutions can cause erosion, sedimentation and flooding downstream.

Opportunities: When tackling flooding problems, greater consideration needs to be given to the rest of the catchment, particularly to possible downstream effects.

Future action:

- Manage wetlands to reduce flood events (the Highland Council, Scottish Environmental Protection Agency, Scottish Natural Heritage, land owners).

E. Species introductions

Issues: Invasive, non-native species of fish, mammals, invertebrates and plants cause problems for water courses and aquatic life. Examples include mink and minnows.

Opportunities: We should ensure any re-introductions are bred from local stocks where possible, avoid releasing non-native species in Sutherland, and take steps to eradicate problematic species.

Future action:

- Monitor the effects of, and if possible remove, mink from North West Sutherland (fishing estates, West Sutherland Fisheries Trust, District Salmon Fishery Boards and Scottish Natural Heritage).

F. Lack of Awareness

Issues: There is a lack of awareness about freshwater habitats and species, and a lack of knowledge about the distribution of many freshwater species.

Opportunities: There are opportunities for the Fisheries Trusts and Boards to work with the ranger service over the provision of guided walks and events, and the installation of bird hides or interpretation panels at strategic locations to raise awareness of the freshwater environment.

Current projects: The pupils of Stoer Primary School are working on a big project to find out 'What lives in our loch?' involving the erection of a hide and the purchase of microscopes, binoculars and other equipment to look at the loch environment. Various freshwater education projects have taken place in Bettyhill and Achfary Primary Schools, focussing on the Rhioconich and Strathnaver Lochs. The West Sutherland Fisheries Trust is undertaking a project entitled 'Salmon in the Classroom' to raise awareness of the life cycle and habitat requirements of salmon.

The Kyle of Sutherland Board is also considering establishing a salmon interpretation centre in Bonar Bridge to inform the local community and visitors about salmon management issues, establish links with local primary schools and raise awareness of the importance of salmon and the freshwater environment in general.

Future actions:

- Develop the 'Salmon in the Classroom' project to enable children to raise a small number of eggs, measuring temperature and other variables, before planting out the fry in a neighbouring stream, linked with electrofishing to show the different species and sizes present as well as kick sampling to look at invertebrates and classroom work to look at the life cycle of the salmon (West Sutherland Fisheries Trust, primary schools).
- Produce a Freshwater Atlas indicating the occurrence of native freshwater fish (trout, char and eels), pearl mussels and introduced species (rainbow trout, golden trout and any coarse fish) (Highland Biological Recording Group, Scottish Natural Heritage, West Sutherland Fisheries Trust, District Fishery Boards, fishermen, land owners).

1.3 CROFT & FARM LAND

Introduction

There are over 2,000 crofts in Sutherland, occurring mostly in the west and north and covering 1,048km^2, over one sixth of the total land area. The greater part of this is hill ground used as common grazings, but there is a narrow fringe of more fertile ground along the coast, which was more widely cultivated in the past. Farmland is virtually confined to the south-east and some of the more fertile straths throughout the county. Actively managed agricultural land, where a mosaic of crops are grown and mixture of sheep and cattle are grazed, is generally considered to be good for biodiversity by providing a variety of habitats.

Croft at Culkein, Assynt

Biodiversity objectives

- To encourage actively managed, small-scale agriculture such as traditionally managed crofts and small farms for their environmental and landscape benefits, and make the public aware of those benefits.
- To enable up to 50% of Sutherland's farm and croft land to be managed for biodiversity under agri-environment schemes such as the Rural Stewardship Scheme or Whole-Farm Agreements.
- To create genuine, accessible economic benefits from biodiversity for those involved in agriculture.
- To restrict or reduce the year-round grazing of woodlands to assist natural regeneration.

Specific habitats discussed in Appendix 1

Rough grassland
Arable crops & field margins

Key issues

A. Industry problems

Issues: Due to the current economic problems facing the agricultural industry, the rural population is declining and with it we are experiencing a closure of rural services, reduction in the work force and loss of traditional land management skills. In-bye croft land is now likely to be left unworked, and abandonment and a reduction in the management of small farms and crofts is leading to the spread of invasive plants such as bracken and rushes. Although both are good for biodiversity in small areas, blanket coverage is not desirable for agriculture or biodiversity.

Opportunities: Small farmers and crofters should be encouraged to continue to work the land by strengthening their businesses through enhanced marketing of crofting produce, diversification and adequate payments for agri-environment works.

Current projects: There are many crofting groups in Sutherland that manage land jointly and aim to ensure the survival of small-scale agriculture, with its associated biodiversity benefits. Examples include the Assynt Crofters Trust, Melness Crofters Estate, North West Cattle Producers Association, Kyle of Sutherland Crofters and the Scottish Crofting Foundation.

The Scottish Executive Environment & Rural Affairs Department run an Agricultural Business Diversification Scheme for farmers and crofters that wish to enhance their income through diversification of all or part of their business away from its current use. This can help make the farm or croft more viable, thus strengthening the remainder of the agricultural enterprise.

Crofts at Clashmore, Assynt

Future actions:

- Create and demonstrate genuine socio-economic benefits from biodiversity by enhancing links with tourism and local marketing of produce (the Highland Council, Highlands of Scotland Tourist Board, Highlands & Islands Enterprise).
- Raise public awareness of the biodiversity benefits of well-managed croft and farm land, the importance of traditional land management skills and the potential impacts if this sort of agriculture continues to decline (Scottish Natural Heritage, the Highland Council).

Sheep grazing, Strathnaver

B. Lack of agri-environment funding

Issues: Agri-environment schemes such as the Rural Stewardship Scheme provide some income for biodiversity-friendly management, although such schemes have been under-funded to date. Agricultural funding does not reflect the institutional and social complexities of crofting areas, where crofters may depend on a large area of common grazing and yet payments are area based. Neither does it take into account the annual letting of land or the habitat diversity of common grazings.

Opportunities: Crofters and farmers could do a lot more positive environmental works if the level of funding available through the Rural Stewardship Scheme and whole farm agreements was enhanced, and the scoring criteria amended to take account of small and rented units as well as common land.

Current projects: The Scottish Crofting Foundation and Scottish Natural Heritage run an award scheme incorporating environmental criteria entitled 'The Crofting Township of the Year Award'.

Future actions:

- Enhance the Rural Stewardship Scheme so that it is more accessible and delivers both for individuals and common grazings across the full potential range of habitats (Scottish Executive Environment & Rural Affairs Department).
- Raise awareness of the options available under the Rural Stewardship Scheme, and make it more accessible for anyone going into crofting through the Croft Entrant Scheme and for those keeping cattle in the North West (Scottish Executive Environment & Rural Affairs Department, Crofters Commission, Scottish Crofting Foundation, Scottish Agricultural College, Highland Farming & Wildlife Advisory Group).
- Develop more Peatland Management Scheme type operations for areas not currently eligible on other habitats (Scottish Natural Heritage).

C. Decline in cattle numbers

Issues: The decline in numbers of hill cattle since the 1970s is contributing to a reduction in the biodiversity of some grasslands, moorlands and woodlands. Cattle grazing is often beneficial because of the non-selective manner in which they graze and trample the ground. Sheep have largely replaced cattle in crofting areas, and in-bye croft land is often neglected or overgrazed. A continued decline in cattle, and the associated loss in cropping, will have particularly adverse effects on the area's biodiversity.

Opportunities: Crofters and farmers should be encouraged to rear more cattle on an extensive basis, altering the stocking densities according to the habitat type.

Current projects: The North West Cattle Producers Association is trying to raise awareness of the importance of cattle for biodiversity, and to encourage crofters and farmers in North West Sutherland to keep more cattle.

Cattle grazing below Suilven

Future actions:

- Encourage farmers and crofters to rear more cattle in some areas, where this will result in biodiversity benefits (North West Cattle Producers Association & others).
- Raise awareness of the link between cattle grazing and biodiversity through demonstration sites (North West Cattle Producers Association & others).
- Extend the use of woodchip corrals and sheds, to reduce winter poaching of in-bye land from over-wintering cattle (North West Cattle Producers Association, North Highland Forest Trust).
- Support the erection or repair of fences and dykes to aid management of cattle on hill land (Scottish Executive Environment & Rural Affairs Department, Scottish Natural Heritage).

D. Loss of boundary features

Issues: Farms are getting bigger, and it is no longer viable to employ a large workforce to maintain hedgerows, dykes and other features used by wildlife. This is leading to the loss and neglect of hedges and drystone boundary walls in East Sutherland.

Opportunities: Training could be provided in land management skills such as drystone dyking, hedge creation and management, and crofters and farmers should be encouraged to undertake such works where practical for biodiversity, shelter and stock management benefits.

Current projects: Clashmore & Raffin Township have produced a Development Plan that identifies a desire to rebuild the existing historically important dykes for their biodiversity benefits.

Future action:

- Provide training courses on the management of boundary features such as conservation headlands, hedges and ditches (Lantra, Highland Agricultural Labour Supplies, Scottish Agricultural College and Highland Farming & Wildlife Advisory Group).

E. Intensification

Issues: Mechanisation and intensification of crop production is leaving less waste on the fields. A reduction in crop rotation and decline in the undersowing of cereal crops to produce a grass ley is leading to a reduction in the diversity of management both across the farm and through the year, leading to a corresponding reduction in biodiversity.

Nutrient enrichment from fertilisers can cause problems far beyond the farm boundary, and widespread use of pesticides is associated with the severe decline in populations of farmland birds, largely due to the effects on their food supply, although this is less of a problem in Sutherland than elsewhere. Increased and insensitive use of sheep dips and cattle drenches leads to a loss in invertebrates, and there are disposal issues with sheep dip. The use of some broad spectrum anti-parasitic drugs has reduced the number and variety of insects associated with dung, which are important as food for birds like starlings. Overgrazing of in-bye croft land by sheep is also reducing the biodiversity value of the grassland.

Opportunities: Facilitate nutrient budgeting plans to help farmers utilise manure and reduce dependence on fertilisers. Increase coverage of the Rural Stewardship Scheme to enable more farms and crofts to gain entry to the scheme.

Future actions:

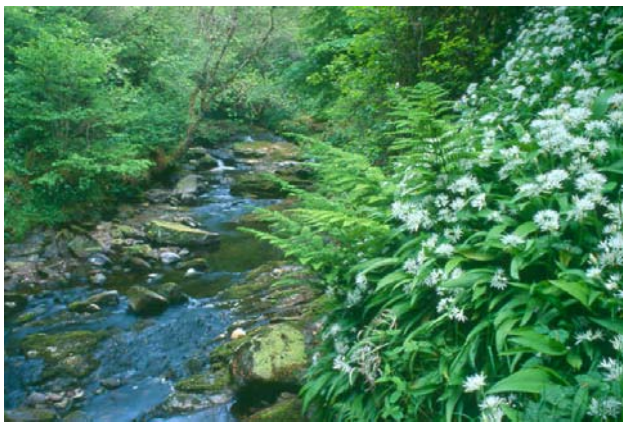
- Encourage organic & low intensity farming (Scottish Agricultural College, Highland Farming & Wildlife Advisory Group).
- Encourage crofters and farmers to create or manage existing wild flower meadows for their biodiversity benefits, including invertebrates such as bumble bees, butterflies & moths, (Scottish Natural Heritage, Scottish Agricultural College, Highland Farming & Wildlife Advisory Group).
- Encourage small local contractors to spread farmyard manure and spent sheep dip on designated areas (Scottish Environmental Protection Agency, Scottish Agricultural College, Highland Farming & Wildlife Advisory Group).

Orchid

1.4 FOREST & WOODLAND

Introduction

In total, Sutherland holds over 74,200 hectares of Woodland. Most of Sutherland's forests and woodlands are conifer plantations of comparatively recent origin. However, small areas of native, mainly deciduous woodland do exist, especially on the west coast and in the sheltered straths, dominated by birch, hazel, oak or alder, with a variety of other species. Their importance to the biodiversity of the area greatly outweighs their coverage. The ancient woodland inventory identifies approximately 11,700 hectares of woodland in the county, much of which is unmanaged and in poor condition. The northernmost stands of oak and native pinewood are found in the county.



Big Burn, Golspie

Biodiversity objectives

- To facilitate and support community management and ownership of local native and commercial woodlands and forestry.
- To halt the destruction of native woodland through felling or inappropriate management (such as overgrazing) and housing and other developments through sound planning, awareness raising and influencing of grant scheme.
- To encourage appropriate management of existing woodlands to promote biodiversity.
- To encourage the development of new broadleaved woodlands and mixed conifer and broadleaf blocks in appropriate sites.
- To protect and increase coverage of aspen and juniper, to restore and expand coverage of riparian woodlands throughout Sutherland.

Specific habitats discussed in Appendix 1

Semi-natural Woodland
Plantation Forestry

Key Issues

A. Management of semi-natural woodlands

Issues: Over-grazing by deer, rabbits and domestic stock, bracken expansion and inappropriate felling and burning have left many semi natural woodlands isolated and in poor condition. Natural regeneration is often absent or of only one species, leading to an unnatural age-structure and composition. In the uplands, some restoration and expansion has occurred through fencing or planting programmes in the last 10 - 15 years, however forest fencing raises further issues in some areas.

Opportunities: The Scottish Forestry Grants Scheme (SFGS) provides incentives for the expansion, restoration and management of semi-natural woodlands. A reduction in grazing pressure by more effective deer control and shepherding will benefit many woodlands outwith specific schemes. For species of particular concern, encouragement of enrichment planting of appropriate species from local seed sources is necessary to preserve the diversity of semi-natural woodlands.

Current projects: The Gearrchoille Woodland, near Ardgay was recently gifted to the local community, and a company has been formed to manage access, interpretation and woodland operations. Under the Highland Biodiversity Project's Know Your Own Patch initiative, a Woodland Open Day was held, and a number of guided walks and other events are taking place in the wood during 2003.

Gavin MacLean at the Gearrchoille Woodland Open Day

Future actions:

- Encourage woodland managers to leave more standing deadwood, as it benefits many species of invertebrates (Forestry Commission, Scottish Natural Heritage, North Highland Forest Trust, woodland advisers).
- Raise awareness of the importance of birch woodland (as above).

B. Management of coniferous plantations

Issues: The majority of Sutherland's plantations have been managed on a clearfell system, which provides little benefit to either biodiversity or local communities. Low timber prices and distance from markets have provided a disincentive to silviculture, even on those sites where ground conditions and exposure would permit alternatives to clearfell.

Opportunities: Restructuring for the second rotation should allow better forest design, incorporating a greater variety of species and open ground habitats. Encouragement of alternative silvicultural systems where conditions allow will promote greater structural diversity. Greater local involvement should promote more sensitive and intimate management.

Current projects: People throughout Sutherland are becoming increasingly involved in the management of their local woodlands through initiatives run by community groups like North Sutherland Community Forest Trust, Culag Community Woodland Trust and Rosehall & District Action Group. North Highland Forest Trust provide advice and assistance for community groups wishing to manage their local woodlands, and have developed a series of marketing projects using timber from local forests including woodchip corrals and heating plants.

Forestry Plantation, Glen Loth

Future action:

- Encourage community involvement in the management of woodlands (community groups, North Highland Forest Trust, Forestry Commission).

C. Management of riparian woodlands

Issues: The banks of many rivers, burns and lochs - the riparian zone - are devoid of woodland. Riparian woodlands can provide some of the most valuable habitat linkages for wildlife, help stabilise river and stream banks, and give cover and a food source to fish.

Opportunities: Restoration and expansion of riparian woodlands should be encouraged as a priority in Sutherland. The Forestry Commission's Scottish Forestry Grant Scheme provides enhanced opportunities for the planting, natural regeneration and management of riparian woodlands.

Current project: Through the previously mentioned LIFE Rivers Project, the Forestry Commission hope to restructure coniferous plantations in the River Oykel catchment to open up the riparian areas and allow more light to penetrate, and to include more broadleaf species to encourage invertebrates and help stabilise river banks.

Future action:

- Raise awareness of the value of riparian woodlands, and encourage land managers to plant or regenerate existing areas of woodland along the banks of rivers, streams and lochs (Forestry Commission, North Highland Forest Trust, Scottish Native Woods, Scottish Natural Heritage, West Sutherland Fisheries Trust, District Fishery Boards, woodland advisers).

D. Management of policy and urban fringe woodlands

Issues: Under-management, fly-tipping and the spread of invasive species such as sycamore and rhododendron present a threat to some woodlands in Sutherland.

Opportunities: Invasive species such as rhododendron should be controlled where possible, and increased local involvement encouraged to promote responsible stewardship.

E. Other issues

Foxes and crows: In areas where previously there were no woodlands, forest blocks can harbour predators such as foxes and crows, which prey on young lambs and the eggs of ground-nesting birds, and may be more numerous with the reduction of gamekeepers.

Forest Fencing: Bird strike on forest fences is a cause of mortality for some species – it can be significantly reduced by marking necessary fencing and removing redundant fences.

Balance between woodland and other land uses: Large-scale afforestation no longer threatens the blanket bog of Caithness & Sutherland, and some inappropriate plantings are being clear felled and the ground restored to peatland habitats through initiatives such as the LIFE Peatlands Project. Future woodland expansion will probably be at the expense of heather moorland and agricultural land, and will require a reduction in grazing pressure through culling or fencing. Strategic planning of land released for forestry (e.g. through the Indicative Forestry Strategy using the Forest Habitat Network concept) is limited by the complex pattern of land tenure.

Current project: The Highland Indicative Forest Strategy is currently under review, and the new Strategy that helps guide new woodland plantations and natural regeneration schemes, as well as identifying opportunities for restructuring existing woodlands, is likely to be issued in 2004.

1.5 MOUNTAIN & MOOR

Introduction

Sutherland's mountains are concentrated along a line parallel to the west coast, from Seana Bhraigh in Kincardine, north to Foinaven with the outliers of Ben Hope, Ben Loyal and Ben Klibreck further to the east. They vary greatly in their geology and in the plant and animal communities they support. Sutherland holds, with Caithness, the largest expanse of treeless, oceanic blanket bog in Europe, extending to over 2,000 km^2.

View from Arkle

Biodiversity objectives

- To maintain or improve the management of mountain and moorland species.
- To reduce the numbers of sheep and deer in certain areas where overgrazing has been identified as a problem.
- To reduce the number of wildfires through more effective muirburn planning and management.

Specific habitats discussed in Section 2

Mountain
Moorland

Key issues

A. Overgrazing and inappropriate burning

Issues: In certain areas, High deer and sheep numbers, and a decline in shepherding, have resulted in overgrazing which has lead to increases in rough grassland at the expense of heather moorland. This may cause localised erosion and run-off. Traditional land management such as muirburn and domestic peat cutting have modified much of the peatland habitat and contributed to the landscape pattern we see today.
Controlled strip-burning of heather moorland can benefit grouse and some species of moorland bird (e.g. meadow pipit, skylark). However, burning of other habitats such as blanket bog, scree and woodland, can cause lasting damage and uncontrolled muirburning is a major problem in some parts of Sutherland.

Fighting Fire, Skerray

Opportunities: Numbers of red deer and sheep should be managed to appropriate levels, with assistance from schemes such as the Rural Stewardship Scheme and the implementation of agreed Deer Management Plans. Training and encouragement of best practice in muirburning is needed, along with support for burning plans covering common grazings and enforcement of legislation when guidelines are ignored. Most of the blanket bog of high biodiversity value is designated as Sites of Special Scientific Interest, Special Areas of Conservation and Special Protection Areas where development proposals are carefully controlled.

Current projects: Numbers of deer and sheep are controlled for sporting and welfare purposes, and the Deer Commission Scotland, Scottish Natural Heritage, estates and conservation bodies are working together on the production of Deer Management Plans, which help neighbouring estates to manage their deer numbers.

The Royal Society for the Protection of Birds manages an extensive peatland Reserve for its conservation interest at Forsinard. In addition to its positive management for conservation, the Reserve is used for survey and monitoring work, and as a teaching resource by many Primary Schools throughout the county.

Peatland Trail, Forsinard

Future actions:

- Document the long-term effects of muirburn in the North and West, building on existing research (Scottish Natural Heritage, Centre for Ecology & Hydrology, Macaulay Land Use Research Institute, Game Conservancy Trust, etc).
- Help with the enforcement of legislation regarding heather burning (Northern Constabulary, Highlands & Islands Fire Brigade, Deer Management Groups, etc).
- Provide enhanced training in heather management, particularly muirburning and the agreement of burning plans covering common land (Scottish Natural Heritage, Scottish Crofters Foundation, Crofters Commission, Deer Management Groups, North Highland College, landowners, crofters, etc).
- Support the production and implementation of Deer Management Plans (Deer Management Groups, Deer Commission).

B. Balance between moorland and woodland land uses

Issues: Large-scale afforestation is no longer a major issue threatening the blanket bog of Caithness & Sutherland, but some peatland areas are drying out because of nearby plantations and drains. Increases in native woodland and natural regeneration schemes are leading to increased consideration of the balance between open ground and woodland.

Commercial forestry and grant aided natural regeneration requires a reduction in grazing pressure through culling or fencing. Fencing encourages long-term dense regeneration of scrub and tall heather, and discourages burning on adjacent ground. There are also issues surrounding the provision of habitats for pest species.

Opportunities: Some forest plantations on deep peat are being restructured or clear felled and the ground restored to peatland habitats through initiatives such as the LIFE Peatlands Project. Consideration should be given to the balance of woodland and moorland land uses but in general, natural regeneration of native broadleaves onto heather moorland, particularly along burns and rivers, should be encouraged. Populations of foxes and crows should be controlled where they have an adverse impact on grassland and moorland species.

Current projects: The LIFE Peatlands Project has undertaken a number of practical projects to improve peatland habitats, including drain blocking and the removal of inappropriately planted forestry and subsequent restoration of peatland. The project has also undertaken a number of awareness-raising initiatives, and is working on a land use strategy for the peatlands of Caithness and Sutherland.

C. Other management issues

Issues: All-terrain vehicles can be damaging to some of the wetter and steeper areas, leading to increased erosion. In drier areas damaged by fire or erosion, expansion of bracken can be a threat. Ticks are a major issue to moorland birds and animals in some areas. Egg theft and illegal persecution of birds of prey is a problem in some localities.

Opportunities: Gamekeepers and stalkers play a key role in effective moorland management, and should be retained as key partners in the management of moorland and hill-land for biodiversity.

Current projects: Scottish Natural Heritage has been running a Peatland Management Scheme for over ten years. The Scheme pays land managers to manage the peatlands according to an agreed plan, and is now being taken forward under SNH's Natural Care Scheme.

D. Recreation and path maintenance

Issues: Hill walking and mountain biking are becoming increasingly popular, and increased numbers of walkers are eroding hill paths and tracks.

Opportunities: Continued support is needed for path maintenance works, and initiatives that guide visitors away from the most sensitive areas, awareness raising to ensure dogs are kept on leads during nesting season, etc.

Current projects: Many estates already undergo a programme of path maintenance, but funds for such

works are currently restricted and it is anticipated that demand will increase with changes to access legislation. The Highland Access Project is providing help and financial assistance for the provision of path networks, waymarking, etc. The Assynt Footpath Group survey existing paths and try to source funding for repair and maintenance.

Future actions:

- Set up joint projects to deliver managed access to hills through existing tracks and enhanced car parking arrangements (the Highland Council, Scottish Natural Heritage, community councils, agencies and landowners).
- Initiate local access forums that concentrate on issues that are relevant to Sutherland and have a budget to support future works (as above)

E. Renewable energy

Issues: There has been an increased interest in renewable energy in recent times, with wind farms and small hydropower schemes representing the most favoured options. Some bird species are thought to be sensitive to the erection of high structures such as wind turbines or pylons near to their breeding sites, and altering the flow of some rivers and streams could have an adverse effect on the migration of salmon and sea trout, spawning beds and fresh-water pearl mussels.

Opportunities: Consideration should be given to mapping areas where wind or hydro power proposals would be detrimental to biodiversity, and identifying sites where they would cause minimal damage. (eg. away from sensitive bird areas)

Current projects: An indicative map has been drawn up by the Highland Council that shows some sensitive areas for wind power, e.g. designated sites, low flying zones. Any bird information could be added to this map.

Walker on Quinag with Loch Assynt below

Future actions:

- Produce a review of the potential of sites for the generation of onshore and offshore wind, wave, tidal and hydro-power, and the production of appropriate plans that guide developments away from sensitive areas, including biodiversity issues as part of a wider piece of work. (Scottish Natural Heritage, The Highland Council).
- Issue guidance to potential developers on ways to minimise any negative impacts (as above).

1.6 TOWN & VILLAGE

Introduction

The 2001 Census states that Sutherland has a total population of 13,778. Of this, 3,750 people live in settlements of over 500 people (Brora, Golspie and Dornoch), and the rest live in smaller towns, villages and crofting communities. With its small, scattered population, Sutherland does not have any extensive built-up areas. However, the variety of managed landscapes in and around its towns, villages, crofting townships and isolated houses make a major contribution to the biodiversity in their vicinity, as do the roads that connect them.

Dornoch

Biodiversity objectives

- To raise awareness of the biodiversity on people's doorsteps through initiatives such as 'Know Your Own Patch'.
- To ensure the biodiversity of roadside verges and hedges and nearby streams and water courses is taken into account in future maintenance contracts.

Specific habitats discussed in Section 2

Parks & gardens
Roadside verges

Key Issues

A. Lack of resources

Issues: With increasing budgetary constraints, park and public garden management is becoming less well resourced, and biodiversity is not always high on the agenda of the park managers or indeed, the general public.

Opportunities: Leaving some grass areas long and uncut and hedges untrimmed on roadsides will benefit biodiversity and save costs, but there may be a need for awareness raising amongst local people as to the benefits of such management.

Future actions:

- Garden for wildlife by growing food plants for butterflies, providing nesting space in ivy or nest boxes, creating mini ponds, composting garden waste, leaving a 'wild corner' and fitting cats with bell collars (everyone).
- Leave old tree trunks, piles of wood or stones around gardens and villages as possible homes for insects and nesting birds (everyone).
- Reduce rubbish and try not to let bins overflow (everyone).
- Leave seed plants as winter food for birds (farmers & crofters, Highland Farming & Wildlife Advisory Group)
- Involve children in the environmental enhancement of parks, cemeteries and public gardens (community groups, Highland Council Ranger Service, the Highland Council, Scottish Natural Heritage).

Kinlochbervie

B. Lack of awareness on biodiversity issues

Issues: There is a general lack of awareness on biodiversity issues around villages and towns in Sutherland.

Opportunities: Encourage people to learn about their local wildlife and document it.

Current projects: The Highland Council Ranger Service does a lot to raise awareness of biodiversity issues in Sutherland through regular guided walks, talks, slide shows and other events.
The Highland Biodiversity Project helped three

communities undertake 'Know Your Own Patch' projects in Skerray, Stoer and Ardgay. The Skerray Historical Association is undertaking a survey of the flora and fauna around Skerray. Pupils of Stoer Primary School have been taking part in a project to find out more about the biodiversity of a local loch entitled 'What Lives in Our Loch?'. The Gearrchoille Woodland Group held a Woodland Open Day and series of events to find out more about the trees and wildlife in their local woodland.

Future action:

- Undertake more Know Your Own Patch projects to help people find out more about their local wildlife (community groups and councils, Scottish Natural Heritage, the Highland Council Ranger Service).

C. Fungal infections

Issues: Fungal infections and loss of old trees are a threat to urban trees and parklands. Old trees and deadwood are acknowledged micro-habitats, but are often removed in an attempt to 'tidy up' parks and gardens.

Opportunities: By raising awareness of the value of deadwood, there will be less pressure to tidy up public parks and gardens. Old and dead trees should be retained where possible, and new trees planted to replace any that have been removed.

D. Road verge and hedge maintenance

Issues: If verge vegetation is cut before the wild flowers have time to set seeds, they will gradually be lost in favour of rank grasses. Spread of invasive species such as ragwort is a big problem in some areas. Where safety permits, hedges should also be left uncut to provide a source of food and shelter for birds through the winter.

Opportunities: Biodiversity elements should be incorporated into roadside maintenance specifications, combined with awareness raising of the likely benefits to be had from such works. A ragwort eradication programme has been suggested.

Ben Loyal

SECTION 2: BIODIVERSITY AUDIT

Introduction

The following pages list the national priority habitats (**highlighted**) and species that are present in each of the six broad habitats, as well as the local priorities that have been identified through the consultation exercise. Lists of the priority habitats, and national and local priority species present in Sutherland are given at the end of this section.

Major gaps and constraints

As previously stated, a major constraint to the production of this plan was the lack of a biodiversity audit summarising available information on habitats and species for Sutherland. The Highlands lack a properly funded and staffed Biological Record centre, and there are enormous gaps in our knowledge of the biodiversity of Sutherland.

The marine environment is much less surveyed and understood than on land, and we do not know the distribution of many important marine habitats and species, much less potentially damaging operations and management requirements.

Beach at Strathan, near Melness

We also know very little about the distribution of groups such as insects and fungi, which are less popular and easily identifiable than flowers and vertebrates, but are nonetheless very important components of our natural systems. Bacteria and other micro-organisms play a much bigger role in the function of ecosystems than hitherto acknowledged, and yet we still know relatively little about bacteria and interactions within the food web, for example, in Sutherland.

2.1 SEA & COAST

The Sea

The seabed around Sutherland is composed mainly of bedrock, sand and gravel. The UK Biodiversity Action Plan classifies this as **sublittoral sands and gravels**, and sandy bays such as Sandwood, Balnakeil and Brora provide good spawning and nursery areas for fish such as sandeels, herring and plaice.

The **deep water mud habitats** in sea lochs like Loch Eriboll, Loch Inchard, Loch Laxford and in Eddrachillis Bay support many species of crab and starfish as well as burrowing shrimp, nephrops, burrowing urchins and sea pens including *Funiculina quadrangularis*, which is rare in such relatively shallow waters. Many sea lochs also contain **maerl beds**, a rare habitat made up of purple encrusting calcareous algae. In favourable conditions, maerl may form reefs of loose, branching nodules.

The sheltered, low-energy habitats of some of Sutherland's inner sea lochs support a rare variation of the knotted or egg wrack *Ascophyllum nodosum*. In particular conditions of extreme shelter and fluctuating salinity, detached fragments of this species can grow into unattached masses at upper or mid-tide levels - the variant ecad *mackaii*. The main UK (and world) populations of this are confined to Scottish sea lochs.

Tidal rapids, which the UK Biodiversity Action Plan uses to define a broad range of high energy environments including shallow sills and constrictions in coastline along sea lochs, deep tidal streams and tide-swept habitats, are found at the mouths of sea lochs, such as at Kylesku. These tidal rapids support characteristic marine communities rich in biodiversity, nourished by food brought on each tide. Many rare mammals, birds and fish have been sighted or caught in and around Sutherland's waters. Harbour porpoises, dolphins (including Risso's, bottle-nosed, common, Atlantic white-sided and white-beaked dolphins) and minke and long-finned pilot whales are regularly seen from the shore and boats. Basking sharks are rare late summer visitors and orca whales are rarely sighted. Both grey and common seals come close to the shore to feed, rest and raise their pups, and otters can be seen close to river mouths in some of the quieter locations. In winter, the waters around Sutherland support coastal populations of common scoter, long-tailed, goldeneye and eider ducks, and great northern and red throated divers are also regular visitors.

The inshore waters of the North Atlantic once offered prime fishing grounds. Common skate, cod, hake, herring, mackerel, plaice, saithe, sole, whiting, monkfish and ling are all caught in inshore waters around Sutherland. Occasionally, leatherback turtles have been recorded, having been brought to Scotland on the Gulf Stream Atlantic current.

Beaches, dunes & machair

The **machair** or dune grasslands of Oldshoremore, Oldshorebeg and Sheigra are amongst the richest dune areas in Britain, with over 200 different species of flowering plant growing there. Strathy Bay is another area of **dune grassland** rich in wild flowers, and a number of rare plants including purple oxytropis, Scottish primrose and some rare eyebright species flourish there. These plant communities co-exist with the traditional low intensity land management undertaken by local crofters, and provide important habitats for rare species such as the great yellow bumblebee.

Sutherland has some beautiful and unspoilt **beaches**. At Sandwood Bay a relatively undisturbed sand dune and machair bar impounds the Sandwood loch, and the peaty soils of the surrounding area are influenced by blown sand. Balnakeil beach is another beautiful area, backed by dunes, coastal grasslands and steep cliffs on the narrow headland of Faraid Head.

There are small areas of **salt marsh** located around the county, for example at Durness, Laxford Bridge, Loch Fleet and the inner Dornoch Firth.

The headland between the Rivers Naver and Borgie forms a unique raised beach where, due to the severe exposure, mountain plants grow almost down to sea level. This area also contains some important archaeological sites, and Torrisdale Bay contains large **sand dune** systems that are particularly evident at Invernaver.

During the winter months, large flocks of wading birds such as oystercatcher, ringed plover and dunlin can be seen feeding at low tide in areas such as Loch Fleet, Brora and Golspie beaches and Balnekeil Bay. Other shore birds like turnstone can also be seen looking for invertebrates along the water's edge. Common and Arctic terns inhabit some of the quieter coastal locations such as on Handa, Brora Golf Course or the Kyle of Tongue.

People relaxing on beach at Handa, Sutherland

Coastal cliffs & heaths

The towering **cliffs and slopes** of Cape Wrath, Stoer, Handa, Faraid Head and Whiten Head rise out of the sea to provide a habitat for cliff-top plant communities and nesting seabirds. Clo Mor, gaelic for 'great web' or 'great cloth' is the highest vertical sea cliff in mainland Britain. The Torridonian sandstone cliffs of Stoer are markedly different from the surrounding Lewisian gneiss coastline. Tall cliffs with stacks, caves and arches are common and the many cliff ledges and crevices are used by a variety of breeding seabirds.

Rock ledge and crevice plant communities may contain thrift, Scots lovage, sea mayweed and roseroot. From May to August our cliffs are home to a collection of nesting seabirds including puffins, fulmars, kittiwakes, razorbills, guillemots, black guillemots, cormorants and shags.

Some of the best remaining examples of **maritime heath** in Scotland occur along the coastline of Sutherland at places such as Cape Wrath, Ben Hutig, Strathy Point and Littleferry. On the east coast, the Ferry Links, Littleferry and Cuthill Links are nationally important heathland sites for lichens.

The limestone outcrops by Loch Eriboll have greatly influenced the vegetation, which has developed extensive grasslands and coastal heaths dominated by mountain avens. Other mountain plants such as moss campion and purple saxifrage occur on these northern-most coasts almost down to sea level because of the suitable bedrock and severity of the weather. The western cliffs support a suite of nationally rare mosses and liverworts, listed below. The tops of the sea cliffs have developed a coastal heath dotted with spring squill and Scottish primrose.

2.2 RIVER, LOCH & WETLAND

Rivers & lochs

Sutherland is dissected by many rivers and burns, which form more fertile incisions into the heart of the county, draining the mountains and moors. Central and South East Sutherland are drained by the Rivers Oykel, Shin, Brora and Helmsdale, which start as peatland burns deep in the heart of Sutherland. Rivers such as the Halladale, the Naver and the Hope drain northwards, whilst shorter, faster flowing rivers and burns drain the hills on the West to empty into the Minch. Britain's highest waterfall is located at the head of Loch Glencoul, near Kylesku.

The biodiversity of Sutherland **lochs** and pools is heavily dependent on their chemistry, which in turn is dependent on the surrounding rocks, soils and distance from the sea. The peatland lochs are acidic and nutrient poor (oligotrophic). Bogbean and sphagnum mosses are characteristic, with unique species of desmids occurring in many of the lochs.

Loch Assynt & Quinag

Lochs of intermediate **(mesotrophic)** nutrient levels have a broad range of species utilising their environment. Insect life is diverse and brown trout, char and eels thrive in such locations.

The limestone lochs of Durness are high in nutrients **(eutrophic)** and support rare pondweeds. Similarly, lochs situated on machair, where reworked shells form sand and gravel of the loch bottom, are rich in aquatic life. Common gulls prefer freshwater lochs during the breeding season, where they gather in colonies of varying size.

These clean waters are vital for sustaining important populations of Atlantic salmon, sea trout, brown trout, char and freshwater pearl mussel. Water voles, now lost from much of the British Isles, still occur on headwater burns in the West.

Daubenton's bats can be seen at dusk feeding over bodies of open water such as slow flowing rivers and lochs.

Black-throated diver

Sutherland's peatland and hill lochs provide particularly important nesting habitats for red and black throated divers and common scoters, whilst the larger lochs such as Loch Loyal are important breeding and moulting sites for waterfowl including Sutherland's resident population of greylag geese.

Wetlands

Pockets of open water, **reedbed** and **fen** can be found within hollows, and often extend along narrow field and road margins in crofting areas such as between Strath Brora and Strath Fleet. This mosaic of arable land, fen and damp grassland is important for lowland breeding waders such as lapwing, curlew, snipe, redshank and oystercatcher. In Assynt, Loch an Aigeil, na Claise and Awe have relatively large reedbeds that act as roosting locations for many birds.

A diverse and colourful range of aquatic plants is found in these open water and wetland habitats. The wetlands are carpeted with an array of flowers including marsh marigold, ragged robin, northern marsh orchid and water avens. Numbers of amphibians are declining further south, which makes Sutherland an increasingly important area for frogs, toads and newts.

2.3 FARM & CROFT LAND

Rough grassland

In the farm and croft land up straths such as at Straths Fleet, Brora, Halladale and Naver, low intensity farming techniques supports a variety of unimproved, **herb-rich grasslands** and **hay meadows**, important habitats in biodiversity terms.

The sward can include a wide variety of plants such as orchids, devil's bit-scabious, birdsfoot trefoil and meadowsweet. Sutherland' rough grasslands support good populations of brown hares which, along with rabbits, form an important part of the diet of hunting raptors and wildcats. This habitat also supports high populations of insects, which provide a food supply for birds like grey partridge and skylarks.Melness

Melness

The UK Biodiversity Action Plan splits rough grassland into several categories. **Lowland dry acid grassland** occurs on nutrient poor, free-draining soils over acid rocks, sand or gravel. They support plants such as heath bedstraw and tormentil, and dwarf shrubs such as heather and blaeberry are also present in small quantities. **Purple moor grass and rush pasture** occurs on shallow peaty soils. This habitat can be species rich, wet grassland, supporting a range of invertebrate life including marsh fritillary butterflies, narrow-bordered bee hawk moths and several species of snails and flies. It is also important for a range of wading birds such as snipe and curlew.

Floodplain grazing marsh is pasture with water filled ditches, which is regularly flooded, grazed and occasionally cut. The Kyle of Sutherland is an example of this habitat type, and it is important for breeding waders such as snipe, lapwing and curlew, and for wintering wildfowl.

Improved grasslands and reseeds may be low in plant diversity, but inEast Sutherland they are important feeding areas for many wading birds such as golden plover, lapwing, curlew and redshank. Where these grasslands have wet patches and areas of longer vegetation, they provide greater opportunities for wildlife. Migrant and over-wintering geese feed on many of the improved grassland fields, and some raptors utilise these fields for hunting.

Arable crops & field margins

East Sutherland is one of the few areas that still supports mixed farming and crofting. The growing of a range of crops and domestic stock is the key to the richness and variety of much agricultural land and if this is lost, so too will be the diversity in the structure of the countryside and wildlife.

The relatively uniform crop structure and low species diversity produced by **arable cropping** provides a limited habitat for wildlife. Cultivated fields can support a flora of annual weeds, which provide seeds and attract insects for bird-life. The stubble left after the combine gives cover and a welcome source of food for small passerines such as brambling, chaffinch and greenfinch. North West Sutherland is one of the few mainland locations where corncrakes breed on a regular basis.

Traditional crofting rotation crops such as oats, turnips and hay offer much in terms of maintaining and improving biodiversity, and the importance of the **crofting mosaic** encompassing crops, rough and improved grasslands and out-bye land is beginning to be recognised by conservationists. In Central Sutherland, hill reseeds provide a valuable habitat.

The **field margins** also offer a wide range of habitats to wildlife and plantlife. **Hedges and dykes** provide a refuge for plants, insects and small mammals that were once widespread in the countryside, as well as acting as wildlife corridors. Boundary habitats such as conservation headlands, where the outermost strip of the crop is managed to control weeds rather than eradicate them and grass margins, where a grass strip is grown around the field edge with no inputs are valuable tools to improve biodiversity on arable and mixed farms. **Ditches and streams** provide rich habitats of flowering plants, supporting invertebrates such as butterflies and beetles.

2.4 FOREST & WOODLAND

Semi-natural woodland

Many of Sutherland's native woods are isolated and fragile, remnants of extensive forests that once covered much of the county. Afforestation in the last century has primarily employed exotic conifers. The composition and structure of both native and plantation woodland reflect climate, soil fertility and past management. The biodiversity value of woodlands resides both in the trees themselves, and in the habitats provided for a great range of species, from the mosses and lichens of the Atlantic oakwoods, to the insects and beetles that thrive on deadwood, to the characteristic woodland birds such as capercaillie and crossbill.

In the uplands, a limited range of tree species thrive on infertile, often peaty soils, and management is constrained by exposure and difficulty of access. Native woods here are typically unfenced, confined to steeper slopes and bounded by low-intensity grazing, with considerable potential for expansion by natural regeneration. On more fertile sites in the coastal lowlands and straths, and particularly in the South-East, woodlands have a wider suite of dominant tree species, and a correspondingly richer ground flora and more diverse canopy structure. These woodlands are often bounded by more intensive agricultural land uses, and have limited scope for natural expansion.

Big Burn, Golspie

Sutherland's diverse forests and woodlands have the potential to deliver a broad range of social, economic and environmental benefits to local communities and society at large. The use of forests and woodlands for recreation has increased, and many communities now seek to play a greater part in their management and even take on ownership. The long-term future of woodlands in Sutherland depends on the continuing delivery of a range of benefits, and the challenge to woodland managers is to balance the needs of recreation, local employment and habitat provision for wildlife.

Upland birchwoods (NVC: W4/W17) Key sites: Strathnaver.

The most common native woodland type in Sutherland is typically found on acid, peaty soils on valley sides or at the margins of blanket mires and hillslope and valley-side flushes. Downy birch is usually the dominant tree, forming a open and often rather decrepit canopy, with a field layer of purple moorgrass and various sphagnum moss species. Various willow species colonise sites too wet for birch, and common alder is often present beside streams and flushes where the nutrient status is higher. On drier ground, rowan is common, holly and hazel are found on pockets of better soils, and juniper in open spaces. Wood sorrel often carpets the ground, and the heathy field layer contains an abundance of mosses and liverworts, especially in rocky terrain or sunless gorges.

Upland oakwoods (NVC: W11) Key sites: Ardvar and Loch a'Mhuillin, Strathfleet, Ledmore. Oakwoods are found on more fertile soils, sessile or hybrid oak assumes dominance, with stands of aspen (on wetter sites) and hazel, and wych elm, birch, rowan, hawthorn and holly in the understorey. The drier eastern oakwoods have often become overrun by bracken, though bluebells may provide a spring carpet. The wetter Atlantic oakwoods, occupy humid valleys and gorges providing ideal conditions for many moss and lichen species. Other western coastal woodlands such as the aspen and hazel woods at Achmelvich and elsewhere is Assynt contain important oceanic lichen and bryophyte communities.

Pinewoods (NVC: W18) Key sites: Amat, Alladale, Fairy Glen.

Pine woodland is only found on poor, usually thin and well drained soils in Scotland north of the Central Belt. Downy birch and rowan are usually important components of the woodland, with juniper common. The ground flora is usually heather, with blaeberry, cowberry and often extensive carpets of mosses. Twinflower, and one-flowered wintergreen are important species that are found in the managed plantation at Balblair Wood.

Wet Woods (NVC: W4/W7) Key sites: Mound Alderwoods, Kyle of Sutherland.

Wet woods are characterised by seasonal waterlogging, and are usually found on very flat sites, such as estuarine and bog margins. Alder is often the dominant species, with willows, aspen and birch common, and a wide range of other species found occasionally. Extensive wet woods, such as those by Loch Fleet, are important for their lack of disturbance, and can provide a refuge for many species, from otters to osprey.

Loch Druim Suardalain, nr Lochinver

Riparian or 'waters edge' woodlands are tremendously important from a biodiversity and river management perspective. Trees help stabilise banks, provide shade and the invertebrates and leaf matter form the basis to the aquatic food chain.

Upland Ash Woodland (NVC: W9)

This woodland type is found on the most fertile soils in the region, and consequently has been much reduced in extent by agriculture. Ash, alder, wych elm, hazel, downy birch, sessile oak, rowan, hawthorn, aspen, bird-cherry and holly will all be found, over a rich and varied ground flora, although the mixture at any site will usually reflect past management practices.
Native woodlands form part of the designated criteria for 26 Sites of Special Scientific Interest, and are an important component of several National Nature Reserves and National Scenic Areas. There are 4 Special Areas of Conservation for woodland in the county: Amat and Alladale Pinewoods (candidate SAC's), Ardvar and Loch a'Mhullin Atlantic Oakwoods (cSAC), Mound Alderwoods (Special Protection Areas / cSAC), Ledmore Woods (cSAC).

Plantation forestry

Conifer plantations comprise the majority of woodland blocks in Sutherland and as with semi-natural woods, their structure and diversity varies with site conditions. In the uplands, management, species diversity and structure are limited by poor soils and exposure, and such plantations are usually dominated by sitka spruce and lodgepole pine. Better soils and more sheltered sites in the South East of Sutherland allow larch, Scots pine, Douglas fir, western red cedar and western hemlock to be managed according to a range of silvicultural systems. Some conifer plantations are rich in associated fungi, and significant opportunities exist for improving biodiversity through restructuring to create more open space within woodlands, planting with broadleaves and, in some situations, tree removal and reversion to bog habitats.

New native woodlands were encouraged by the Woodland Grant Scheme and Crofter Forestry Act, and have accounted for the majority of recent new planting in the county. Species choice and planting design are intended to simulate natural woodlands, and frequently incorporate significant areas of open ground: downy birch, willow, rowan and alder are the most frequently planted species in Sutherland. These woodlands will produce little if any timber, but are expected to develop considerable value for biodiversity, amenity and recreation in the future.

Policy woodlands are typically small plantings, often from the 19th Century, associated with large houses and fertile, sheltered sites. Characterised by a wide range of exotic broadleaf and conifer species such as beech, sycamore, monkey puzzle and silver fir, they often have a complex and stable structure, with high proportions of old trees and dead wood, and very high recreation and amenity value: the Big Burn at Golspie has been described as one of the finest woodland walks in Scotland. This site holds a profusion of woodland flowers and birds, and interesting plants include moschatrel, enchanter's nightshade and the opposite-leaved golden saxifrage. Similarly, urban and garden woods and trees, whilst of limited size, can provide important habitats for a range of woodland creatures.

2.5 MOUNTAIN & MOOR

Mountain

Many of the **mountains** on the western seaboard have a white cap of quartzite rock overlaying red Torridonian sandstone. Very little grows on the quartzite as it is hard and nutrient poor, and the climate is harsh.

Quinag

At high latitudes elsewhere, alpine and sub-alpine heaths characterise the vegetation with dwarf shrubs such as alpine bearberry, juniper, crowberry and cowberry predominating with mountain sedges. Slow growing mosses, lichens and liverworts become dominant components in these communities, and rich communities of liverworts inhabit the colder, wetter north-facing slopes. Golden eagle, dotterel, ptarmigan, ring ouzel, mountain hare and deer inhabit these mountain areas.

Seana Bhraigh, in the Parish of Kincardine and Croick, holds an important montane flora which, in botanical recording terms, is noted under Ross and Cromarty.

Limestone influenced vegetation occurs along the Moine Thrust in West Sutherland, supporting a rich and distinctive plant community with mountain avens as a dominant down to sea level such as at Durness. The Inchnadamph National Nature Reserve, situated on the plateau between Loch Assynt and Ben More Assynt, is of great botanical, geological and geomorphological interest. The plantlife includes mountain avens, globeflower, hollyfern and dark-red belleborine.

However, it is for its limestone caves, the largest in Scotland, that Inchnadamph is better known. Excavations from caves above the Allt Nan Uamh (Burn of the Caves) have revealed bones of the animals that inhabited this part of Scotland around the time of the last Ice Age. They include brown bear, polar bear, arctic fox, reindeer, lynx and lemming. Smoo Cave is another impressive limestone cave at the head of the narrow coastal inlet at Durness.

Upland calcareous grassland is generally restricted to shallow soils over lime-rich rocks. Despite its name, it occurs down to sea level in exposed conditions, and arctic-alpine plants can be present. The most important type in nature conservation terms is the Mountain avens variant, which occurs along the North Coast.

Moorland

The **blanket bog** of Caithness and Sutherland form a dramatic open landscape with associated hills, lochs, rivers and small pools or dubh lochans. These peatlands are home to a unique range of plants and animals, and the plantlife is dominated by ling heather, cross-leaved heath, deer grass, cotton grass and Sphagnum bog mosses. Rather than being important for individual Sphagnum species, it is the diversity and abundance of bog mosses in a relatively undisturbed state that makes the peatlands of Caithness and Sutherland so significant in international terms.

A rich and varied invertebrate fauna provides a food source for the many bird species that inhabit the peatlands. Red-throated and black-throated divers, wigeon, common scoter, golden plover, greenshank, dunlin, wood sandpiper, greylag goose, short-eared owl, golden eagle, hen harrier, merlin and peregrine falcon can all be found here.

The **knock-and-lochan** landscape on the gneiss in the West is characterised by rocky outcrops, small hills and lochans, interspersed with small areas of blanket bog and oceanic - montane heath dominated by heather, cross-leaved heath and deer grass. The wetter areas have a greater proportion of bog mosses, and are home to waders such as dunlin and greenshank. Base-rich flushes with distinctive black bog rush are common, along with more extensive areas of species rich grassland including thyme and lady's mantle.

2.6 TOWN & VILLAGE

Parks & gardens

Although town parks and urban trees are rare in Sutherland, towns and villages such as Lochinver, Durness, Bettyhill, Melvich, Helmsdale, Brora, Golspie and Dornoch have woodland, riverside and coastal walks joining the towns to the surrounding countryside.

Birds such as house martins and swallows are dependent on buildings and agriculture. Song thrushes are declining in number, mainly as a result of excessive hunting and the over-use of pesticides in their wintering areas outwith the county, but they are still quite common.

Roadside verges

Hedges and species-rich verges have also been identified as a locally important habitat in Sutherland, retaining once abundant farmland plants such as orchids, ragged robin, meadowsweet and water avens for local communities and visitors to admire.

Armadale

Priority Habitats:

The habitats listed below have been identified by the UK Biodiversity Steering Group as 'priority habitats' and are present in Sutherland. Habitat Action Plans or Statements have been prepared for these habitats, and are available on the website www.ukbap.org.uk. Additional local priorities, which are not covered by the national categories but are nonetheless important habitats in their own right, have been identified and are distinguished by an (L).

Habitat type:	Section:
Maerl beds	The Sea
Modiolus modiolus beds (horse mussel)	
Mud habitats in deep water	
Sheltered muddy gravels	
Sublittoral sands and gravels	
Tidal rapids	
Coastal saltmarsh	Beaches, dunes & machair
Coastal sand dunes	
Coastal vegetated shingle	
Machair	
Mudflats	
Saline lagoons	
Seagrass beds	
Beaches (L)	
Lowland heathland (inc maritime heath)	Coastal cliffs & heaths
Maritime cliff and slopes	
Eutrophic standing waters	Rivers & lochs
Mesotrophic lakes	
Rivers & burns (L)	
Lochs (L)	
Fens	Wetlands
Reedbeds	
Coastal and floodplain grazing marsh	Rough grassland
Lowland dry acid grassland	
Lowland meadows	
Purple moor grass and rush pasture	
Upland hay meadows	
Herb-rich grassland (L)	
Cereal field margins	Arable crops & field margins
Arable crops (L)	
Crofting mosaic (L)	
Lowland wood pasture and parkland	Semi-natural woodland
Native pine woodlands	
Upland mixed ashwoods	
Upland oakwood	
Wet woodland	
Upland birch woodland (L)	
Hazel woods (L)	
Alder woods (L)	
Upland scrub (L)	
Coniferous plantations (L)	Plantation forestry
Policy woodland (L)	
Limestone pavements	Mountain
Upland calcareous grassland	
Mountain (L)	
Limestone areas (L)	
Knock-and-lochan (L)	
Blanket bog	Moorland
Upland heathland	
Parks & gardens (L)	Town & village
Roadside verges (L)	

UK Priority Species:

The following species have been identified by the UK Biodiversity Steering Group as 'priority species' and are present in Sutherland. Species Action Plans or Statements have been prepared for these species, and are available on the website www.ukbap.org.uk.

Scientific name:	Common name:	Habitat:
Algae		
Ascophyllum nodosum ecad *mackii*	a Knotted wrack	Marine
Amphibians		
Triturus cristatus	Great crested newt	Freshwater
Ants		
Formica aquilonia	Scottish wood ant	Woodland
Formica exsecta	Narrow-headed ant	Woodland
Formica lugubris	Hairy wood ant (Northern)	Woodland
Formicoxenus nitidulus	Shining guest ant	Woodland
Bees & Wasps		
Bombus distinguendus	Great yellow bumblebee	Coast
Colletes floralis	Northern colletes	Coast
Chrysura hirsuta	Cuckoo wasp	Coast
Osmia uncinata	a Mason bee	Coast
Beetles		
Cryptocephalus decemmaculatus	10 spotted leaf beetle	Woodland
Cryptocephalus sexpunctatus	6 spotted leaf beetle	Woodland
Dromius quadrisignatus	a Ground beetle	Woodland
Procas granulicollis	a Weevil	Woodland
Rhynchaenus testaceus	Jumping weevil	Woodland
Birds		
Emberiza schoeniclus	Reed bunting	Freshwater
Alauda arvensis	Skylark	Farm & croft land
Carduelis cannabina	Linnet	Farm & croft land
Crex crex	Corncrake	Farm & croft land
Miliaria calandra	Corn bunting	Farm & croft land
Perdix perdix	Grey partridge	Farm & croft land
Loxia scotica	Scottish crossbill	Woodland
Muscicapa striata	Spotted flycatcher	Woodland
Passer montanus	Tree sparrow	Woodland
Pyrrhula pyrrhula	Bullfinch	Woodland
Tetrao tetrix	Black grouse	Woodland
Tetrao urogallus	Capercaillie	Woodland
Turdus philomelos	Song thrush	Woodland
Melanitta nigra	Common scoter	Moorland
Butterflies & Moths		
Aricia artaxerxes	Northern brown argus	Farm & croft land
Boloria euphrosyne	Pearl-bordered fritillary	Woodland
Epione parallelaria	Dark-bordered beauty	Woodland
Hydrelia sylvata	Waved carpet	Woodland
Paradiarsia sobrina	Cousin German	Woodland
Rheumaptera hastata	Argent and sable	Woodland
Trichopteryx polycommata	Barred tooth-striped	Woodland
Xylena exsoleta	Sword-grass	Woodland
Crustaceans		
Austropotamobius pallipes	Freshwater white-clawed - crayfish	Freshwater
Fish		
Cetorhinus maximus	Basking shark	Marine
Clupea harengus	Herring[1]	Marine
Gadus morhua	Cod[1]	Marine

Merlangius merlangus	Whiting[1]	Marine
Merluccius bilinearis	a Hake[1]	Marine
Merluccius merluccius	a Hake[1]	Marine
Pleuronectes platessa	Plaice[1]	Marine
Pollachius virens	Saithe[1]	Marine
Raja batis	Common skate	Marine
Scomber scrombrus	Mackerel[1]	Marine
Solea vulgaris	Sole[1]	Marine
Tracharus tracharus	Horse Mackerel[1]	Marine

[1] Grouped plan for commercial marine fish

Flies

Blera fallax	a Hoverfly	Woodland
Brachypter putata	a Stonefly	
Hammerschmidtia ferruginea	a Hoverfly	Woodland
Lipsothrix ecucullata	a Cranefly	Woodland
Lipsothrix errans	a Cranefly	Woodland
Lipsothris nervosa	a Cranefly	Woodland

Fungi

Boletopsis leucomelaena	Poroid fungus	Woodland
Hypocreopsis rhododendri	Ascomyte Fungus	Woodland

Lichens

Caloplaca luteoalba	Orange-Fruited Elm-lichen	Woodland
Catapyrenium psoromoides	Tree catapyrenium	Woodland
Pseudocyphellaria norvegica	a Lichen	Woodland
Gyalideopsis scotica	a Lichen	Mountain

Mammals

Balaenoptera acutorostrara	Minke whale[1]	Marine
Delphimus delphis	Common dolphin[2]	Marine
Globicephala melas	Long-finned pilot whale[3]	Marine
Grampus griseus	Risso's dolphin[2]	Marine
Lagenorhynchus acutus	Atlantic white-sided dolphin[2]	Marine
Orcinus orca	Killer whale[3]	Marine
Phocoena phocoena	Harbour porpoise	Marine
Stenella coeruleoalba	Striped dolphin[2]	Marine
Tursiops truncatus	Bottlenosed dolphin[2]	Marine
Lutra lutra	Otter	Marine /Freshwater
Arvicola terrestris	Water vole	Freshwater
Lepus europaeus	Brown hare	Farm & croft land
Sciurus vulgaris	Red squirrel	Woodland
Pipistrellus pipistrellus	Pipistrelle bat	Built Environment

[1] Grouped plan for baleen whales
[2] Grouped plan for small dolphins
[3] Grouped plan for toothed whales

Molluscs

Ostrea edulis	Native oyster	Marine
Margaritifera margaritifera	Freshwater pearl mussel	Freshwater

Mosses & Liverworts

Acrobolbus wilsonii	Wilson's Pouchwort	Woodland
Campylopus setifolus	Silky swan-neck moss	Woodland / Mountain

Reptiles

Dermochelys coriacea	Leatherback turtle[1]	Marine

[1] Grouped plan for marine turtles

Sea anemones

Funiculina quadrangularis	a Tall sea pen	Marine

Stoneworts

Nitella gracilis	Slender stonewort	Freshwater

Vascular plants

Euphrasia rotundifolia	an Eyebright[1]	Coast
Pilularia globulifera	Pillwort	Freshwater
Potamogeton rutilus	Shetland pondweed	Freshwater
Centaurea cyanus	Cornflower	Farm & croft land
Linnaea borealis	Twinflower	Woodland
Trichomanes speciosum	Killarney fern	Woodland
Artemisia communis	Norwegian mugwort	Mountain
Juniperus communis	Juniper	Moorland
Lycopodiella inundata	Marsh clubmoss	Moorland

[1] *Grouped plan for eyebrights*

Local Priority Species

Sutherland contains a number of additional species that are rare or scarce in either Highland or Britain as a whole, and these 'local priority species' are listed below. We have also included a number of species that although not rare or scarce nationally, are rare in Sutherland. Further details of locally important species are available from the Highland Biodiversity Officer.

Scientific name:	Common name:	Habitat:
Amphibians		
Bufo bufo	Common toad	Freshwater
Bees & Wasps		
Bombus muscorum	a Bumble bee	
Beetles		
Carabus clatratus	a Ground beetle	Moorland
Nebria nivalis	a Ground beetle	Mountain
Birds		
Alca torda	Razorbill	Sea & coast
Ardea cinerea	Grey heron	Sea & coast, Freshwater
Bucephala clangula	Goldeneye	Sea & coast
Cephus grylle	Black guillemot	Sea & coast
Clangula hyemalis	Long-tailed duck	Sea & coast
Corvus corax	Raven	Sea & coast, Moorland, Mountain
Falco peregrinus	Peregrine	Sea & coast, Moorland
Fratercula artica	Puffin	Sea & coast
Fulmarus glacialis	Fulmar	Sea & coast
Gavia artica	Black-throated diver	Sea & coast, Freshwater
Gavia immer	Great northern diver	Sea & coast, Freshwater
Gavia stellata	Red-throated diver	Sea & coast, Freshwater, Moorland
Hydrobatus pelagicus	Storm petrel	Sea & coast
Larus argentatus	Herring gull	Sea & coast
Larus fuscus	Lesser black-backed gull	Sea & coast
Melanita fusca	Velvet scoter	Sea & coast
Melanitta nigra	Common scoter	Sea & coast, Freshwater, Moorland
Phalacrocorax aristotelis	Shag	Sea & coast
Phalacrocorax carbo	Cormorant	Sea & coast
Rissa tridactyla	Kittiwake	Sea & coast
Somateria mollissima	Eider	Sea & coast
Tadorna tadorna	Shelduck	Sea & coast
Uria aalge	Guillemot	Sea & coast
Anas acuta	Pintail	Freshwater
Anas clypeata	Shoveler	Freshwater
Anas crecca	Teal	Freshwater, Freshwater, Moorland
Anser anser	Greylag goose	Freshwater, Farm & Croft, Moorland
Anser brachyrhynchus	Pink footed goose	Freshwater, Farm & Croft
Anus penelope	Wigeon	Freshwater, Moorland
Arenaria interpres	Turnstone	Freshwater
Aythya ferina	Pochard	Freshwater
Aythya marila	Scaup	Freshwater
Branta leucopsis	Barnacle goose	Freshwater
Calidris alba	Sanderling	Freshwater
Calidris alpina	Dunlin	Freshwater, Moorland
Calidris canutus	Knot	Freshwater
Calidris maritima	Purple sandpiper	Freshwater
Carduelis flavirostris	Twite	Freshwater, Farm & Croft
Charadrius hiaticula	Ringed plover	Freshwater
Cygnus cygnus	Whooper swan	Freshwater, Farm & Croft
Cygnus olor	Mute swan	Freshwater
Emberiza schoeniclus	Reed bunting	Freshwater, Farm & Croft
Gallinago gallinago	Snipe	Freshwater
Gallinula chloropus	Moorhen	Freshwater
Haematopus ostralegus	Oystercatcher	Freshwater
Larus canus	Common gull	Freshwater
Larus ridibundus	Black headed gull	Freshwater
Limosa lapponica	Bar-tailed godwit	Freshwater
Limosa limosa	Black-tailed godwit	Freshwater
Locusella maevia	Grasshopper warbler	Freshwater
Numenius arquata	Curlew	Freshwater, Farm & Croft, Moorland

Pandion haliaetus	Osprey	Freshwater
Philomachus pugnax	Ruff	Freshwater
Plectrophenax nivalis	Snow bunting	Freshwater, Farm & Croft
Pluvialis squatarola	Grey plover	Freshwater
Podiceps auritus	Slavonian grebe	Freshwater
Porzana porzana	Spotted crake	Freshwater
Rallus aquaticus	Water rail	Freshwater
Riparia riparia	Sand martin	Freshwater
Sterna albifrons	Little tern	Freshwater
Sterna hirundo	Common tern	Freshwater
Sterna paradisaea	Arctic tern	Freshwater
Sterna sandvicensis	Sandwich tern	Freshwater
Tringa nebularia	Greenshank	Freshwater, Moorland
Tringa totanus	Redshank	Freshwater, Farm & Croft
Vanellas vanellas	Lapwing	Freshwater, Farm & Croft
Alauda arvensis	Skylark	Farm & Croft
Anthus pratensis	Meadow pipit	Farm & Croft, Moorland
Carduelis carduelis	Goldfinch	Farm & Croft
Carduelis chloris	Greenfinch	Farm & Croft
Carduelis flavirostris	Linnet	Farm & Croft, Roadside
Coturnix coturnix	Quail	Farm & Croft
Crex crex	Corncrake	Farm & Croft
Fringilla coelebs	Chaffinch	Farm & Croft
Fringilla montifringilla	Brambling	Farm & Croft
Hirundo rustica	Swallow	Farm & Croft
Miliaria calandra	Corn bunting	Farm & Croft
Perdix perdix	Grey partridge	Farm & Croft
Pluvialis apricaria	Golden plover	Farm & Croft
Sturnus vulgaris	Starling	Farm & Croft, Urban
Turdus iliacus	Redwing	Farm & Croft, Woodland
Turdus pilaris	Fieldfare	Farm & Croft, Woodland
Turdus viscivorus	Mistle thrush	Farm & Croft, Woodland
Anthus pratensis	Tree pipit	Woodland
Asio flammeus	Short-eared owl	Woodland, Moorland
Asio otus	Long eared owl	Woodland
Circus cyaneus	Hen harrier	Woodland, Moorland
Falco columbarius	Merlin	Woodland, Moorland
Falco tinnunculus	Kestrel	Woodland
Loxia curvirostra	Crossbill	Woodland
Muscicapa striata	Spotted flycatcher	Woodland
Phoenicurus phoenicurus	Redstart	Woodland
Phyloscopus sibilatrix	Wood warbler	Woodland
Phyloscopus trochilus	Willow warbler	Woodland
Pyrrhula pyrrhula	Bullfinch	Woodland
Regalus regalus	Goldcrest	Woodland
Scolopax rusticola	Woodcock	Woodland
Tetrao tetrix	Black grouse	Woodland, Moorland
Turdus philomelos	Song thrush	Woodland
Tyto alba	Barn owl	Woodland
Aquila chrysaetos	Golden eagle	Moorland, Mountain
Cuculus canorus	Cuckoo	Moorland
Lagopus lagopus	Red grouse	Moorland
Numenius phaeopus	Whimbrel	Moorland
Pluvialis apricaria	Golden plover	Moorland
Saxicola torquata	Stonechat	Moorland
Stercorarius parasiticus	Arctic skua	Moorland
Stercorarius skua	Great skua	Moorland
Charadrius morinellus	Dotterel	Mountain
Lagopus mutus	Ptarmigan	Mountain
Turdus torquatus	Ring ouzel	Mountain
Apus apus	Swift	Urban
Delochon urbica	House martin	Urban
Passer domesticus	House sparrow	Urban
Emberiza citronella	Yellowhammer	Roadside
Passer montanus	Tree sparrow	Roadside
Prunella modularis	Dunnock	Roadside

Butterflies & Moths

Hipparchia semele	Grayling	Coast
Coenonympha tullia	Large heath	Moorland
Erebia aethiops	Scotch argus	Moorland

Crustaceans

Homarus gammarus	Common lobster	Marine
Palinurus elephas	Crawfish	Marine

Fish

Salmo salar	Atlantic salmon	Freshwater / Marine
Salmo trutta	Sea trout	Freshwater / Marine
Salmo trutta	Brown trout	Freshwater
Salvelinus alpinus	Arctic char	Freshwater

Mammals

Myotis daubentoni	Daubenton's bat	Freshwater
Neomys fodiens	Water shrew	Freshwater
Martes martes	Pine martin	Woodland
Felis sylvestris	Wild cat	Mountain
Mustela erminea	Stoat	Mountain
Plecotus auritus	Brown long-eared bat	Built environment

Molluscs

Cochlicella acuta	Pointed snail	Coast
Helicella itala	Heath snail	Coast
Pupilla muscorum	Moss chrysalis snail	Coast
Vallonia costata	Ribbed grass snail	Coast
	Button ram's horn	Freshwater
	Freshwater pea mussel	Freshwater

Mosses & Liverworts

Geocalyx graveolens	a Liverwort	Coast
Pellia borealis	a Liverwort	Freshwater
Anastrophyllum joergensenii	a Liverwort	Mountain
Mastigophora woodsii	a Liverwort	Mountain
Bryum marrattii	a Moss	Coast
Bryum salinum	a Moss	Coast
Myurium hochstetteri	a Moss	Coast
Sanionia orthothecioides	a Moss	Coast
Hygrohypnum dilatatum	a Moss	Freshwater
Brachythecium compactum	a Moss	Mountain
Campylopus shawii	a Moss	Mountain
Paraleucobryum longifolium	a Moss	Mountain
Pohlia andalusica	a Moss	Mountain
Pseudoleskella nervosa	a Moss	Mountain
Rhychostegium alopecuroides	a Moss	Mountain
Seligeria trifaria	a Moss	Mountain
Sphagnum fuscum	a Bog-moss	Mountain
Sphagnum majus	a Moss	Mountain
Amblystegium varium	a Moss	Limestone areas
Bryum mildeanum	a Moss	Limestone areas
Conardia compacta	a Moss	Limestone areas
Hypnum bambergeri	a Moss	Limestone areas
Rhychostegiella teneriffae	a Moss	Limestone areas
Tortella densa	a Moss	Limestone areas

Reptiles

Anguis fragilis	Slow worm	Moorland
Vipera berus	Adder	Moorland

Spiders

Larinioides patagiatus	an Orb-web spider	Freshwater

Vascular plants

Carex maritima	Curved sedge	Coast
Carex recta	Estuarine sedge	Coast
Euphrasia foulaensis	an Eyebright	Coast
Euphrasia marshallii	an Eyebright	Coast / Freshwater
Hieracium fulvocaesium	a Hawkweed	Coast
Hieracium pauculidens	a Hawkweed	Coast
Juncus balticus	Baltic rush	Coast
Ophioglossum azoricum	Small adder's tongue	Coast
Oxytropis halleri	Purple oxytropis	Coast

Primula scotica	Scottish primrose	Coast
Vicia orobus	Wood bitter-vetch	Coast
Carex chordorhiza	String sedge	Freshwater / Mountain
Isoetes echinospora	Spring quillwort	Freshwater
Nuphar pumila	Least water-lily	Freshwater
Cephalanthera longifolia	Narrow-leaved helleborine	Woodland
Moneses uniflora	One-flowered wintergreen	Woodland
Neottia nidus-avis	Bird's nest orchid	Woodland
Ajuga pyramidalis	Pyramidal bugle	Mountain
Alchemilla glaucescens	a Lady's mantle	Mountain
Arctostaphylos alpinus	Arctic bearberry	Mountain
Arenaria norvegica ssp *norvegica*	Arctic sandwort	Mountain
Asplenium septentrionale	Forked spleenwort	Mountain
Betula nana	Dwarf birch	Mountain
Carex capillaris	Hair sedge	Mountain
Carex rupestris	Rock sedge	Mountain
Dactylorhiza incarnata ssp *cruenta*	Early marsh orchid	Mountain
Dactylorhiza lapponica	Lapland orchid	Mountain
Deschampsia setacea	Bog hair-grass	Mountain
Diphasiastrum issleri	Yellow cypress clubmoss	Mountain
Hieracium diversidens	a Hawkweed	Mountain
Hieracium kennethii	a Hawkweed	Mountain
Hieracium mucronellum	a Hawkweed	Mountain
Hieracium pollinarium	a Hawkweed	Mountain
Hieracium prolixum	a Hawkweed	Mountain
Luzula arcuata	Curved wood-rush	Mountain
Minuartia rubella	Mountain sandwort	Mountain
Minuartia rubella	Mountain sandwort	Mountain
Minuartia sedoides	Cyphel	Mountain
Poa glauca	Glaucous meadow-grass	Mountain
Rhynchospora fusca	Brown beak-sedge	Mountain
Salix myrsinites	Whortle-leaved willow	Mountain
Salix reticulata	Net-leaved willow	Mountain
Saxifraga nivalis	Alpine saxifrage	Mountain
Sorbus rubicola	Rock whitebeam	Mountain
Dryas octapetala	Mountain avens	Limestone areas
Epipactis atrorubens	Dark red helleborine	Limestone areas
Gymnocarpium robertianum	Limestone fern	Limestone areas

Rural Stewardship Scheme

The Rural Stewardship Scheme incorporates a list of 30 locally important habitats and species, that have been drawn up jointly by agricultural and conservation interests. There are different lists for different areas throughout Scotland, and Sutherland falls under the West Highland list, which is shown below. This list is not to be confused with the national and local priority habitats and species above, as it is used specifically for RSS applications and is updated by the Scottish Executive Environment and Rural Affairs Department on an annual basis.

RSS 2003 LBAP Species and Habitats List: West Highland

Habitat

1. Acid grassland
2. Marshy grassland and rough pasture
3. Purple moor grass and rush pastures
4. Neutral grassland
5. Upland meadows
6. Watercourses (rivers and streams)
7. Rushes & marginal vegetation (including species-rich rush pasture)
8. Wetland margins
9. Blanket bog
10. Wet heath
11. Dry heath
12. Overwintering crops
13. Wet woodland
14. Wood and scrub pasture
15. Scrub woodland (upland scrub)

Species

16. Ragged robin
17. Yellow rattle
18. Devil's bit scabious
19. Bird's foot trefoil
20. Common eyebright
21. Knapweed
22. Brown trout
23. Redshank
24. Lapwing
25. Snipe
26. Curlew
27. Woodcock
28. Yellowhammer
29. Goldfinch
30. Twite

ANNEX 1: REFERENCES

- Preston, CD, Pearman, DA & Dines, TD (Eds) (2002) 'New Atlas of the British & Irish Flora'. Oxford University Press
- Scottish Natural Heritage (2002) 'Natural Heritage Futures' documents
- Joint Nature Conservation Committee (1996) 'Coasts and Seas of the United Kingdom, Region 3 North-east Scotland: Cape Wrath to St Cyrus'. Coastal Directory Series
- Joint Nature Conservation Committee 'Directory of the Celtic Coasts and Seas'
- The Macaulay Land Use Research Institute (1993) 'The Land Cover of Scotland 1988' (LCS88)
- The Scottish Biodiversity Group (1997) 'Biodiversity in Scotland: The Way Forward'. The Stationary Office Bookshop, Edinburgh
- The Scottish Biodiversity Group (1999) 'Local Biodiversity Action Plans: A Manual and Guidance Notes'. CoSLA, Edinburgh
- The Scottish Biodiversity Group (2000) 'Action for Scotland's Biodiversity'. The Stationary Office Bookshop, Edinburgh
- The Scottish Biodiversity Group (2001) 'A Flying Start: Local Biodiversity Action in Scotland'. The Stationary Office Bookshop, Edinburgh
- The UK Government (1994) 'Biodiversity: The UK Action Plan'. HMSO, London
- The UK Government (1994) 'Sustainable Development: The UK Strategy'. HMSO, London
- UK Biodiversity Action Plan 'Tranche 2 Action Plans'. English Nature, Peterborough
  Index to the Tranche 2 Action Plans
  Volume I: Vertebrates and Vascular Plants
  Volume II: Terrestrial and Freshwater Habitats
  Volume III: Plants and Fungi
  Volume IV: Invertebrates
  Volume VI: Terrestrial and Freshwater Species and Habitats

ANNEX 2: CONTACT DETAILS

Organisation:	What they can help with:	Contact details:
Bat Conservation Trust	Information on bats, bat habitats, bat boxes and conservation.	www.bats.org.uk
Biological Recording in Scotland	Promote the gathering of environmental data, initiate projects and circulate information to help the recording community in Scotland.	www.brisc.org.uk
BSBI - Botanical Society of the British Isles	Holders of the botanical records for the Sutherland area.	www.bsbi.org.uk
British Dragonfly Society	Information on dragonfly habitats, training of volunteers in identification & collation of dragonfly records.	www.dragonflysoc.org.uk
BTCV Scotland - British Trust for Conservation Volunteers	Volunteer participation in practical conservation activities, can work with communities to deliver local environmental projects & provide insurance for such works.	Kerry Jones, 30 Millbank Road, Munlochy, Inverness IV8 8ND. Tel: 01463 811560 www.btcv.org.uk
British Trust for Ornithology	Investigate the populations, movements and ecology of wild birds, organise annual breeding and winter bird surveys locally.	www.bto.org
Butterfly Conservation (Scotland)	Encourage surveying and monitoring of butterflies and moths, and advise on habitat management for priority species.	Tom Prescott, Kingussie. (HQ: Balallan House, Allan Park, Stirling FK8 2QG. Tel: 01786 447753 www.butterfly-conservation.org
Caithness & Sutherland Enterprise	Provide advice and support for environmental projects and community-led works.	Eann Sinclair, Tollermachie House, High Street, Thurso KW14 8AZ. Tel: 01847 896115 www.hie.co.uk
Caithness & Sutherland Environmental Group	A forum for land managers and others to transfer ideas and best practice on the integration of conservation and agriculture.	Doreen Morgan (see Scottish Agricultural College)
Caithness & Sutherland Trout Angling Group	A local partnership that provides advice on sustainable trout angling in Caithness and Sutherland, and has undertaken a number of habitat improvement projects.	enquiries@fishing-highland.co.uk www.fishing-highland.co.uk
District Salmon Fishery Board	The Board has a statutory duty to protect and improve salmon stocks within its area.	
Assynt Field Club	Encourage recording of animal and plant observations, and organise a number of talks and field trips.	

Deer Commission Scotland	Provide advice on deer management and welfare issues.	Knowsley, 82 Fairfield Road, Inverness IV3 5LH. Tel: 01463 231751 www.dcs.gov.uk
Highland Biodiversity Project	Responsible for the preparation and implementation of Local Biodiversity Action Plans in Highland.	Janet Bromham, The Highland Council, Glenurquhart Road, Inverness IV3 5NX. Tel: 01463 702274
Highland Biological Recording Group	Record biological information individually and through co-ordinated atlas projects, surveys, field trips and events.	Jonathan Watt, Inverness Museum & Art Gallery, Castle Wynd, Inverness IV2 3EB. Tel: 01463 237114
Highland Council Ranger Service	Run a programme of environmental education events and guided walks, run practical conservation projects, and give advice on access and conservation issues.	Andy Summers, Ian Patterson, Donald Mitchell
Highland Council Sustainable Development Officer Highland FWAG – Farming and Wildlife Advisory Group	Provides advice on sustainability issues and appropriate community action. Provide advice to farmers, crofters and landowners on conservation projects and agri-environmental grants.	Una Lee, The Highland Council, Glenurquhart Road, Inverness IV3 5NX. Tel: 01463 702543 Fran Lockhart, Glaikmore, North Kessock, Inverness IV1 1XD. Tel: 01463 811072 www.fwag.org.uk/scotland
Forestry Commission	Administer the Scottish Forestry Grant Scheme, which provides woodland management and expansion incentives for private woodland owners, and regulate and control works through Felling Licence and Environmental Impact Assessment regulations.	Willie Beattie, Fodderty Way, Dingwall IV15 9XB. Tel: 01349 862144 www.forestry.gov.uk
Froglife	Provide habitat advice about amphibians and reptiles in gardens and the wider countryside, and encourage their recording.	www.froglife.org
Grounds for Learning	Provide advice, contacts, programmes, grant and award schemes tailored for Scottish schools, for the improvement of school grounds for education, biodiversity and enjoyment.	www.ltl.org.uk/scot.html
Community Toolkit	Can help organisations find solutions to a range of problems and issues. Specifically designed for community groups and is based on common themes identified by local voluntary groups from around Inverness and Nairn.	www.communitytoolkit.org.uk

LIFE Peatlands Project	Undertake a range of initiatives to help raise the profile and awareness of the peatlands.	Neil Wilkie, Alba House, Main Street, Golspie KW10 6TG. Tel: 01408 634150 www.lifepeatlandsproject.com
Marine Conservation Society	Run a number of volunteer coastal and marine projects including beachwatch, seasearch and	Calum Duncan, 3 Coates Place, Edinburgh EH3 7AA. Tel: 0131 2266360 www.mcsuk.org
Moray Firth Partnership	Provide advice on management of marine and coastal habitats in the Moray Firth, and run a small environmental scheme.	27 Ardconnel Terrace, Inverness IV2 3AE. Tel: 01463 226495 www.morayfirth-partnership.org
National Farmers Union of Scotland	Provide information on agricultural matters and representation on behalf of members.	4 Brabster Street, Thurso KW14 7AP www.nfus.org.uk
North Highland Forest Trust	Provide advice and assistance on woodland biodiversity and community woodland projects.	Alba House, Main Street, Golspie KW10 6TG. www.nhft.org.uk
Plantlife	Acts to stop common wild plants becoming rare in the wild, to rescue wild plants on the brink of extinction, and to protect sites of exceptional botanical importance by practical conservation work, and influencing policy and legislation.	www.plantlife.org.uk
RSPB Scotland – Royal Society for the Protection of Birds	Provides advice and assistance on the conservation of wild birds and their habitats, especially declining, threatened or rare species.	Kenny Graham, Alba House, Main Street, Golspie KW10 6TG. Tel: 01408 634150 www.rspb.org.uk
Scottish Agricultural College	Provide advice to farmers, crofters and land owners on wildlife habitat improvement, and help prepare and submit Rural Stewardship Scheme applications.	15 Traill Street, Thurso. Tel: 01847 892719 www.sac.ac.uk
Scottish Crofting Foundation	Promotes the benefits that crofting brings to its communities, as well as to the wider public.	Old Mill, Broadford, Isle of Skye IV49 9AQ. Tel: 01471 822529 www.crofting.org
Scottish Environmental Protection Agency	Regularly monitor and classify coastal waters, rivers and lochs, deal with pollution incidents and provide advice and, through its Habitat Enhancement Initiative, provides guidance and support on the creation and best management of wildlife habitats.	Tel: 0800 806070 (24 hour pollution emergency number) www.sepa.org.uk
SEERAD - Scottish Executive Environment & Rural Affairs Department	Advises on and implements policy relating to agriculture, rural development, food, the environment and fisheries.	Strathbeg House, Clarence Street, Thurso KW14 7JS. Tel: 01847 893104 www.scotland.gov.uk

Scottish Natural Heritage	Provide advice and assistance on protected species and designated areas, grant-aid practical biodiversity and awareness-raising projects.	Main Street, Golspie. Tel: 01408 633602. www.snh.org.uk
Scottish Ornithologists Club	Brings together amateur birdwatchers, keen birders and research ornithologists with the aims of documenting, studying and enjoying Scotland's varied birdlife. The local Club collects and collates bird records for Caithness.	Harbour Point Newhailes Road Musselburgh EH21 6SJ Tel 0131 6530653 www.the-soc.fsnet.co.uk
Scottish Water	Provides water and waste water services to household and business customers across Scotland.	www.scottishwater.co.uk
Scottish Wildlife Trust	Provide advice on habitat management, identification of areas of high biodiversity and conservation volunteer activities.	Unit 4A, 3 Carsegate Road North, Inverness IV3 8DU. Tel: 01463 714746 www.swt.org.uk
The Mammal Society	Organise mammal surveys and work to protect British mammals, to halt the decline of threatened species.	www.mammal.org.uk

Glossary

acoustic	of sound or hearing
agri-environment	linkage between the rearing of crops and livestock and the surrounding environment
all-terrain vehicle	light vehicle with many low pressure tyres or caterpillar tracks that spread the weight and make it easier to cross boggy areas
amphibian	a vertebrate, such as a newt, frog or toad, that lives on land but breeds in water
aquatic	growing or living in water
arthropod	a creature, such as an insect or spider, which has jointed legs and a hard case on its body
biodegradable	capable of being decomposed by natural means
biodiversity	biological diversity, the variety of all living things
bryophyte	a moss or liverwort
calcareous	of or containing calcium carbonate
catchment	area of land draining into a river, basin or reservoir
cetacean	member of an order of aquatic mammals having no hind limbs, front limbs modified into paddles, and a blowhole for breathing, includes whales, dolphins and porpoises
clearfell	an area where all the trees have been felled
coarse fish	any freshwater fish that is not of the salmon family
coastal defences	natural or man-made barriers to slow down or halt erosion from the sea
common grazing	piece of rough grazing land shared between two or more people
community	a group of independent plants and animals inhabiting the same region
conifer	a tree / shrub bearing cones and evergreen leaves, such as pine, spruce, fir or larch
crustacean	usually aquatic arthropod with a hard outer shell and several pairs of legs, such as the lobster, crab or shrimp
culvert	a drain or covered channel that crosses under a road or railway
deciduous	a tree or shrub which sheds its leaves annually, such as birch or oak
Deer Mangement Plan	a plan drawn up by the local Deer Management Group to agree culling targets amongst neighbouring estates
diffuse	spread out over a wide area (diffuse pollution: no single point source)
diversification	to vary products or operations in order to spread risk or expand
dredging	the process of scooping or sucking up material from the seabed or a riverbed
ecosystem	a system involving the interactions between a community and its non-living environment
electrofishing	method of surveying fish by stunning them with an electrical pulse
environment	the external surroundings in which a plant or animal lives, which influence its development
eutrophic	describes lochs with high nutrient levels
extensive	(agricultural context) widespread, designed to spread impacts over a large area
fauna	all the animal life of a given place or time
fen	peatland that receives water and nutrients from the soil, rock and groundwater as well as from rainfall
fence marking	the act of making a fence more visible to avoid bird collisions from e.g. black grouse
fertiliser	any substance, such as manure, added to soil to increase its productivity
flora	all the plant life of a given place or time
Forest Habitat Network	a concept to link forest habitats for the benefit of woodland species
fry	the young of various species of fish
genetic purity	where the internal characteristics of an organism come from one source alone
genus	a group into which a family of animals or plants is divided and which contains one or more species
geomorphology	the study of the shapes and processes of the earth
Gulf Stream	a warm oceanic current originating in the gulf of Mexico that travels north-east as the North Atlantic Drift to warm the west coast of Scotland
habitat	the natural home of an animal or plant
hatchery	place where fish eggs are hatched to produce fry or parr for restocking
herbicide	a chemical that destroys plants, especially weeds
hybrid	an animal or plant resulting from a cross between two different types of animal or plant
in-bye	grazing or arable land, usually close to the croft or farm steading
Indicative Forest Strategy	a planning tool used by local authorities and agencies to help site new woodlands away from sensitive areas
insecticide	a substance used to destroy insect pests
inshore	in or on the water but close to the shore (inshore fisheries: within 12 miles of the shore)
intensive	(agricultural context) designed to increase production from a particular area
	interpretation explanation provided by the use of original objects, visual display material, etc.
invasive	spreading uncontrollably, taking over, replacing natural community
invertebrate	any animal without a backbone, such as an insect, worm or mollusc
ley	land temporarily under grass
mammal	any warm-blooded vertebrate animal, the female of which produces milk to feed her young
mesotrophic	describes lochs with intermediate nutrient levels

mollusc	an invertebrate with a soft, unsegmented body and often a shell (group includes snails, slugs, clams, mussels and squid)
muirburning	the controlled strip-burning of heather moorland to create new shoots for grouse, deer or sheep to eat
natural regeneration	seeding of plants, especially trees, without direct interference by man
non-native	a non-indigenous animal or plant, not of local origin
nutrient budgeting	the allocation of nutrients (especially fertilisers) to particular areas for particular purposes, to minimise wastage and environmental impacts
nutrient enrichment	an increase or improvement in the substances providing nourishment to a water body, sometimes resulting in a change in the chemistry and corresponding loss in naturally occurring species
oligotrophic	describes lochs with low nutrient levels, such as the dubh lochans in the peatlands
out-bye	rough grazing land, usually far from the croft or farm steading
overgraze	to graze land too intensely so that it is damaged and no longer provides nourishment or (if an area is managed for woodland) so that trees cannot regenerate or grow
parasitic	the process of one animal or plant living in or on another from which it obtains its nourishment
parr	the intermediate stage of a salmonid fish between fry and smolt
passerine	a songbird or perching bird
pest	any organism that damages crops, or irritates livestock or man
pesticide	a chemical used for killing pests, especially insects
plankton	organisms inhabiting the surface layer of a sea or loch, consisting of small drifting animals or plants
plateau	a wide mainly level area of elevated land
raptor	a bird of prey
recreation	refreshment of health or spirits by relaxation and enjoyment, or an activity that promotes this
reedbed	wetland dominated by stands of the common reed *Phragmites australis*, where the water table is at or above ground level for most of the year
reseed	a crop, especially grass, that has been sown
riparian	of or on the bank of a river or stream
roost	a place, such as a perch, where birds rest or sleep
salmonid	fish from the salmon family (includes salmon, trout & char)
sea lice	a fish parasite
second rotation	the second crop of trees grown on a plantation
sessile	a plant with flowers or leaves but no stalk / an animal fixed in one position
sheep dip	a liquid disinfectant and insecticide in which sheep are immersed
siltation	to fill or choke up with silt (a fine sediment of mud or clay deposited by moving water)
silviculture	the cultivation of forest trees
Site of Special Scientific Interest (SSSI)	an area designated under UK legislation for its nature conservation interest
smolt	young salmon at the stage when it migrates from freshwater to the sea
spawning beds	the location where fish, amphibians or molluscs lay eggs
Special Area of Conservation (SAC)	an area designated under European legislation (the Habitats Directive) for its nature conservation interest
Special Protection Area (SPA)	an area designated under European legislation (the Birds Directive) for its wild bird interest
species	any of the groups into which a genus is divided, the members of which are able to interbreed
standing deadwood	dead trees left standing or lying to support fungi and invertebrates
upland	an area of high or relatively high ground
vertebrate	any animal with a backbone, such as a mammal, fish, bird or amphibian
wader	a long-legged bird that lives near water or in a wetland
waterfowl	bird that lives on or near water, especially one that swims such as a duck or swan
weed	any plant that grows wild and profusely, especially one that grows among cultivated plants
wildfire	out-of-control fire started accidentally or through out-of-control muirburning, which can rage over vast areas and threaten woodlands, roads or even houses
wildfowl	any game bird
woodland restructuring	the process of changing the structure of a woodland to allow more internal space and diversity of tree species

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