Current Status - UK and Local

LBAP Partnership area Status: Local Priority Species

The two Butterfly-orchids are similar in appearance and overlap in size, causing some problems for identification. They are most readily distinguished by characters associated with their anthers and the size of their flower parts. The Greater Butterfly-orchid is found throughout Britain, tending to be more western in Scotland. The Lesser is a much more northern species, with scattered localities in Wales and northern England, but only becoming common in the northwest of Scotland.

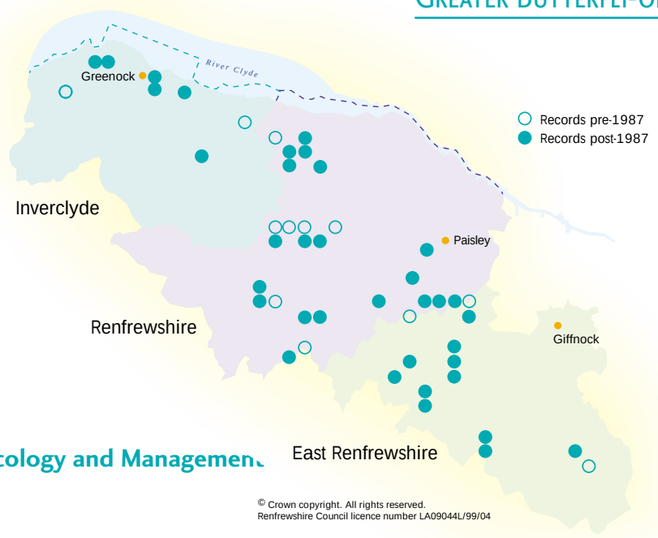
Today, in the LBAP Partnership area, the Greater Butterfly-orchid is known from 48 one-km squares, twelve of these being pre-1987 records. By contrast there are only five records for Lesser Butterfly-orchid, all pre-1987 except for one recent site (near Gourock). There is limited specific data on former distribution but earlier Flora writers considered both to be frequent. Hennedy's *Clydesdale Flora* (1891) describes Greater Butterfly-orchid from "moist woods and thickets", but only names Gourock; the Lesser he notes from "moist meadows and heaths" and cites Gourock to Arran. Lee (1933) does not mention any localities but notes the habitats for Greater Butterfly-orchid as "wet meadows, moors and heaths", somewhat at variance with Hennedy's observations. Today all of the records for Greater Butterfly-orchid tend to be from unimproved, or semi-improved, neutral pasture, or occasionally from neglected waste ground grassland, including former railway embankments.

The Greater Butterfly-orchid is a species of damp woodlands on base rich soils in the south of England, but in more northern parts it is a feature of permanent pasture and meadows. It becomes markedly scarcer in upland pastures or on moorlands. These tend to be the favoured habitats of the Lesser Butterfly-orchid, which can tolerate more acidic soils, often quite poorly draining. Population survival depends on the maintenance of traditional habitat management.

Factors Causing Loss or Decline

There is little past data on the species in order to monitor declines or changes in populations but, contrasted with earlier authors' comments, neither species can be described as frequent, certainly in the case of the Lesser Butterfly-orchid. The general decline in unimproved neutral grassland locally, and loss of upland pasture, give further weight to the presumption of decline. Agricultural improvement is the most likely cause of loss, and high stock densities may lead to over-grazing or trampling.

Greater Butterfly-orchid



Lesser Butterfly-orchid

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Greater Butterfly Orchid © Norman Tait

Butterfly-orchids (*Platanthera chlorantha*) (*Platanthera bifolia*)

Greater Butterfly-orchid

An orchid which smells faintly of vanilla with two glossy leaves folded around the base. Height about 30 cm. The white flowers are more tinged with green than those of the Lesser Butterfly-orchid.

Lesser Butterfly Orchid © Norman Tait

Lesser Butterfly-orchid

A sweet-smelling orchid of about 25 cm high with two basal leaves folding around the stem. The flowers are white with a slight green tinge. It can be distinguished from the Greater Butterfly-orchid by careful examination of its flowering parts.

Opportunities and Current Action

The Butterfly-orchids receive no specific action at present, apart from the general protection of wild plants by the Wildlife and Countryside Act 1981. At one site, designated as a Site of Special Scientific Interest (SSSI), both species occur. Several of the other sites where the orchids occur (or formerly did) are included within existing or proposed Sites of Importance for Nature Conservation (SINCs). Other populations occur within the Clyde Muirshiel Regional Park where some monitoring occurs.

Action Plan

A priority is to increase the awareness among landowners and landusers of the species' presence and their vulnerability to agricultural treatments. The maintenance of appropriate habitat management regimes and their introduction elsewhere should help to stabilise populations and prevent further decline.

Greater Butterfly-orchid © Norman Tait

Lesser Butterfly-orchid © Norman Tait

Objectives and Targets

Objective 1	Establish current distribution and status of Butterfly-orchid populations.
Objective 2	Maintain the current distribution and population sizes.
Objective 3	Introduce appropriate habitat management to encourage viable population.
Objective 4	Consider reintroduction of populations at known former localities.
Objective 5	Review this plan on an annual basis, beginning in 2005.

We will achieve these objectives by:

Action	Actioned by	Timescale
Reviewing and collating available survey information	BSBI PNHS UoP LAs	2004/2005
Ensuring no further loss in extent and quality of existing populations	LAs	2004/2007
Encouraging appropriate management of known sites	FWAG SNH CMRP GBCP	2004/2007
Inform landowners of presence of orchid population	BSBI FWAG	2004/2005
Identifying suitable sites for potential reintroduction	BSBI CMRP GBCP PNHS UoP	2004/2005
Monitoring and recording actions towards these objectives	LBAP Steering Group LBAP Officer Local Records Centre	Ongoing / annual

Links with Other Action Plans

Dwarf Shrub Heathland, Unimproved Grasslands.

Further Information can be obtained from The Biodiversity Officer 0141 842 5281

Current Status - UK and Local

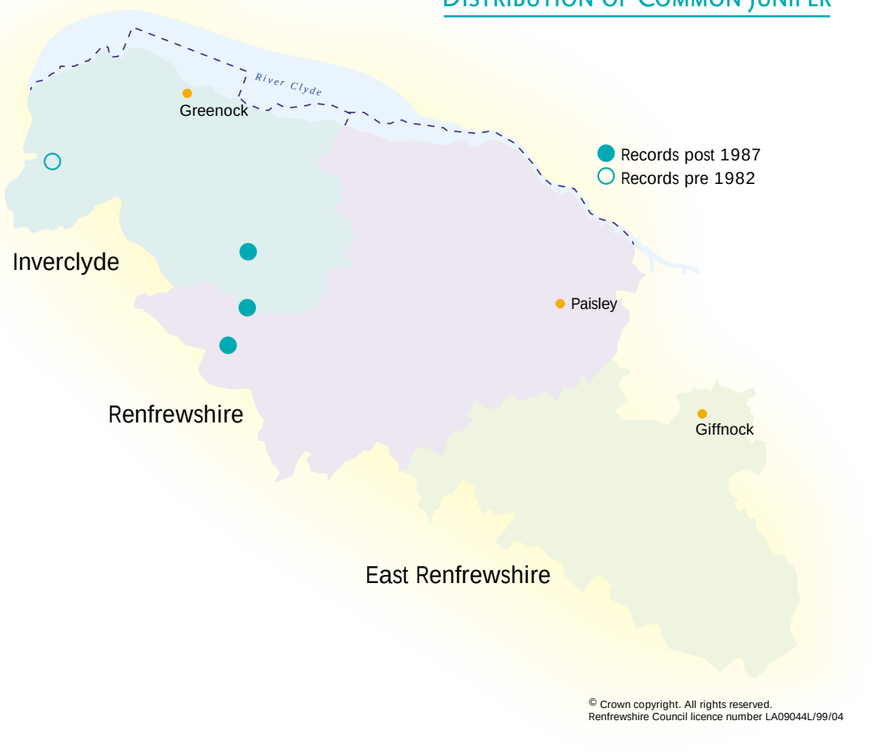
UK Biodiversity Status: Priority Species
LBAP Partnership Area Status: Local Priority Species

Juniper is widely distributed throughout the northern hemisphere but in the UK its distribution, although widespread, is discontinuous, with two main centres: the Scottish Highlands and the chalk downs of southern England. Today in the LBAP Partnership area Juniper is only known from four sites, all within the Clyde Muirshiel Regional Park (CMRP). At three of these sites it is represented by single specimens, two of which are low growing but cover a large area, with some apparent layering. At the fourth site there are two isolated bushes. Of the five known plants only one is known to be female, and two other individuals have been identified as male. There is little specific data on former distribution although Hennedy's *Clydesdale Flora* (1891) describes it as frequent, in woods and heaths, but only mentions Gourock as a locality; this statement is repeated by Lee in his *Flora of the Clyde Area* (1933).

Ecology and Management

Juniper is a dioecious (separate sexes), perennial shrub and is one of three Gymnosperms (conifers and related species) native to Britain, the others being Scots Pine and Yew. It is divided into two subspecies, ssp. *communis*, which occurs in the LBAP Partnership area, and ssp. *nana*, which is restricted to montane areas of northwest Britain. It appears to be tolerant of a wide range of soil and climatic conditions and is generally considered to be a successional shrub, opportunistic in its pattern of establishment although it can occur under woodland in NE Scotland.

Distribution of Common Juniper



Factors Causing Loss or Decline

Data at the national Biological Records Centre (BRC) suggests that since 1960 there has been a 60% decline in the national distribution of Juniper. Although there is little local data available, it appears likely that Juniper has declined markedly since last century and is now very rare, and on the verge of extinction in the local area. It is only known from one locality in Lanarkshire and the nearest Greater Glasgow locality is to the north of Milngavie.

The decline is most likely due to excessive grazing and burning, particularly relevant at the extant LBAP area sites, which can prevent the establishment of young bushes. These ongoing management factors, along with the apparent old age of the surviving individuals, geographical isolation and dioecious breeding system, decrease the likelihood of successful regeneration.

Opportunities and Current Action

Surveys are being carried out by local and national agencies at sites throughout Britain, and many Juniper sites are included within designated sites. Juniper occurs in a number of habitat types listed under the EC Habitats Directive and Juniper scrub has been recognised as a nationally scarce woodland type. An action group involving SNH, FC, Highland Birchwoods, Scottish Agricultural College, NTS and Plantlife has been set up to increase interest in and develop management prescriptions for montane scrub woodland.

Recent work by the Botanical Society of the British Isles (BSBI), Paisley Natural History Society (PNHS) and Clyde Muirshiel Regional Park (CMRP) has established the sex of three of the relic bushes and attempted cross-pollination. Vegetative cuttings of the male Junipers have been planted out at the site of the female Juniper. Ongoing actions have been reported in the local press and further work is to be undertaken.

Action Plan

Key priorities are to ensure the survival of the remaining shrubs and to encourage further surveys to establish true population distribution. The current known populations are within the Clyde Muirshiel Regional Park and so could benefit from management agreements with local land users and the staff resources to enable sufficient monitoring. Liaison with farmers and landowners over the existence of relic sites or access for new surveys will be necessary outside of the park.

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Common Juniper © Lorne Gill/SNH

Common Juniper (*Juniperus communis*)

Juniper is a low growing, blue-grey, hardy conifer. The form of individual bushes is very varied with feathery foliage. The cones, which resemble berries, were used medicinally and for flavouring Gin. The wood was burned for its sweet smell, and the plant was also traditionally used for warding off evil. It was one of the first tree species to colonise Britiain after the last glacial period.

Objectives and Targets

Objective 1	Maintain the viability of the relic individuals.
Objective 2	Introduce appropriate management to encourage regeneration.
Objective 3	Re-establish populations at known former or suitable new localities.
Objective 4	Establish current distribution and population status.
Objective 5	Review this plan on an annual basis, beginning in 2005.

We will achieve these objectives by:

Action	Actioned by	Timescale
Ensuring no loss or damage to the surviving plants	FC LAs FWAG	2004/07
Encouraging regeneration at all known sites	BSBI CMRP	2004/07
Establishing new sites at appropriate locations	BSBI CMRP	2004/07
Identifying suitable sites for potential reintroduction and carrying out surveys of these and known historic sites	BSBI CMRP	2004/07
Monitoring and recording actions towards these objectives	LBAP Steering Group LBAP Officer Local Records Centre	Ongoing / annual
Co-ordinating with National Plan and encouraging study of gentic diversity	BSBI LBAP Officer	Ongoing

Links with Other Action Plans

Dwarf Shrub Heath, Unimproved Grasslands.

Further Information can be obtained from The Biodiversity Officer 0141 842 5281

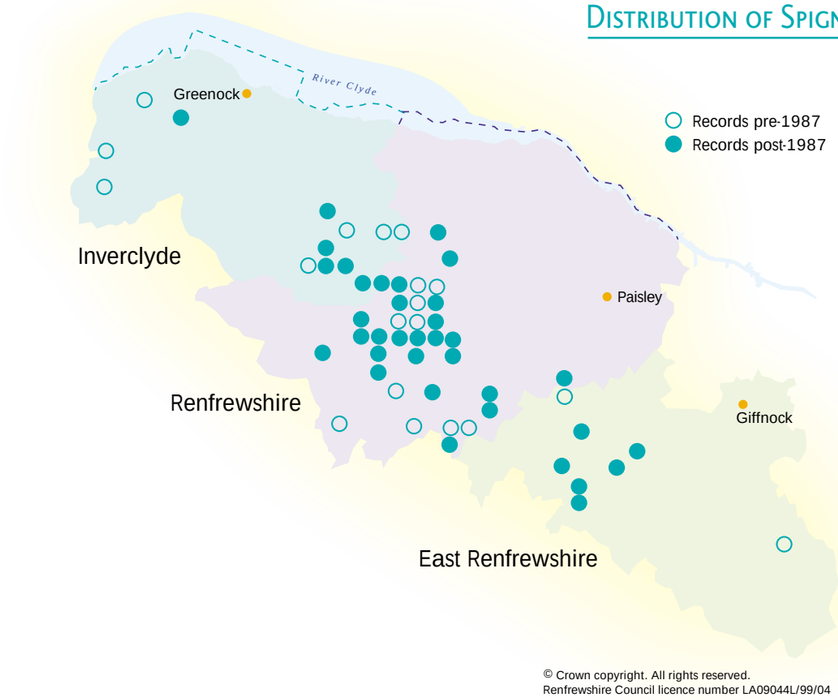
Current Status - UK and Local

LBAP Partnership area Status: Local Priority Species

Spignal is a local and northern species within the UK. It is found in only a few localities in northern England and Wales, but in Scotland it extends north into Argyll and Aberdeen, with large population centres in Dumfries, Perthshire and Angus.

In the LBAP Partnership area, Spignel is known from 56 one-km squares, but 16 of these are pre-1987 records. There is limited data on former distribution: Hennedy's *Clydesdale Flora* (1891) describes it as "not common" and quotes "hills beyond Greenock above the road to Inverkip" and "hills above the Cloch lighthouse". Lee in his *Flora of the Clyde Area* (1933) describes Spignel as a plant of hill pastures, not common, but also says "abundant on the Renfrewshire moors above Kilmacolm and Lochwinnoch".

Distribution of Spignel



Ecology and Management

Spignel occurs in unimproved, upland, somewhat acidic grasslands, occasionally with dry heath. Although generally found on free draining soils, such as on steep embankments and ridges, it can also be seen along ungrazed road banks.

Local populations of Spignel are of particular interest also for the presence of *Nyssopsora echinata*, a host-specific 'rust fungus' with very distinctive, long, spiny spores that make it unique amongst British species. *N. echinata* was first found in Britain in Perthshire in 1939 and subsequent British records have all been from the same small area. However, examination of two Renfrewshire Spignel colonies in June 2001 revealed the presence of the rust at both sites. Although parasitic, the rust poses no threat to otherwise healthy plants and its presence should be considered as enhancing the conservation importance of local Spignel populations. Further investigation of the local status of *Nyssopsora* is in progress.

Factors Causing Loss or Decline

There is little past data on the species in order to monitor changes, but with the general decline in unimproved pasture locally, it is very likely that the species has declined. At many of its current sites it is present as small isolated populations, along steep ridges which have escaped the excesses of agricultural improvement treatments, however, Spignel can be present in large numbers at such sites. Overgrazing may be a factor at some sites, although it appears to persist in some heavily grazed pastures, and improvement is likely to be the main threat.

Opportunities and Current Action

Spignel receives no specific action at present, although it is included within the Scarce Plants Atlas (covering all species whose present distribution comprises less than one hundred 10x10 km squares in Britain). Several of the Spignel sites are within sites identified as being Sites of Importance for Nature Conservation (SINCs). Other populations occur within the Clyde Muirshiel Regional Park, where local monitoring occurs.

Action Plan

A priority is to increase awareness among landowners and users of the species' presence and vulnerability to agricultural treatments. Local populations within the Clyde Muirshiel Regional Park could benefit from management agreements with local landusers and the staff could carry out monitoring. Further survey work should help to locate new populations and assist the monitoring process.

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Spignel (*Meum athamanticum*)

Spignel is a pleasantly aromatic perennial member of the carrot family. It is characterised by its sweet, aromatic scent and finely divided leaves. In summer it produces flattish flower heads consisting of clusters of tiny, white or purplish white, flowers. The roots have sometimes been eaten as a vegetable.

Objectives and Targets

Objective 1	Maintain the current distribution and population sizes.
Objective 2	Introduce appropriate habitat management to encourage viable populations.
Objective 3	Establish current distribution and population status.
Objective 4	Consider introduction of populations at known former localities or new suitable sites.
Objective 5	Review this plan on an annual basis, beginning in 2005.

We will achieve these objectives by:

Action	Actioned by	Timescale
Ensuring no further loss or damage to the surviving populations	SNH FWAG LAs	2004/07
Encouraging appropriate management of known sites	LAs SNH FWAG	2004/07
Surveying to locate new populations and monitoring existing populations	BSBI UoP PNHS	2004/07
Inform local landowners of presence of population	BSBI FWAG LRC	2004/07
Identifying suitable sites for potential reintroduction	BSBI CMRP GBCP PNHS UoP	2004/07
Monitoring and recording actions towards these objectives	LBAP Steering Group LBAP Officer Local Records Centre	Ongoing / annual

Links with Other Action Plans

Unimproved Grasslands

Further Information can be obtained from The Biodiversity Officer 0141 842 5281

Current Status - UK and Local

LBAP Partnership area Status: Local Priority Species

The River Clyde and its tributaries form a large water catchment area which supports a substantial Brown Trout fishery. It was also known for large numbers of migratory Sea Trout and Atlantic Salmon, but many decades of pollution from local heavy industries eliminated these fish from the upper Clyde system. With the decline of heavy industry and the introduction and enforcement of legislation to improve the environment, Salmon have returned to the river. The following plan, whilst largely concerned with Atlantic Salmon, will also protect the Sea Trout (*Salmo trutta*).

Ecology and Management

The Atlantic Salmon has, over the last 30 years, recolonised parts of the Clyde catchment in increasing numbers, due to improvements in water quality and habitat management work. Access for anglers has also been improved. Whilst declining salmon stocks in Northern Europe and North America are a cause for international concern, Atlantic Salmon in the Clyde catchment appear to be on the increase, with a slow but perceptible increase in numbers being reported. Most riverine habitats are used, but salmon require clean headwater streams with suitable grades of gravel bed for successful spawning which takes place mainly in the autumn and early winter.

Factors Causing Loss or Decline

The complex life cycle of the Atlantic Salmon involves numerous threats at every stage. Young fish (parr and smolts) use different sections of the river system for two or more years before migrating to the open ocean for periods from one to three years and occasionally longer, then they return to their native river to spawn.

The widespread decline in salmon stocks in Western Europe and other parts of Scotland may involve several of the following factors: some are outside the scope of this action plan but may require lobbying at the appropriate political levels:

- Increasing pollution at sea
- Overfishing at sea of both the Atlantic Salmon and some of its prey (e.g. capelin and sandeels), especially through seine / drift netting
- Changes in temperature, currents or food availability resulting from global warming
- Increased toxicity from pesticides in the upper water catchment areas during summer
- Alterations in the sex of some fish resulting from increasing levels of oestrogen in water courses.

Local Factors may include:

- Obstruction of fish movement caused by weirs (without fish passes) and culverts
- Loss of spawning areas due to silt deposition from drainage works, run-off from surrounding land, erosion or changes in river structure
- Diffuse pollution from agriculture, industry and road run-off
- Specific pollution incidents
- Overfishing, poaching, and predation by introduced American Mink
- Influences caused by the introduction of non-native fish species in Inland Waters.

Opportunities and Current Action

Legislation covering the Atlantic Salmon is complex, tending to concentrate on the control of fishing activity rather than on the fish's habitat or the ecological factors affecting water quality. However, the Salmon (Fish Passes and Screens) (Scotland) Regulations 1994 do attempt to ensure that both Atlantic Salmon and Sea Trout have physical access to their spawning rivers and burns. Other relevant acts include the Salmon and Freshwater (Protection) Act 1868, the Salmon and Freshwater (Protection) Act 1951, the Freshwater and Salmon (Scotland) Act 1976 and the Salmon Act 1986.

Most of the trout and salmon fisheries management issues are handled by a network of angling clubs whose rights are leased from the Crown Estate Commissioners. In 1984 the clubs initiated the formation of the River Clyde Fisheries Management Trust Ltd (RCFMT). The Trust coordinates fishery management in each catchment and includes representation from the relevant local authority. The angling clubs are responsible for managing their fishery but can call for assistance from other members of the Trust. Current actions include:

- A bailiffing system to control poaching
- Work undertaken by angling clubs to improve fish habitats such as the formation of pools / croys and managed riverbank realignment
- Limited stocking with sea trout
- The Clyde River Foundation (CRF) established in 1999 undertakes scientific research into ecological issues in the Clyde catchment. Preliminary work has been done on the distribution and population structure of fish species and their habitat in the Clyde catchment including the White Cart, Black Cart and Gryfe. It also runs an education project (Clyde in the Classroom) with primary schools in the LBAP Partnership area.

Opportunities could include:

- The European Water Framework Directive could have positive implications for many waterways, leading to the improvement of water quality and tighter controls on

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Atlantic Salmon © Norman Tait

Atlantic Salmon

(*Salmo salar*)

Adult Atlantic Salmon weigh between 4-20 lbs. and measure up to 90cm in length. Salmon in the sea are silvery on the sides and belly, while the back varies with shades of brown, green, and blue. Atlantic Salmon also have numerous black spots, usually "X"-shaped and scattered around the body. When spawning, both sexes take on an overall bronze-purple colouration and may acquire reddish spots on the head and body. The shape, length of head, depth of body and colour of this fish vary with each stage of sexual maturity.

diffuse pollution. This directive will require the adoption of an integrated catchment management plan (CMP) for all river systems.

As part of the CMP, carrying out research studies in order to:

- Determine population numbers of salmon present in inland waters
- Identify areas requiring improvement to instream and / or bankside structures and habitats, in order to benefit salmon stocks
- Examine the influence of stocking policies and introduced genetic material on the long-term population of the species (inland water).

Action Plan

The key priority is to ensure that stocks of Atlantic Salmon (and Sea Trout) are maintained and enhanced throughout the Clyde water catchment area. This would include seeking to carry out specific management work and research that will benefit salmon in the River Clyde and its tributaries.

Objective 1 Maintain and enhance the present Atlantic

Auldhouse Burn, Rouken Glen

Objectives and Targets

Salmon population.

Objective 2 Introduce appropriate water catchment management to improve water quality.

Objective 3 Establish current distribution and population status of the River Clyde and its tributaries.

Objective 4 Review this plan on an annual basis, beginning in 2005.

We will achieve these objectives by:

Action	Actioned by	Timescale
Ensuring no net loss of species numbers or range.	RCFMT SEPA	Ongoing
Participating in the production of a Catchment Management Plan for the River Clyde and its tributaries.	SEPA LAs RCFMT CRF	2004 - 2007
Recording known and reported sites in the area and monitoring population trends.	RCFMT SEPA CRF	2004 - 2007
Monitoring and recording actions towards these objectives. Local Records Centre	LBAP Steering Group LBAP Officer	Ongoing / annual

Links with other Action Plans

Rivers & Streams, Standing Waters

Further Information can be obtained from The Biodiversity Officer 0141 842 5281

Current Status - UK and Local

UK Biodiversity Status: Vulnerable (*Hygrocybe spadicea*)
LBAP Partnership area Status: Local Priority Species

In common with many waxcaps, both *H. radiata* and *H. spadicea* favour basic, unimproved grassland. Both have only been found locally on the ultrabasic, basaltic soil of the Gleniffer Braes.

Date Waxcap (*Hygrocybe spadicea)*
This species occurs in Western Europe but is rare throughout its range. In recent years, the species has occurred in fewer than 15 one-km squares within the UK, with records showing a distinct westerly bias, e.g. Ayrshire, Colonsay, Cumbria, Shropshire, Wales. The species has been recorded only once within the LBAP Partnership area, a single fruitbody on thin soil covering a basalt outcrop on the Gleniffer Braes during the early 1990s.

Slender Waxcap *(Hygrocybe radiata)*
This species seems to be extremely rare in the UK being currently known from only three localities in the Scottish Borders and one site within the LBAP Partnership area, all recorded in autumn 2000. This species may have gone unrecorded in the past due to confusion with similar species. The local record is of a single fruitbody found growing at the edge of a tiny quarry on the Gleniffer Braes.

In Great Britain *H. spadicea* is considered to be *Vulnerable* and is included in the provisional red data list of European fungi. The rarer H. *radiata* may have been unknown in Britain before 2000 and consequently was not considered by the UK Biodiversity Group when drawing up the priority list of Species of Conservation Concern. *H. radiata*, with only four British records, might superficially be considered as *Endangered* but is likely to be under-recorded and perhaps more appropriately regarded as *Vulnerable* in the UK.

Ecology and Management

The 'Date-coloured' Waxcap (*H. spadicea*) is mainly an upland species which occurs on south-facing limestone pastures in submontane regions, but has also been recorded on calcareous dunes and basic / neutral grassland in lowland areas, including mown parkland and road verges. The species produces fruiting bodies following heavy rain in late summer and early autumn in most years. The edible fruit bodies are rather distinctive in appearance, being 5-7 cm in diameter with a brown cap and bright yellow gills.

H. radiata is a lead-grey coloured waxcap 3-5 cm in diameter which grows on basic or neutral unimproved grassland in continental Europe.

Factors Causing Loss or Decline

The factors influencing population trends in waxcaps are poorly understood, but potential threats to existing sites are likely to include the following:

- Improvement of grassland habitat through ploughing, reseeding or application of fertilisers
- Reduction of grazing or mowing which leads to the growth of rank vegetation and scrub
- Changes in the microhabitat at isolated sites.

Opportunities and Current Action

- In Great Britain, *H. spadicea* receives general protection under the Wildlife and Countryside Act 1981
- The known sites for *H. radiata* and *H. spadicea* are both protected to some extent because they are within Gleniffer Braes Country Park
- There is an ongoing British Mycological Society / Scottish Natural Heritage "Survey of Waxcap Grasslands", the aim of which is to identify grasslands of high biodiversity value using waxcap diversity as an indicator.

Action Plan

A priority is to increase awareness among landowners and landusers of the species' presence and vulnerability to certain land management practices. Local populations should be monitored and further survey work carried out to locate new populations.

Hygrocybe radiata © Tom Byars

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Hygrocybe radiata © Alan Silverside

Waxcaps

(Hygrocybe spadicea) and *(Hygrocybe radiata)*

Waxcaps have been described as the orchids of the world of fungi. They are often startling in colour from reds, oranges and yellows to whites and browns.

The Date Waxcap *(Hygrocybe spadicea)* and has a rather distinctive appearance, being 5-7 cm in diameter with a brown cap and bright yellow gills.

The Slender Waxcap (*Hygrocybe radiata)* is a lead-grey coloured waxcap 3-5 cm in diameter.

Hygrocybe spadicea © Alan Silverside

Objectives and targets

Objective 1	Continue to protect all waxcap species under the Wildlife and Countryside Act (1981). Maintain the current distribution and population sizes.
Objective 2	Research the current status of *H. radiata* and *H. spadicea* within the LBAP area.
Objective 3	Enhance the presence of *H. spadicea* and *H. radiata* as part of a diverse waxcap community at all known sites for these species.
Objective 4	Promote, in the LBAP area, an awareness of the significance of waxcap diversity as an indicator of biodiverse grassland, along with the specific identification of features of *H. radiata* and *H. spadicea* where appropriate.
Objective 5	Review this plan on an annual basis, beginning in 2005.

We will achieve these objectives by:

Action	Actioned by	Timescale
Ensuring no further loss or damage to the surviving populations	GBCP LAs Landowners	2004-07
Surveying to locate new populations and monitoring existing populations	UoP SNH	2004-07
Encouraging appropriate management of known sites	LAs GBCP SNH	2004-07
Disseminating information on identification of waxcaps and their use as indicator species	UoP LBAP Officer	2004-07
Monitoring and recording actions towards these objectives	LBAP Steering Group LBAP Officer Local Records Centre	Ongoing

Links with Other Action Plans

Unimproved Grasslands

Further Information can be obtained from The Biodiversity Officer 0141 842 5281

Current Status - UK and Local

UK Biodiversity Status: Conservation Concern
LBAP Partnership area Status: Local Priority Species

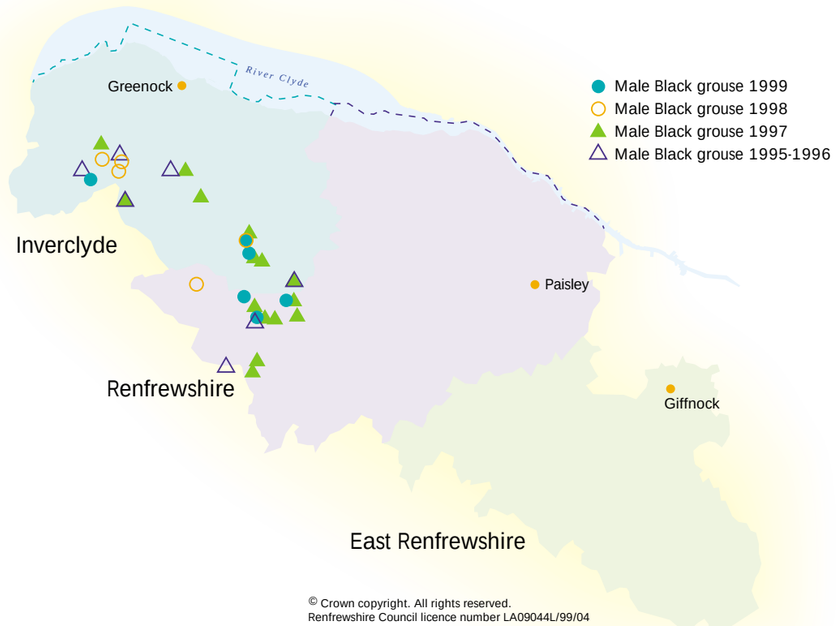
Black Grouse are found throughout northern and central Europe and across Siberia. The species has declined over most of its European range with the number of young reared per hen decreasing by approximately 60% between 1950 and 1990. In some areas of Scotland low survival rates of adults has been an important factor in the population decrease.

Black Grouse are largely dependent on the suitable management of moorland / woodland edge in Scotland and Wales, and the moorland / farmland fringe in northern England. Black Grouse also utilise young conifer plantations and clear-felled areas with well-developed field and shrub layers. Mature plantations with widely spaced trees also support suitable ground vegetation and can be important for Black Grouse.

The species declined in range by 28% between 1968-72 and 1988-91, and the most recent UK population estimate (1996) is 6510 lekking males compared with an estimate of 25,000, in 1990. Numbers of Black Grouse have been recorded mainly within Renfrewshire and Inverclyde since the 1970s. The years 1975 to 1995 represent occasional records and importantly two of the sites had over 6 males with an estimated total population of 45 males. Since 1997, none of the lek sites have had more than two males with an estimated total population of 33 males (1997-1999) and 13 males in 2002.

The extensive moorland of Clyde Muirshiel Regional Park (CMRP) is a key area of extremely high regional importance for its heather moorland, wet grasslands and wooded areas with forestry and intensive farming confined to the fringes. One of the aims of the Regional Park is to improve the conservation diversity of the moorland whilst ensuring that the agricultural value for farmers and for red grouse shooting is not reduced.

Distribution of Black Grouse in Clyde Muirshiel Regional Park



Ecology and Management

Black Grouse are found in areas of moorland, often close to native woodland areas. They feed mainly on heather and blaeberry although they also eat a variety of leaves, stems, buds, flowers, seeds and fruits, and insects in the summer. During courtship the male birds display to the females at communal 'lekking' areas. The birds are normally found in upland areas at an altitude of 200 to 500 metres, and nest on the ground in tall, rank heather, dense blaeberry, rushes or bracken.

Factors Causing Loss or Decline

The main factors attributed to the loss or decline of this species include:

- Loss, degradation and fragmentation of habitat through unsympathetic management practices such as overgrazing, drainage, too frequent muirburn and agricultural improvement
- Human disturbance of lekking birds
- Poor weather conditions which can affect chick survival
- Collisions with deer fences and other obstacles.

Within Renfrewshire and Inverclyde, the likely cause of the loss of habitat for Black Grouse is heavy grazing in moorland areas resulting in the loss of heather and favouring the growth of grass. Over the period 1969 to 1999 there has been a 21% increase in rainfall (recorded at the Paisley Observatory) and this may have encouraged growth of acidic grasses such as Wavy-hair Grass (*Deschampsia flexuosa*). Though muirburn encourages heather, if it is poorly managed this can reduce moorland diversity and lead to the formation of impoverished acidic grasslands. It is also known that conifer plantations have covered previously recorded lek sites at Gryfe Reservoir, Ladymuir and on the Eaglesham moors.

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Black Grouse (*Tetrao tetrix*)

The all-black males have a distinctive red wattle over the eye and show a striking white stripe along each wing in flight. They have a lyre-shaped tail which is fanned out and raised to show white undertail feathers when displaying. The smaller grey-brown females have a slightly notched tail.

Length: 40-55cm Wingspan: 65-80cm

Weight: 1000-1450g (m); 750-1100g (f)

Opportunities and Current Action

Black Grouse was included on the Red List of endangered species in 1989 and is a Priority Species in the UK Biodiversity Action Plan. It is protected under the Game Acts, Annex 2.2 of the EC Birds Directive, and Appendix III of the Berne Convention.

- Management measures to regenerate woodland, reduce grazing and control predators, based on research by the Forestry Commission (FC), Game Conservancy Trust (GCT) and Royal Society for the Protection of Birds (RSPB), have been shown to increase Black Grouse populations.

- Guidelines for conifer forest management were published by the FC in 1993 and are incorporated into FC Forest Design Plans and Native Woodland Management Plans. Guidelines are being given a broader policy context through the UK Forestry Standard. The Forestry Authority has issued a guidance note on deer, forest regeneration and fencing.

- Grant aid mechanisms, including the Scottish Forestry Grant Scheme (SFGS), Rural Stewardship Scheme (RSS) and the Moorland Scheme (MS), have the potential to improve much Black Grouse habitat through funding habitat management and fence removal.

- Collaborative recovery projects for Black Grouse are being developed and implemented by a range of organisations in different parts of the UK.

- The RSPB organised a seminar 'Habitat management for Black Grouse' in March 2002 which was hosted by CMRP. In conjunction with tenant farmers CMRP have used the Macaulay Hill Grazing Model to improve grazing regimes and have organised seminars on the Rural Stewardship Scheme and moorland areas. They also chair a Moorland Management group comprised of a group of interested land users and conservationists. Seminars held by FWAG with CMRP have highlighted the availability of Agri-environment schemes such as the Rural Stewardship Scheme to farmers. Currently there has been limited uptake within the Park area.

- Tree planting within the Regional Park has included species beneficial to Black Grouse. Woodland management and tree planting at Park farms also aim to improve their habitat. CMRP, local councils and RSPB have made representation at a scoping exercise for plantation management for Leapmoor Forest. A leaflet has been produced to encourage the public to report any sightings of Black Grouse to staff at the Ranger service CMRP, Kelburn and to the RSPB.

Action Plan

The main aim of this plan is to increase the numbers of Black Grouse in the area to 1997 numbers. In order to achieve this, key priorities are to promote appropriate management of sites and to monitor populations on a biannual basis.

Objectives and Targets

Objective 1	Stem or reverse the decline in numbers and range of the Black Grouse in CMRP, in order to restore the population to its 1997 size and range by 2007.
Objective 2	Promote recolonisation of formerly occupied areas between currently isolated populations.
Objective 3	Increase the number of sites occupied by Black Grouse through restoration and positive management.
Objective 4	Establish population trends.
Objective 5	Increase awareness of the Black Grouse and its conservation needs.
Objective 6	Review this plan on an annual basis, beginning in 2005.

We will achieve these objectives by:

Action	Actioned	Timescale
Ensuring no net loss of species numbers or range	CMRP, RSPB, FWAG, SNH	2004-2007
Encouraging sympathetic, site-specific management regimes especially within 1.5 km of known lek sites	LAs, FWAG, SNH Landowners/Managers	2004-2007 2004-2007
Developing policies which promote management practices that enhance and restore habitat suitable for Black Grouse	LAs, FWAG, SNH	2004-2007
Monitoring population trends	CMRP, RSPB, SNH, BRISC	2004-2007
Promoting an appreciation of the value of Black Grouse to local communities and land owners	CMRP, GBCP, SNH	2004-2007
Surveying known lek sites	CMRP, RSPB	2004-2007
Collating existing information on Black grouse in East Renfrewshire and organising lek survey at potential sites	RSPB, SOC	2004
Planting Downy birch at Muirshiel at clear felled woodland edge with open ground and one hectre of native woodland at Hardridge	CMRP	2004
Swiping heather areas within Muirshiel woodland	CMRP	2004
Assessing heather cover near lek sites	CMRP, SOC	2004-2010
Identifying potential areas for habitat restoration	CMRP, SOC	2004-2010
Monitoring and recording actions towards these objectives	LBAP Steering Group, LBAP Officer Local Records Centre	Annual/ongoing

Links with Other Action Plans

Broadleaved & Mixed Woodland, Dwarf Shrub Heath, Juniper, Mires, Unimproved Grassland.

Further Information can be obtained from The Biodiversity Officer 0141 842 5281

Current Status - UK and local

UK Biodiversity Status: Priority (Red-listed) Species of Conservation Concern
LBAP Partnership area Status: Local Priority Species

The Hen Harrier, because it is rare and vulnerable, has statutory protection under Annex 1 of the EC Birds Directive, Appendix II of the Bern Convention, and Schedule 1 of the Wildlife and Countryside Act 1981. It is a crime to disturb a Hen Harrier by approaching or visiting an active nest site, from the building stage right through till the young have fledged and left the nest.

The Partnership area is particularly important for these birds. Following a nationwide survey in 1998, the UK Hen Harrier population was estimated to be in the region of 680 pairs, approximately three-quarters of these being in Scotland. Local surveys by the Scottish Ornithologists' Club (SOC) and Raptor Study Group (RSG) have revealed that the numbers of Hen Harrier attempting to breed in the Partnership area is within the range of 9-14 pairs annually (up to 2% of the UK breeding population). All of these were within the Clyde Muirshiel Regional Park (CMRP).

There is a small, scattered wintering population of up to ten birds throughout the Partnership area. A few remain over winter on the moors of the Regional Park. Occasional sightings also occur on farmland (mainly upland rough grazing), as well as at the Lochwinnoch RSPB Reserve and on recently afforested land in East Renfrewshire.

Main Range of Hen Harrier

Ecology and Management

UK habitats relevant to Hen Harrier conservation in the Partnership area include Upland Heath, Blanket Bog, Acid Grassland, Planted Coniferous Woodland, Fen, Carr, Marsh, Swamp, Reedbed, and Coastal Saltmarsh.

Hen Harriers are present in the UK all year round and in the breeding season are largely restricted to upland heather-dominated moorland. In the Clyde Muirshiel Regional Park this is often interspersed with areas of upland grassland and rush-dominated flushes. The nest is built on or close to the ground in rank vegetation, normally heather.

At other times of year, Hen Harriers occupy a variety of open country habitats, including young forestry, often dispersing to winter on lower ground where prey is more abundant. Most of the birds migrate to wintering grounds in southern Scotland, Ireland or England, with some going as far south as France.

Hen Harriers prey largely on mammals and birds, such as voles or pipits, all of which are taken on or close to the ground. In the Partnership area the most frequently taken prey species are Meadow Pipits and Field Voles, with young Mountain Hares or Red Grouse, and Skylarks, featuring less frequently. Experimental supplementary feeding, to divert harriers from preying upon grouse chicks, has been attempted at one local nest site in two separate years. However in both years the harriers declined to take food offered, even during low vole population levels. The local SOC/RSG harrier workers believe this practice may be harmful to the birds, as the decomposing rabbit corpses attracted scavengers and potential predators to the vicinity of the nest site.

Factors causing loss or decline

During the 1800's and early 1900's, Hen Harriers became virtually extinct as a breeding species in mainland UK, being largely restricted to the Orkney Isles and the Outer Hebrides. This was largely due to persecution, mainly by those wanting to preserve grouse on shooting estates. Since around 1950, as a result of land-use change and a decline in gamekeepering, allied with protective legislation, Hen Harriers have returned to many former Scottish haunts. Their national recovery is, however, far from complete. Widespread persecution continues to restrict harrier numbers and distribution.

The fortunes of breeding Hen Harriers in the Clyde Muirshiel Regional Park have improved in recent years, and hopefully this situation will continue as a result of the Hen Harrier Species Action Plan.

Inappropriate grazing or burning regimes can result in a loss of quality habitat, which in turn reduces prime breeding and foraging areas for harriers. Some extensive areas of heather moorland in Renfrewshire have suffered from excessive burning in the past. On some moors the continuation of overburning has limited the development of mature heather banks, which the harriers require for nesting. Recent fires within the northern part of the Regional Park, particularly in 2002 and 2003, devastated large areas of heather moor, removing many suitable nest sites for harriers and seriously reducing prey availability.

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Hen Harrier *(Circus cyaneus)*

The Hen Harrier is one of our most spectacular birds of prey – and one of the rarest. They perform one of the most dramatic mating displays of the bird world when they launch themselves into their 'skydance' displays. The male bird performs spectacular aerial manoeuvres, often rising hundreds of feet above the ground before tumbling earthwards. As part of the courtship display, the male and female will often engage in dramatic mid-air food passes.

A medium-sized bird of prey, with long wings and tail, harriers hunt by flying low over the ground and catching prey by surprise or in a short pursuit. They are very graceful birds in flight, and the plumage of the male Hen Harrier is particularly striking, being a pale powder blue-grey with conspicuous black wing tips. The female's plumage is mainly brown with chestnut tones, and a noticeable white 'rump' patch above the prominently barred tail.

Unintentional disturbance of nests, by a variety of recreational or occupational pursuits, can adversely affect breeding success. The Regional Park Authority will take this into account in planning walking routes and events, as well as advising park-users, grouse-shooters, landowners, farmers and other land managers of sensitive areas at particular times of year.

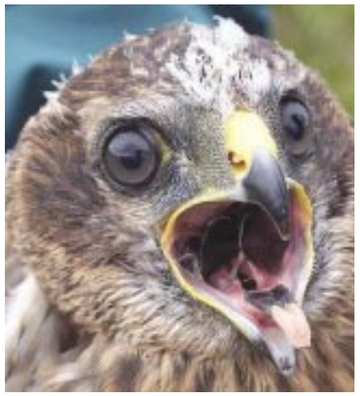
Development proposals, including windfarm proposals, also have the potential to damage the moorland habitats and disturb Hen Harrier populations. Local Councils, together with Scottish Natural Heritage (SNH) and other statutory consultees, are consulted on such developments to assess possible impacts.

All possible measures should be investigated to mitigate any damage and compensate for potential impacts of such developments. In agreements or planning conditions, provision must be made for undertaking positive habitat management which can safeguard appropriate areas for Hen Harriers in the long term. In conjunction with the relevant local authorities, the Regional Park Authority has produced a map to highlight sensitive areas for potential wind farm developments within the Park area.

Opportunities and Current action

The Clyde Muirshiel Regional Park is in a special position to influence the status of Hen Harriers within its boundaries, especially on land publicly owned by Renfrewshire and Inverclyde Councils. There is considerable scope to amend moorland management, primarily through strategic control of muirburn, drainage and grazing regimes, to enhance the habitats for Hen Harrier and other moorland wildlife.

As part of its stated remit, Clyde Muirshiel Regional Park seeks to promote the conservation of Hen Harriers in partnership with landowners and land users. RSPB, CMRP and SNH have developed a Hen Harrier remote viewing facility at the Muirshiel Visitor Centre where the successful fledging of three birds was observed in 2003, and regular guided moorland walks were available to visitors.



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The SOC and Raptor Study Group (RSG) have proposed that an area of moorland within the Park is managed primarily for the conservation of Hen Harriers, as well as for wider biodiversity objectives. The Regional Park is also working with the Heather Trust to promote heather recovery on the moors around Muirshiel.

The density of breeding Hen Harriers in the Regional Park over the five-year period of 1998-2002 indicates that it would meet the criteria for selection as a Special Protection Area under the terms of the Conservation (Natural Habitats Etc) Regulations 1994. Members of the South Strathclyde RSG, the SOC and staff from the Regional Park, under licence from SNH, monitor the breeding population and productivity of Hen Harrier on an annual basis.

Revision of agricultural incentive schemes may provide enhanced options for environmentally sensitive management of uplands, allied to the biodiversity priorities of this action plan. These may enhance financial incentives towards the control of grazing and promotion of the heather-dominated habitats that support Hen Harriers.

The Clyde Muirshiel Regional Park has used a Macaulay Institute Hill Grazing Model to improve grazing regimes, has organised seminars on the Rural Stewardship Scheme (RSS) for moorland areas, and chairs moorland management meetings comprised of a group of interested landowners, land users and conservationists.

Action Plan

Key priorities are to maintain and enhance Renfrewshire's breeding Hen Harrier population, and through protection measures and habitat enhancement, aim to increase the breeding population by 25% and improve productivity by 50% over a five-year period. The entire known breeding population is within the Clyde Muirshiel Regional Park, so the species could benefit from management agreements with local land owners and users. Staff resources of the park could continue to assist with ongoing monitoring of breeding success, and also with the development of habitat management projects.

Objectives

Objective 1:	Increase the breeding population and productivity over the next 5 years.
Objective 2:	Maintain and enhance key Hen Harrier habitat.
Objective 3:	Eliminate or reduce the number of sites failing due to human interference.
Objective 4:	Ensure that all relevant landowners and tenants are aware of Hen Harriers on their land and what they can do to help them.
Objective 5:	Establish size of breeding and wintering populations and their trends.
Objective 6:	Raise awareness of Hen Harriers and the need for their conservation.
Objective 7:	Review the action plan on an annual basis, commencing in 2005.

We will achieve these objectives by:

Summary of Actions / Targets	**Delivery (Lead Partner in bold)**	Timescale
Establish a population of 14-16 breeding pairs (approximately 25% increase over the past 5-year mean) of Hen Harrier by 2008, through implementation of the Species Action Plan.	**RSPB**, CMRP, SNH, RSG, SOC, MMG, PWLO, FWAG, LBAP Officer	2004-08
Develop management practices to protect and extend suitable nesting and foraging habitat within publicly owned land, and seek private landowners' help in restoring and protecting heather moorland throughout the LBAP area.	**CMRP**, MMG, RSPB, SNH, RSG, SOC	2004-08
Increase vigilance to detect and deter persecution of Hen Harriers.	**RSPB**, CMRP, PWLO, RSG/SOC, MMG	2004-08
Contact all landowners and tenants whose land supports Hen Harriers by spring 2004, and seek partnership working to further the objectives of the action plan.	**CMRP**, MMG, SNH, RSPB, FWAG	2004
Continue to run a programme of monitoring of breeding and wintering Hen Harriers during the lifetime of this plan.	**RSG/SOC**, CMRP	2004-08
Produce awareness strategy by 2005.	**LBAP Officer**, RSPB RSG/SOC, Education Adviser	2004-05
Continue the remote viewing facility at Muirshiel Country Park initiated in 2003.	**RSPB/CMRP**, SNH RSG/SOC,	2004 onwards
Record and monitor actions towards the objectives.	**LBAP Officer** All listed partners	Ongoing

Links with Other Action Plans

Dwarf Shrub Heath, Mires, Unimproved Grassland.

Further Information can be obtained from The LBAP Officer Tel.: 0141 842 5281

Current Status - UK and local

UK Biodiversity Status: Conservation Concern
LBAP Partnership area Status: Local Priority Species

The Brown Hare, probably introduced by the Romans to Britain around 2000 years ago, is associated with farmland and is now considered an integral part of our mammalian fauna.

This species is listed in the Mammal Society Red Data Book as common but declining, although the Game Conservancy Trust (GCT) has indicated that they believe the numbers are stable. It was included as only one of nine species of mammal (and the only non-native mammal) classified as 'vulnerable, or rapidly declining' for which a Biodiversity Action Plan was written as part of the UK Biodiversity Steering Group Report (1995).

The Brown Hare is widespread on farmland throughout England, Wales and in lowland areas of Scotland, but absent from the northwest and western Highlands. It is found in its native range across most of central Europe. Population densities in the UK are estimated to be 1 hare for every 2-4 hectares of land. Previously considered abundant, the species seems to have experienced a considerable loss in population since the early 1960s, with total numbers in Britain now estimated between 817,500 and 1,250,000. Arable areas are believed to support 46% of the population with 24%, 13% and 17% resident in pastoral, marginal upland and upland areas respectively.

Past recording of the species in the Partnership area has been insufficient to make a quantitative assessment of status change, but some local naturalists believe that a considerable decline has occurred throughout the LBAP area since the 1960s. This has perhaps been more pronounced in the west; it is said to have been possible in the 1970s to see as many as a dozen or more Brown Hares in one field in certain parts of the Strathgryfe, for example, whereas in recent years one or two is the norm.

Reasons for the local decline are unknown, but may be related to changes in agricultural practice including a local arable decline. In addition, long-established and relatively herb-rich pastures have largely been replaced with improved grassland and leys, often with associated drainage measures which occurred during the period of substantial EEC grants in the 1970s. Brown Hares in the LBAP area now appear to be more abundant on marginal agricultural land, and are perhaps more associated with grasslands alongside rivers and open woodland edge. As part of the action plan process, it is important to survey the species throughout the LBAP area.

Ecology and Management

Although found mainly on agricultural land including rough pasture up to the limit of cultivation, the Brown Hare can also be associated with heather moorland and upland unimproved grassland habitats. Road casualties of hares peak in summer to autumn whereas sightings of live animals peak in the spring, due mainly to the "Mad March Hare" synrome, which is actually a male fighting off rivals from his female. Adults occupy home ranges of between 20ha and 40ha. These are usually shared with other hares, although individuals may concentrate on particular patches within their home range.

Anecdotal evidence indicates that the decline in the Brown Hare population since the 1960s cannot be attributed solely to recent changes in farming practices. Its status as a game species means that numbers can be monitored through the game bag. This information indicates that numbers in pastoral areas have been declining slowly since the last century up to the present day. However, populations in arable areas did not show such a pronounced decline until later. Arable production postwar increased markedly, with hare populations increasing accordingly. A couple of severe winters in the 1960s had a detrimental impact on the population, as have hunting, disease and predation.

Brown hares have two to three young a year which are called leverets, and these stay in a resting place called a 'form' which can be a shallow, dug out depression in an open field or under cover of long grass, scrub or hedgerow. Brown Hares are usually solitary animals, occasionally seen in small groups.

Factors Causing Loss or Decline

Incidental mortality is primarily through road deaths, with other current contributory factors being:

- Loss of habitat due to agricultural improvements. In particular the loss of mixed habitat and a greater reliance on silage rather than later cut hay, and the application of herbicides, have had a significant and cumulative impact. Where there is now continuous cereal production, without pastures or grass leys, hares have declined because cereals become too tall and woody in summer to be edible. Brown Hares appear to have a requirement for short grass and a diversity of crops at different growth stages throughout the year.

- Disease and predation, mainly by foxes on leverets, may have contributed to local population crashes. The disease *coccidiosis* affects young hares and *yersiniosis* affects adults in the winter. Illegal hare coursing with dogs possibly causes local declines.

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Brown Hare (*Lepus europaeus*)

Brown Hares are larger than rabbits, with longer limbs and a loping gait. They have black-tipped ears that are equal in length to the head.

Head and body length: 48-70cm, Weight: 3-5kg.

The tail is held down when running, showing its black dorsal surface. The fur moults in spring and autumn, the summer coat being a little lighter than the reddish winter coat.

Brown Hares are the fastest land animals in the UK.

Opportunities and Current Action

The national Brown Hare Species Action Plan, prepared as part of the UK Biodiversity Action Plan, seeks to maintain and expand existing populations (i.e. aims to double spring numbers in Britain by 2010) and includes an action for the Joint Nature Conservancy Council (JNCC) to prepare a management advisory booklet for Brown Hares. At the time of writing, no action has been taken in the LBAP Partnership area to conserve the Brown Hare; however, the Paisley Biological Records Centre has in the past collected records of sightings.

The Brown Hare is a game species and so has limited protection through the Ground Game Act 1880 and the Hare Protection Act 1911. The Game Conservancy Trust is of the opinion that the Brown Hare should remain a game species because this encourages their conservation. However the limited amount of protection provided under current legislation may not be enough to restore Brown Hare populations. Hares can still be shot as pests, quite legitimately by some arable farmers and woodland managers, and this may limit their recovery.

Some of the information required to carry out a detailed survey of the LBAP Partnership area, to assess the present day population and distribution, may be available from The National Hare Survey, carried out by R Temple *et al*, University of Bristol.

It may be possible to encourage landowners to introduce management practices that would benefit the conservation of local Brown Hare populations, using the Rural Stewardship Scheme.

Action Plan

The main aim is to increase the Brown Hare population in the LBAP Partnership area back to pre-1960s numbers. To enable the achievement of this aim, key priorities are to protect the Brown Hare through land management agreements and ensure yearly population monitoring is carried out.

Objectives and Targets

Objective 1	Maintain and enhance the current Brown Hare population and distribution in the LBAP area.
Objective 2	Restore the Brown Hare population and distribution to their former (pre 1960s) status throughout the LBAP area by 2010.
Objective 3	Ensure management of arable landscapes, heather moorland and upland unimproved grassland habitats, which will maintain and enhance hare populations.
Objective 4	Initiate a survey in the LBAP area to determine the status of the Brown Hare.
Objective 5	Ensure that all relevant landowners and /or tenants are aware of Brown Hares on their land and what they can do to help them.
Objective 6	Review this plan on an annual basis, beginning in 2005.

We will achieve these objectives by:

Action	Actioned by	Timescale
Ensuring no net loss of the species numbers or range	LAs FWAG CMRP, Landowners	2004/07
Developing policies which promote management practices that enhance and restore suitable habitat for Brown Hare	LAs FWAG	2004/07
Encouraging sympathetic, site-specific management regimes	FWAG	2004/07
Recording known and reported sites and carrying out a survey of the population	CMRP SNH	2004/05
Promoting an appreciation of the value of Brown Hares to local communities and land owners	LAs FWAG Countryside Ranger Service	2004/07
Monitoring and recording actions towards these objectives	LBAP Steering Group LBAP Officer Local Records Centre	Ongoing / annual

Links with Other Action Plans

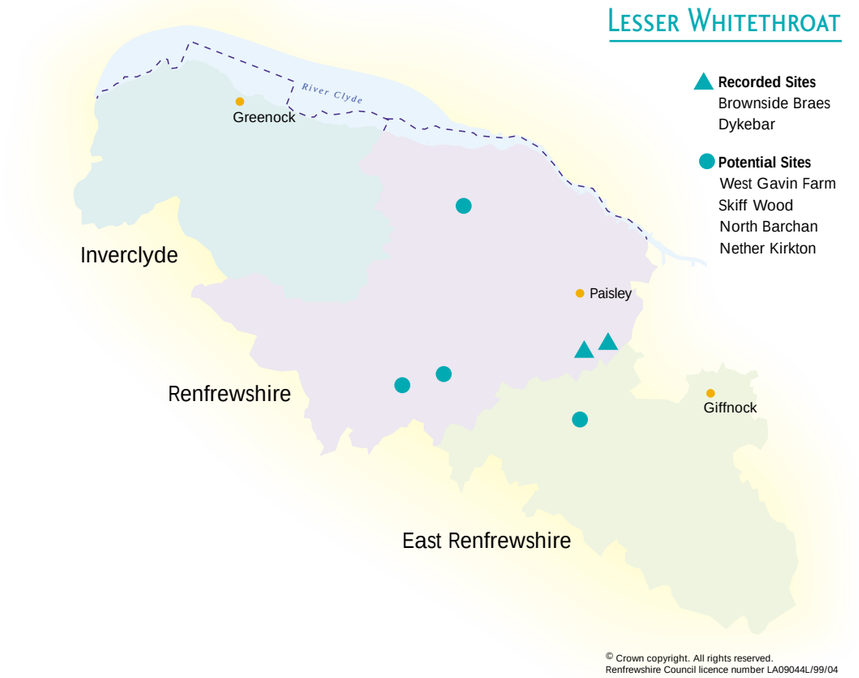
Broadleaved & Mixed Woodland, Dwarf Shrub Heath, Mires, Unimproved Grassland.

Further Information can be obtained from The Biodiversity Officer 0141 842 5281

Current Status - UK and Local

LBAP Partnership area Status: Local Priority Species

The Lesser Whitethroat (*Sylvia curruca*) is probably the least familiar of all the British scrub warblers and is certainly the most secretive of the group. Both sexes are alike in plumage colouration, their smaller size and distinctive black face mask separating them easily from the Whitethroat (*Sylvia communis*). Lesser Whitethroats are summer migrants to the UK and usually return to their breeding territories during late April to early May. Some males can become quite visible and animated then, as they perform their rattling song openly from the scrub canopy. The song period is unusually short for a warbler species, 4-14 days, and this makes field surveys and population estimates rather difficult.



According to the New Atlas of Breeding Birds, the Lesser Whitethroat breeding population in the UK has been estimated at around 80,000 territories. The main UK stronghold for the Lesser Whitethroat is to be found in southern England, where breeding densities can be as high as 3-6 pairs per km^2 in prime chalk downland scrub habitat. Other habitat types include coastal scrub, old overgrown hedgerows, and long-established scrub woodland on disused railway embankments and mineral workings.

The breeding distribution of this species becomes notably sparse the further north and west one travels in the UK. However, range expansion in the north and west of England occurred during the 1960's and 70's. In Scotland there has been a well-documented range expansion occurring in most regions since the mid seventies. The major Scottish stronghold is in the Lothians where The Breeding Birds of South-east Scotland estimates a breeding population of 180-200 pairs, while 9-12 territories were recorded in South Strathclyde. Regular breeding territories are localised to just three "core sites", i.e. Brownside Braes / Dykebar in Renfrewshire, Heads of Ayr in Ayrshire and Baron's Haugh / Strathclyde Park in Lanarkshire. All territories are located in ungrazed hawthorn scrub with a dense understorey of bramble, dog-rose and gorse. This particular type of habitat is very scarce in Strathclyde, hence the localised breeding distribution of the Lesser Whitethroat.

Ecology and Management

The small breeding population of Lesser Whitethroats in the LBAP Partnership area has been intensively studied since 1983. This research has given us an insight into the species' habitat requirements and feeding ecology. Ringing work within the last four years has shown strong site fidelity in both sexes between years and territorial interchange between individual males. Ringing work carried out in northern England has also shown strong site fidelity in both sexes and good survival return rate for breeding adults.

Habitat plays an important part in territory selection as mature hawthorn scrub provides the ideal feeding and nesting biotope required by this species. As an indicator species, the presence of breeding Lesser Whitethroat in those sites denotes the underlying quality of such habitat. Such core sites also hold other important breeding bird species such as Song Thrush (*Turdus philomelos*), Linnet (*Carduelis cannabina*) and Bullfinch (*Pyrrhula pyrrhula*). These birds are designated as Priority Species of Conservation Concern, so in protecting the Lesser Whitethroat and its habitat we also safeguard other important species.

This habitat type is extremely rare in the LBAP Partnership area and the core site at Brownside Braes must rank as the largest known area in Strathclyde (3-4 hectares in extent). The sheer density and plant species complexity of hawthorn, bramble, dog-rose and gorse creates a mosaic-like layer at the one metre height level. This particular combination is important for the Lesser Whitethroat's nesting requirements. Mature hawthorn canopies, spaced out and not enclosed, allow sunlight to penetrate down to ground level, thereby allowing this mosaic-like layer to develop. Both sexes feed unobtrusively on invertebrates high up in the hawthorn canopy, taking mostly various species of flies. When feeding young however, adults seek out moth larvae of a particular size range. When feeding young, adults will always utter a contact call on approaching the nest site. The distinctive "tac" sound is a very reliable indicator of breeding success when surveying dense areas of suitable habitat during late June.

Factors Causing Loss or Decline

There has been no overall change in the Common Birds Census Index for Lesser Whitethroat in the past 30 years, although large fluctuations have occurred. Results from the 1988 - 91 Breeding Atlas indicate that there has been a noticeable extension north and westwards in the UK breeding distribution. This extension has also been reflected in Europe, notably in Scandinavia and France.

The vast majority of breeding Lesser Whitethroats within Strathclyde are restricted to the three core areas. In the LBAP

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Lesser Whitethroat © Norman Tait

Lesser Whitethroat (*Sylvia curruca*)

The Lesser Whitethroat has a white throat that contrasts with its head, back and wings. The head and its relatively short tail are grey, while its back and wings are grey brown. The cheeks are dark grey.

Length 13.5cm Weight 10 – 16g Wingspan 17 – 19cm

Smaller than the similar whitethroat, the dark cheek feathers contrast with the white throat and give it a 'masked' look. The Lesser Whitethroat is quite skulking and often only noticed when its gives its rattling song, or 'tacking' call. When it flits from cover the Lesser Whitethroat shows white outer tail feathers.

Partnership area, all known breeding territories are concentrated within a single 1km square. Any major loss of scrub habitat within that relatively small area would undoubtedly bring about the species' demise.

Factors which could contribute to loss of the scrub habitat include:

- Removal to prevent loss of grazing or grassland habitat
- Removal to extend arable field area
- Removal to facilitate proposed development, e.g. landfill or housing
- Natural succession of existing habitat to woodland
- Decline in management of scrub sites leading through succession to mature, species-poor dense scrub
- Vandalism through direct or indirect action, e.g. cutting or burning scrub.

Lesser Whitethroat breeding sites have already been threatened by developments, e.g landfill and sports developments. A review of the Gleniffer Braes Country Park management plan for this important site is essential to maintain the Lesser Whitethroat habitat integrity.

As summer migrants to this country, Lesser Whitethroat populations can also be affected by changing conditions in their winter quarters or migration routes. During autumn the entire UK population migrates southeast through the Eastern Mediterranean to winter in the Nile valley and Ethiopian highlands. It is in these African countries where climatic conditions and habitat destruction may influence the returning UK population. Evidence from the British Trust for Ornithology (BTO) common bird census shows that this species has a cyclic population pattern, which may indicate changes in their winter quarters.

Opportunities and Current Action

The Lesser Whitethroat is protected under the terms of the Wildlife and Countryside Act 1981 and the EC Birds Directive. The species was included in the 'long list' of Species of Conservation Concern in the UK Biodiversity Steering Group Report 1995.

The Lesser Whitethroat is not regarded as a species for conservation action in Britain, however, the species is of strong local concern because of its rarity value. The breeding population in the Partnership area is at the very northwest edge of the species' European breeding distribution and is regarded as being very vulnerable. The Lesser Whitethroat is a good indicator species with regards to habitat quality. Its hawthorn scrub woodland habitat in this area also supports over thirty breeding bird species within a single 1km square, including Song Thrush, Linnet and Yellowhammer which are UK Priority Species, as well as high densities of other breeding birds such as Willow Warbler (an 'amber listed' Species of Conservation Concern).

The main "core" breeding site in the Partnership area is located southeast of Paisley at Dykebar and Brownside Braes. This site also has the largest area of prime continuous hawthorn habitat to be found anywhere in the area. Between one and three Lesser Whitethroat territories have been recorded most years, along with passage birds, i.e. 'transient' males.

Action Plan

Key priorities are to ascertain occupation of known territories within the core breeding site and to encourage further surveys to establish the true population distribution. The current known populations are within the Gleniffer Braes Country Park and so could benefit from management agreements with local land users and the staff resources to enable sufficient monitoring. Liaison with farmers and landowners over the existence of relic sites or access for new surveys will be necessary outside of the park.

Objectives and targets

Objective 1	Maintain the current populations of Lesser Whitethroat in the LBAP Partnership area.
Objective 2	Increase the breeding population of Lesser Whitethroat in the LBAP Partnership area.
Objective 3	Increase knowledge of site fidelity, movement and survival rates.
Objective 4	Promote awareness and positive perception of Lesser Whitethroat.
Objective 5	Review this plan on an annual basis, beginning in 2005.

We will achieve these objectives by:

Action	Actioned by	Timescale
Ensuring no net loss of species numbers or range	LAs	2004-07
Developing policies which promote management practices that enhance and restore suitable breeding habitat	LAs	2004-07
Expanding the annual monitoring programme and maintaining the ringing programme	Clyde Ringing Group RSPB Scottish Ornithologists Club	2004-07
Supporting educational and local community initiatives that increase the positive perception of Lesser Whitethroat	LAs LBAP Officer	2004-07
Monitoring and recording actions towards these objectives	LBAP Steering Group LBAP Officer Local Records Centre	Ongoing / annual

Further Information can be obtained from The Biodiversity Officer 0141 842 5281

Current Status - UK and Local

UK Biodiversity Status: UK Priority Species
LBAP Partnership area Status: Local Priority Species

The Eurasian Otter's world range extends from Ireland to Japan, taking in Europe, North Africa, the former Soviet States and the Middle and Far East. Formerly widespread throughout the UK, the Otter underwent a rapid decline in numbers from the 1950's to the 1970's. Populations persisted in parts of Wales, south-west England and much of Scotland, where sea loch and coastal areas still support one of the largest populations in Europe. The decline now appears to have halted and Otters are beginning to recolonise some of their former haunts, including parts of the LBAP Partnership area. Indeed, the Otter surveys of Scotland have shown an increased site occupancy in Strathclyde from 59% (1984-85) to 88% (1991-94).

Whilst the LBAP area only comprises a part of this wider Strathclyde region, this increase in Otter distribution is clearly repeated. Increases in Otter presence are apparent on the Black Cart, the White Cart and the Gryfe between the 1984-85 and 1991-94 surveys. Given appropriate watercourse and riparian management it is realistic to anticipate further increases, particularly given the relative proximity to the existing high Otter populations in Ayrshire and Dumfries and Galloway to the south.

Ecology and Management

Otter home ranges are large, particularly in freshwater environments. Otter homes can be called holts, couches, hovers, resting sites or dens. Each individual Otter will use a large number of holts within its territory and these may be above or below ground, in tree-root cavities, man-made cavities, rocks, earth or amongst dense vegetation. Breeding or natal holts are usually secure and away from sources of disturbance (e.g. flooding risk, people).

Otters are largely solitary animals. Territories, social and reproductive status are indicated to other otters by the deposition of spraints (droppings) at traditional or conspicuous sites within an individual's territory.

Males tend to occupy larger ranges than females and each male home range can overlap with those of several females. Otters are dependent on a wide range of aquatic and semi-aquatic habitats, including small streams, ditches and wetlands. The Otter's diet consists largely of fish and their food requirements are considerable to allow for the energetic demands of aquatic hunting.

Reproduction is non-seasonal, although there may be local peaks in certain months. Typically, there are one to three cubs, which remain in the holt for about two months. The cubs are weaned at three months, but remain dependent upon their mother for up to a year. The life expectancy of wild Otters is short, only three years on average. This combined with late sexual maturity often means that early reproductive success is critical to the viability of a population. Whilst many of the threats facing Otter populations are well known, the full explanation for this short life span is not fully understood.

Factors Causing Loss or Decline

- Pollution of watercourses, especially by persistent chemicals (e.g. PCBs), heavy metals and oil
- Insufficient prey associated with poor water quality
- Impoverished riparian and wetland habitat, particularly the availability of cover for breeding, shelter and movement
- Incidental mortality, primarily by road deaths and drowning in eel traps, creels etc. Road deaths represent a significant threat to recovering otter populations
- Development on flood plains and wetlands
- Conflicts of interest at trout farms and other fishing enterprises.

Opportunities and Current Action

Besides the general legal requirements for planning authorities and other agencies to assess the potential environmental impacts of their planned activities, there is specific European and national legislation to protect Otters.

The Otter is listed on Schedules 5 and 6 of the Wildlife and Countryside Act (1981). Under the provisions of this Act it is a criminal offence in most circumstances to:

- intentionally kill, take or injure an Otter
- intentionally disturb an otter in its place of shelter
- intentionally damage, destroy or obstruct access to a place of shelter.

The EC Habitats Directive, implemented through the Conservation (Natural Habitats, & c.) Regulations 1994, makes provisions to protect both a species and its habitat. Under these regulations, it is also an offence to:

- damage or destroy an Otter shelter, whether intentionally or not
- deliberately disturb an Otter.

Thus it is clear that holts and couches are both covered by the legislation whether or not an Otter is present.

There is scope for more detailed research into the current distribution of Otters in the LBAP Partnership area and this

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Otter © Norman Tait

Otter *(Lutra lutra)*

Otters have a long, slim body, a skull with powerful jaws and show numerous adaptations to aquatic life. These include webbed toes and a powerful rudder-like tail, used for propulsion under water. Otters are capable of closing their ears and nostrils while underwater. They have two types of fur: stout waterproof guard hairs and a dense, fine underfur which provides insulation. Their fur is chestnut brown and is slightly lighter on the belly.

Head and body length: 55-110cm, Weight: 5-12kg.

should be combined with studies aimed at establishing the suitability of the available habitat. There may be opportunities to improve riparian habitats, perhaps through the installation of artificial holts and the adoption of enlightened riverbank management practices under agri-environment schemes. In addition, projects to help fish populations and restricting human access to one bank in a few particularly sensitive areas may well be beneficial to Otters.

As the Otter population recovers it will become increasingly important to liaise with local authorities, road builders and others to incorporate underpasses and fencing into new roads, realignments and extensions from an early stage to reduce Otter road deaths. Efforts should be made to raise awareness amongst planners and engineers of the needs of Otters and other wildlife to facilitate a shift away from hard engineering solutions towards a more imaginative and sustainable approach to river management.

The adoption of the Forestry Commission's Forest and Water Guidelines should eventually reduce some of the adverse effects of afforestation.

Although deaths in fyke nets are not a serious local problem, eel fyke net guards are available free of charge from the Vincent Wildlife Trust, and advice on Otter deterrents for fish farms is also available.

Current national initiatives:

- The Joint Nature Conservation Committee has prepared a *Framework for Otter Conservation in the UK 1995-2000*
- National surveys have been conducted every five to seven years. Local surveys by Wildlife Trusts and other organisations have established the present distribution and potential for future spread in many areas
- Research is in progress on the implications of heavy metal and PCB contamination in fish and ecosystems
- Conservation management (eg creating log piles, artificial holts, and developing "otter havens") has proved successful in many river catchments
- The Forestry Commission promotes sensitive woodland management and expansion to favour otters, through the implementation of the Forest and Water Guidelines;
- The government has proposed two sites to the European Commission for selection as Special Areas of Conservation (SACs) for their Otter interest.

Action Plan

This plan adopts the UK Action Plan for the Otter, with the following key objectives:

- Maintain and expand existing Otter populations
- Restore breeding Otters to all catchments and coastal areas where they have been recorded since 1960, by 2010.

Otter © Norman Tait

Objectives and Targets

Objective 1	Maintain the current populations of Otter in the LBAP Partnership area.
Objective 2	Establish baseline status (abundance and distribution) of Otter in the LBAP Partnership area.
Objective 3	Restore Otter populations to their former distribution throughout the LBAP Partnership area.
Objective 4	Establish population trends.
Objective 5	Promote awareness and positive perception of Otters by relevant stakeholders and the general public.
Objective 6	Review this plan on an annual basis, beginning in 2005.

We will achieve these objectives by:

Action	Actioned by	Timescale
Ensuring no net loss of species numbers or range	LAs SNH	2004-07
Recording known and reported sites in the area	BRISC	2004-07
Developing policies which promote management practices that enhance and restore suitable Otter habitat	LAs SNH SEPA	2004-07
Monitoring population trends	SNH BRISC	2004-07
Supporting educational and local community initiatives that increase the positive perception of otters	LAs Greenspace Projects SEPA	2004-07
Monitoring and recording actions towards these objectives	LBAP Steering Group LBAP Officer Local Records Centre	Ongoing / annual

Links with Other Action Plans

Broadleaved & Mixed Woodland, Rivers & Streams, Standing Open Water, Mires, Urban.

Further Information can be obtained from The Biodiversity Officer 0141 842 5281

Current Status - UK and Local

UK Biodiversity Status: UK Priority Species
LBAP Partnership area Status: Local Priority Species

Bats are the only true flying mammals. Like us, bats are warm-blooded, give birth, and suckle their young. They are also long-lived, intelligent, and have complex social lives. Britain's smallest bats, the Pipistrelles, are recorded from all across temperate Europe and extend far into Asia. They are the most frequently recorded and most common of the nine or ten bat species that occur across Scotland. However, the National Bat Colony Survey suggests a population decline of all bat species in Britain of around 70% between 1978 and 1993.

The special roosting requirements of bats and their population decline have led to them being given special protection by law and they are listed in the Red Data Book of Mammals, which lists threatened species. Little is known of the Pipistrelles' status within the LBAP Partnership area and, therefore, nothing definite is known of local population trends over the last century.

Ecology and Management

There are two similar species of Pipistrelle bats, the soprano Pipistrelle and the common Pipistrelle, which can be distinguished by the frequencies of their echo-location calls.

Bats require a variety of habitats in order to meet the basic needs of feeding, breeding and hibernating. They are colony-forming animals and thus rely on safe roosts to hold the colony. Studies of genetic diversity between close and distant colonies suggest that there is little movement between distant colonies. This implies that individuals and local populations are sedentary and are therefore vulnerable to roost and habitat loss. As they move to different roost sites at various times of the year, summer, autumn and winter sites are all vital.

The Pipistrelle diet consists mainly of small insects. One bat is able to consume on average 3000 midges in one night as well as other insects. They therefore require insect rich feeding habitats.

Bats are relatively long-lived for their size, with a lifespan of up to 16 years. They are not prolific breeders, with females averaging less than one young per year. This makes them highly vulnerable to anything that reduces their reproductive success in any given year.

From about May to September, females congregate in summer maternity roosts, often located close to sources of heat such as chimneys and boilers. Holding all the breeding females from an area, as wide as 14 square miles, maternity colonies average around 150 bats. While some immature males may roost with the females, most males remain solitary during the summer. Due to the mobility of colonies, a large number of suitable roosts are necessary to maintain each social group.

Young are usually born from early June to mid July, and are suckled only by their mother. They remain in the roost while the females are out hunting. The adults disperse after young are weaned at six weeks old. As the young have been raised in confined spaces they take their first flight outside in unfamiliar surroundings and disoriented young bats can end up in houses. This results in many requests for advice about bat roosts. In general, more than 50% of known roosts are in houses under 30 years old. Their affinity for houses, large colony sizes and early (pre-dark) emergence time makes pipistrelles the most commonly observed bat and the cause of most enquiries from the public.

In autumn, males establish autumn breeding harems, taking territory and making song-flights nearby. From October Pipestrelles disperse to hibernate through the winter to March. They hibernate in humid areas with cool even temperatures such as in cellars, under slates and behind bargeboards.

Factors Causing Loss or Decline

General threats to bats in the UK include:

Loss of Roosts

Bats are particularly vulnerable to the loss of roosts as the whole breeding population for a wide area can be congregated in one roost; however, in urban areas they may have many smaller roosts. Disturbance at or in a roost either in summer or during hibernation can have severe effects and lead to abandonment of the roost, or deaths of bats. Any change in conditions or loss of access to structures such as buildings, bridges and mines can pose a major threat. Development pressure can lead to loss of suitable roost sites and habitat: old buildings are often renovated or demolished, old trees and hedges are removed and feeding sites are built upon. Old mines and caves are sometimes used for landfill or are being filled as a result of concerns over public liability.

Habitat Change and Loss

Intensive modern farming practices and inappropriate management of riverbanks have led to a reduction in insect prey quantity and fragmentation of suitable habitat. The abundance of insects in marshes or open water habitats will attract bats but pollution, land drainage and the infilling of ponds have caused a significant loss of such habitats. Important source of insects include linear routes that follow hedgerows, woods along riverbanks and tree lines. They also act as travel routes to other feeding areas such as woodlands and old grasslands. These features are all in decline. Field sizes have increased and these relatively barren areas have now fragmented the remaining small patches of good habitat.

Pesticides

Herbicides are widespread and in removing 'weeds' they reduce plant diversity and subsequently the range of insect prey. Timber treatment chemicals, such as Lindane (now banned), have lead to the loss of entire colonies of bats and remain as a residual toxic hazard for years afterwards. Safer chemicals now exist and information can be obtained from Scottish Natural Heritage (SNH) and the Bat Conservation Trust (BCT).

Climate

Climate can seriously affect both wintering bats and foraging breeding females. A long cold winter will reduce fat reserves and threaten survival. However, a cold, windy and wet spring can pose an even greater threat by sapping the post-winter energy reserves. Bats are not able to replenish their food reserves as these conditions make it hard to fly and the availability of insects is greatly reduced.

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Common Pipistrelle Bat (*Pipistrellus pipistrellus* (45 kHz))

Soprano Pipistrelle Bat (*Pipistrellus pygmaeus* (55 kHz))

The pipistrelles are Britain's smallest bats. They vary in colour, but are usually medium to dark brown on the back and only slightly paler underneath. They are the most common species in towns.

Head and body length 35 - 45mm, Forearm length 28 -35mm, Wingspan 190 - 250mm, Weight 3 - 8g, Colour Medium to dark brown

Predators and Disease

Loss through predation has been estimated as up to 11 %. The main predators for bats are cats. Disease and parasites are not considered to be predominant factors.

Opportunities and Current Action

All bats and their roosts are protected by law under the Wildlife and Countryside Act 1981 and by the Conservation (Natural Habitats, &c.) Regulations 1994. It is an offence to:

- Intentionally or deliberately kill, injure, or capture (take) a bat
- Deliberately disturb a bat (whether in a roost or not)
- Damage, destroy or obstruct access to a bat roost.

Although this protection states that it is an offence to disturb bats and their roosts, it does not entirely preclude disturbance or alteration at all times. It does mean however that anyone proposing such an activity (e.g. maintenance work on a roof), must first seek the advice of SNH on whether or not the proposed activity should proceed and, if so, how and when. SNH can then advise on the best time to carry out the work and the most appropriate method for doing so. As bats return to the same places every year a bat roost is protected even if there are no bats there. For more details on this please refer to the Bats and People booklet published and available from SNH.

In addition, the presence of a protected species, such as pipistrelle, is a material consideration where a planning authority is considering a development proposal that can potentially cause significant impact to the species (NPPG14 Natural Heritage).

Current national initiatives include:

- Roost count and foraging monitoring for the National Bat Monitoring Programme and National Bat Colony Survey
- The National Bats and Habitats Survey
- Provision of published guidance leaflets and advice from BCT, SNH etc on bats and their roosts
- Ongoing research into the ecology of the 2 species at various University centres
- Research into the prevalence of rabies in bats by SNH and the Scottish Executive
- Study of heated bat boxes as a possible management tool for 'relocating' excluded bat colonies (any species) (joint SNCO, MTUK and Aberdeen University Project)

Local Initiatives include:

- A network facility to support injured bats, which includes local bat group members and Hessilhead Wildlife Centre
- Educational work via schools and events
- The Clyde Bat Group, which covers the LBAP area, monitors local roosts, collects records, promotes and carries out research, and runs bat box schemes
- Raising awareness, within the appropriate departments of the Local Authorities, on the law and requirements regarding bats (i.e. distribution of SNH booklet)

Action Plan

The main aim is to maintain and enhance the current population and range of Pipistrelle bats in the LBAP Partnership area.

Objectives and Targets

Objective 1	Establish baseline status (abundance & distribution) of Pipistrelles in LBAP area
Objective 2	Maintain and enhance the current populations and range of Pipistrelles in LBAP area
Objective 3	Maintain and enhance key Pipistrelle habitats
Objective 4	Establish population trends
Objective 5	Promote awareness and positive perception of bats by relevant stakeholders and the general public
Objective 6	Review this plan on an annual basis, beginning in 2004

We will achieve these objectives by:

Action	Actioned by	Timescale
Recording known and reported maternity and hibernacula roost sites in the area.	Local Bat Groups, SNH	2004-05
Ensuring no net loss of species numbers or range.	SNH, LAs	2004-07
Developing policies that promote management practices that protect, enhance and restore habitat suitable for bats, including features used by insects in fresh water habitats, woodlands and pastures.	SNH LAs	2004-07
Monitoring population trends.	SNH Local Records Centre	Ongoing
Supporting educational and local community initiatives that increase the positive perception of bats.	LAs, SNH	2004-07
Monitoring and recording actions towards these objectives.	LBAP Officer Local records centre	2004-07

Links with Other Action Plans

Broadleaved & Mixed Woodland, Rivers & Streams, Standing Open Water, Mires, Unimproved Grasslands.

Further Information can be obtained from The Biodiversity Officer 0141 842 5281

Current Status - UK and Local

LBAP Partnership Area Status: Local Priority Species

Aspen is Scotland's only native poplar species. It is widely distributed across the country, but only found in large numbers in north-east Scotland. In Scotland Aspen is usually found standing alone or in small groups and pure woodland stands of aspen are extremely rare. It is estimated that only 160ha of Aspen woodland remain today in Scotland, with just 25ha protected by a statutory designation.

Records for Aspen in the LBAP area are extremely limited with only 20 stands officially recorded by the Botanical Society of the British Isles. Of these, only three are presumed to be of ancient origin but there are two other records in neighbouring areas, one in Glasgow and one in North Ayrshire.

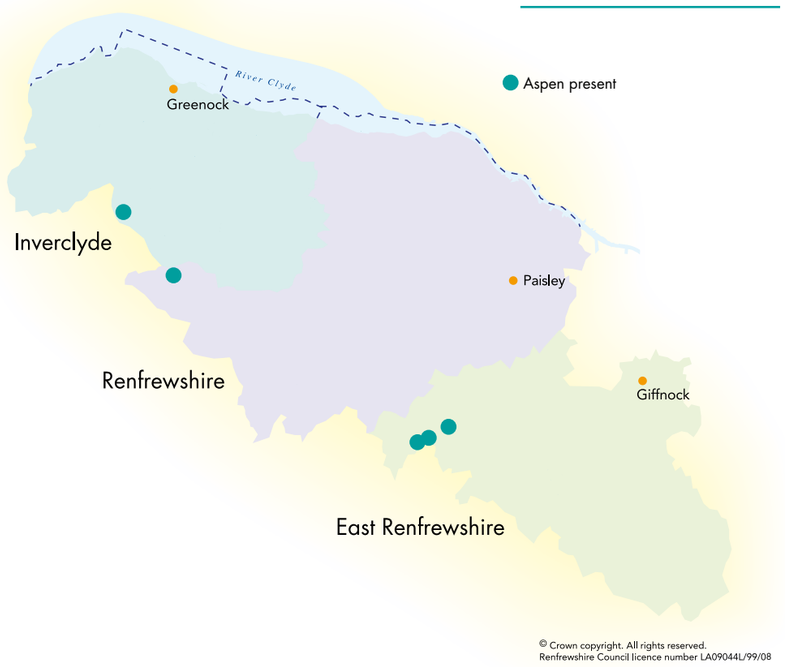
These stands typically comprise one or two trees which are to be found clinging to the sides of steep upland gorges. The three remaining stands of aspen in the LBAP Partnership area, of presumed ancient origin, are all found in locations which are inaccessible to browsing animals.

Ecology and Management

Aspen is associated with well-drained, moist, mineral soils. It was a very early post-glacial colonist, forming the first woodlands after the Ice-Age alongside birch, rowan, hazel and willow. Nevertheless, the species can tolerate a wide range of soil types and grows from sea level up to or just beyond 550m in sheltered locations.

It is now an under-represented component of natural woodland types in Scotland but has a strong association with ancient woodlands. Aspen supports a unique living community containing many rare species including moths, flies, bryophytes, lichens and fungi that occur nowhere else in the UK.

Distribution of Aspen



Aspen is one of the last trees to come into leaf. The trees have distinctive coppery coloured leaves when they first open, before turning green. In the autumn the leaves turn a brilliant yellow or more rarely red in some individuals. The leaves make a characteristic fluttering sound when stirred by the wind. Aspen are dioecious, so individual trees can be either male or female. Trees flower in March or April before the leaves appear, with both sexes producing catkins. Pollinated female catkins ripen in summer and release tiny seeds. For some reason, as yet not fully understood, seed production is rare in Scotland. Aspen is a short-lived species with few individuals surviving beyond 100 years, partly because its soft, white wood is not resistant to rot fungi. Aspen's main method of reproduction, however, is vegetative and it can be very prolific at producing a mass of suckers or new stems growing off the roots of mature trees.

Factors causing loss or decline

The most likely cause of decline in the distribution of Aspen, given that its foliage is very palatable to browsing animals, is the inappropriate grazing of Aspen stands, especially young stems, by livestock, rabbits and deer which suppresses natural regeneration.

The scarcity of the species in the LBAP Partnership area, the distance between stands and the often solitary nature of the trees means that individual specimens are often isolated from the opposite sex, reducing the likelihood of seed generation.

Others factors to be considered include the shortage of suitable planting stock, especially stock of local provenance, to support new woodland plantings.

Generally there is a lack of research into the ecology and management of Aspen. Research into Aspen is in it's infancy but we do know that Aspen has bark which is alkali this makes it an important host for more primitive plant species like mosses, liverworts and lichen to grow on. Consequently the trees biodiversity value is greater than the value of the tree alone as it supports other valuable species including associated UK Priority Species: A hoverfly (*Hammerschmidtia ferruginea*), a leaf rolling weevil (*Bycticus populi*), dark-bordered beauty moth (*Epione vespertaria*), and 2 bristle mosses (*Orthotrichium gymnostomum & O. obtusifolium*).

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Aspen (*Populus tremula*)

Aspen is a smallish tree with grey bark. It rarely produces seed, so its main method of reproduction is vegetative, with new suckers, or stems, growing off the roots of mature trees.

The leaf stalks of aspen are flattened and very flexible near the leaf blade giving rise to the characteristic fluttering of its leaves in the slightest breeze. Its quivering leaves have been the foundation for the tree's bad reputation in folklore and superstition.

Opportunities and Current Action

Trees for Life instigated an Aspen project in 1991, looking at research into propagation methods, protecting regenerating stands and old trees, undertaking mapping and survey work as well as raising awareness of aspen.

There has been an increased interest in Aspen and the species that it supports, which is leading to new research. Recent work has identified 4 species new to Scotland associated with Aspen and has highlighted Aspen's importance in the forest ecosystem.

There are currently controversial plans to re-introduce European Beaver (*Castor fiber*) to Scotland after an absence of around 300 years. Aspen is a favourite food of the European Beaver so if the re-introduction goes ahead increased planting of this tree could provide an important component of their diet.

Key priorities are to ensure the survival and viability of the remaining stands of aspen and to increase the population and distribution of the species across the LBAP Partnership area.

Natural regeneration as well as planting will be used. A tree nursery will be established to propagate cuttings from existing trees for replanting. Further surveys will be undertaken to establish the sex of existing trees and to establish the presence of further stands of ancient origin in the area.

Accepting that the population of ancient origin aspen in the LBAP Partnership area is extremely low, material (seed and cuttings) will be sourced from outwith this area (although within the local provenance zone) for propagation in the nursery, to increase the genetic diversity of the population. Some of the identified stands are within Clyde Muirshiel Regional Park and so could benefit from management agreements with the Park Authority. Outside the park, liaison with local landowners will be necessary.

Objectives and Targets

Objective 1	Protect the existing stands of Aspen identified to be of ancient origin
Objective 2	Establish the current distribution and population status
Objective 3	Increase the Aspen's population in the LBAP area
Objective 4	Identify suitable sites for Aspen planting

We will achieve these objectives by:

Action	Actioned by	Timescale
Liaise with all relevant landowners to erect fenced enclosures around existing stands, where appropriate, to remove grazing pressures and to encourage natural regeneration	BULB CMRP	2009 - 2011
Identify and establish new areas for planting including using fenced enclosures	BULB CMRP	2009 - 2011
Monitor existing trees to establish their sex	BULB	Ongoing
Undertake a publicity campaign inviting the public to contribute information on the occurrence of other trees in the area	BULB	Ongoing
Establish a tree nursery including a propagation unit	BULB	2009 - 2011
Take cuttings from existing trees identified within the local provenance area to propagate in the nursery	BULB	2009 - 2011
Exchange seed, root cuttings and saplings with other interested parties	BULB	2009 - 2011
Plant saplings from a range of sources in each planting site to encourage successful pollination	BULB CMRP	2009 - 2011
Promote genetic research to establish provenance of existing trees	BULB	2009 - 2011
Investigate uses of aspen including timber products, phytoremediation of contaminated land and ground stabilisation	BULB	2009 - 2011

Links with Other Action Plans

Broadleaved and Mixed Woodland; Common Juniper

Further Information can be obtained from BULBLochwinnoch@hotmail.co.uk

Current Status - UK and Local

LBAP Partnership area Status: Local Priority Species
Butterfly Conservation Status: Medium

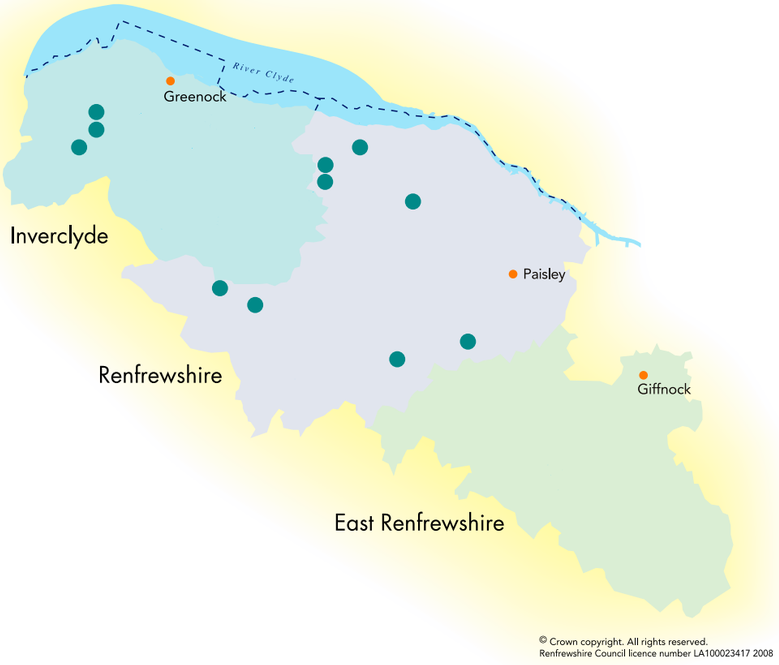
Green Hairstreak is the commonest of the five British hairstreak species. It is stable in most of Europe but has declined in several countries. Colonies may be found on calcareous grassland, woodland rides and clearings, heathland, moorland, bogs, railway cuttings, old quarries, and rough, scrubby grassland. This species occurs on a wide range of soils but is strongly associated with scrub and shrubs, which are usually present at sites where it breeds. A variety of plants are used, but Blaeberry (Bilberry) *Vaccinium myrtillus* is used almost exclusively on moorland and throughout Scotland.

In south-west Scotland the habitat preference is wet heathland with occasional birch to provide shelter from the wind. On these sites blaeberry is recognised as the most common foodplant and indeed within the Partnership area colonies have generally been recorded on sites where this foodplant is present.

Records from throughout the Partnership area are patchy, however, supporting the idea that this species may be subject to under-recording due to its habitat preference. In addition, past records have generally involved single individuals and small colony numbers, suggesting that this species can be overlooked easily.

Records can split Green Hairstreak sites into roughly four areas, two in Clyde Muirshiel Regional Park at Cornalees Bridge and Muirshiel Country Park, one at Glennifer Braes Country Park and one around Dargavel Burn, north of Elphinstone Wood. It is possible that this species is more widespread in the Partnership area than currently recorded, however, because it is a small, fairly inconspicuous butterfly, rarely seen in large numbers.

Distribution of Green Hairstreak Butterfly



Ecology and Management

It has what is probably one of the largest range of foodplants of any British butterfly. Early butterfly collectors thought that the only foodplant was Bramble (blackberry) *Rubus fruticosus* hence its scientific name, but as its habits became better understood the list grew and will probably continue to do so. Depending on the habitat it will use Common Rock Rose *Helianthemum nummularium,* Bird's-foot trefoil *Lotus corniculatus, Gorse Ulex europeans*, Broom *Cytisus scoparius*, Dyer's Greenweed *Genista tinctoria*, Blaeberry *Vaccinium myrtillus*, Dogwood *Cornus sanguinea*, Buckthorn *Rhamnus cathartica*, Cross-leaved Heath *Erica tetralix* and Bramble.

This range of foodplants means that it is able to use a range of habitats including chalk downland, heathland, moorland and woodland. The eggs are laid singly and the caterpillars are green with yellow markings along the back. Like other members of the family they are rather sluglike. They are not known to be tended by ants like some lycid larvae but the pupae, which are formed at ground level, emit squeaks which attract ants and it is thought that ants will always bury any that are found. Green Hairstreaks have one brood a year and overwinter as pupae, which results in them being the earliest of the hairstreaks to emerge in spring.

Factors causing loss or decline

Although a widespread species, localised colonies can be lost due to habitat loss through drainage and subsequent afforestation, scrub regeneration, agricultural improvement and overgrazing.

Opportunities and Current Action

Habitat conservation is the main opportunity to benefit this species. Ensuring that key known sites are maintained with appropriate food plants will ensure this species' survival. Implementing the Dwarf Shrub Heath and Mire Habitat Action Plans will help to deliver this. Surveying historic sites will establish whether the Green Hairstreak colony is still present and checking potential sites which have suitable habitat may discover new populations. Once Green Hairstreak sites are identified we can look at delivering projects to manage the habitat favourably for these butterflies.

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Butterfly © N. Gregory

Green Hairstreak Butterfly *(Callophrys rubi)*

The Green Hairstreak is a small butterfly, which is widespread across most of the UK, although many colonies have been lost in recent years. It is found across Europe and North Africa and eastwards through Asia well into Siberia. The upper side is a uniform dull brown with two paler patches on the male's forewings made up of scent scales. The undersides are a bright green with a thin white line, often reduced to a faint row of dots or even missing altogether. They never rest with their wings open.

Objectives and Targets

Objective 1
Determine extent and status of existing populations

Objective 2
Maintain the current populations of Green Hairstreak in the LBAP Partnership area.

Objective 3
Increase the breeding population of Green Hairstreak in the LBAP Partnership area.

Objective 4
Promote awareness of appropriate land management techniques to conserve Green Hairstreak habitat.

Action	Actioned by	Timescale
Conduct surveys to determine location and status of existing populations	LBAP Officer Butterfly Conservation Trust Paisley Museum	2009/2010
Develop policies which protect existing Green Hairstreak habitat	LAs CMRP	2009-ongoing
Implement projects to enhance and create suitable foraging and breeding habitats	CMRP GBCP	2010 2010

Links with Other Action Plans

Dwarf Shrub Heath
Mire

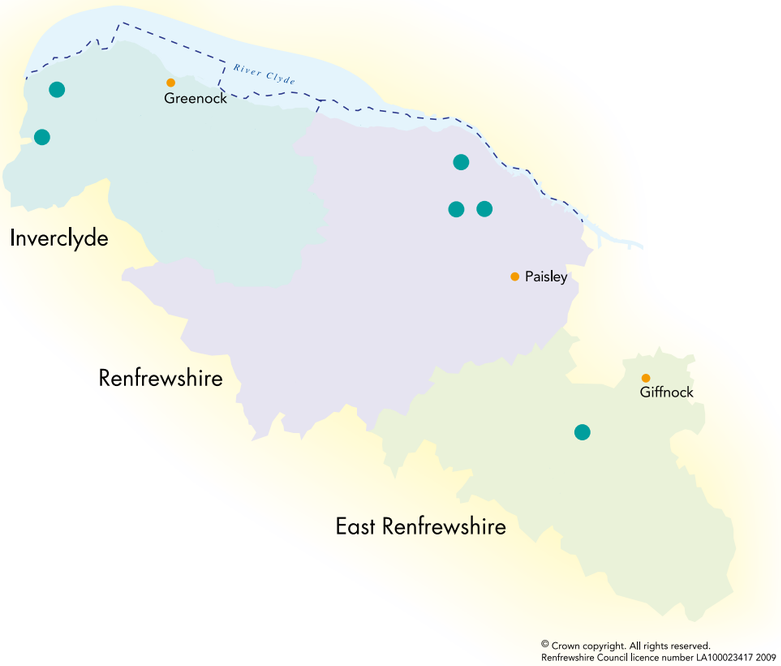
Further Information can be obtained from The Biodiversity Officer 0141 842 5281

Current Status - UK and Local

UK Biodiversity Status: High Conservation Concern – on RSPB's Red List of species because of a rapid decline in its UK breeding population: >50% over the last 25 years.
LBAP partnership area status: Local Priority Species.

The House Sparrow is a resident breeding bird in the UK, which used to be very common in both urban and agricultural areas. The bird's close association with human beings has become one of its most distinctive features: it is often viewed as a creature exploiting our wastefulness. The House Sparrow's use of habitats created by human beings suggests that it is a versatile and productive species, which would be expected to be thriving today. Indeed its estimated 2.8 million to 4.9 million pairs breeding in the UK looks like a healthy population compared with many bird species. On the other hand, the UK population was estimated at 9.5 million in the 1950s and this was reckoned to have risen to 12 million by the early 1970s. Clearly there has been a nationwide population crash (of the order of 62%) in the past 25 years.
Local experts suggest that the House Sparrow population crash occurred earlier in Scotland than in other parts of the UK. The marginal increase in Scotland recorded between 1994 and 2006 by the BTO's Breeding Birds survey is viewed as representing a minor recovery from a dangerously low population base. No systematic population surveys of House Sparrows have been published for Renfrewshire, East Renfrewshire and Inverclyde. Anecdotal reports suggest, however, that there have been selective declines at a local level, with observers claiming that House Sparrows have disappeared from previously well populated urban and suburban haunts in particular. These perceptions are reinforced by survey results, in that the BTO Garden Bird Feeding Survey has shown dramatic declines in suburban Glasgow. In fact, a long term decline of almost 98% has been observed in suburban Glasgow, from 4.9 birds/ha in 1959 to less than 0.1 per ha in 1997 *(Summers-Smith 1999 Current status of the House Sparrow in Britain. British Wildlife, 10: 381-386)*. Overall, it can be concluded that the Local Biodiversity Action Plan area shares the acute population decline which has been particularly well recorded in London.
The Steering Group has started to collect and compile information about known House Sparrow colonies. Whilst the data remains very patchy so far, there is a suggestion that some nesting "hot spots" persist in the LBAP area.

Distribution of House Sparrows



Ecology and Management

The House Sparrow's ecology is relatively well documented. They nest in loose colonies and exhibit a strong preference for nesting in holes or cavities in built structures. They also exhibit strong fidelity towards nest sites and breeding partners, which could be a factor limiting their ability to colonise suitable habitat when it is created outside existing colonies' home ranges.
Nestlings are fed on aphids, caterpillars, weevils and grasshoppers. By the time they fledge, however, seeds and grain become the most important foods. Such food requirements suggest that a successful breeding colony needs a relatively complex mosaic of vegetation types within easy foraging distance of the nest sites. Fledged young are unable to feed themselves for about a week, so parental feeding continues for up to a fortnight and is usually carried out by the male as females start preparing for the next brood of eggs to be laid.
Once independent, the young gather in large flocks and these flocks move to areas with plentiful seed supplies and other food sources, e.g. waste ground, hayfields. Later, flocks move on to cereal crop fields, if available, to feed on ripening grain. Here they are joined by adult birds once they have completed nesting. By October, however, nesting colonies are starting to reform, with any adults which fail to return being replaced by juvenile birds.
Multiple broods and an ability to take advantage of nest sites and food sources created by people suggest that this adaptable species should be thriving, like other species which live commensally with human beings. On the other hand, there is evidence that the House Sparrow's adopted habitats have been changing in recent decades and that fewer of these scruffy patchwork mosaics of habitat are now available for nesting colonies in urban or rural areas. Agricultural production is also much more efficient, providing flocks with fewer opportunities to forage for cereal grain, in particular.

Factors causing loss or decline

Inverclyde
Renfrewshire
East Renfrewshire
LBAP

House Sparrow

Passer domesticus

The House Sparrow is a small brown and grey bird. The male is more striking, with a prominent black bib and eye mask, plus a chocolate hood which is divided in half by a broad grey band running from the beak to the nape of its neck.
Length 14cm, Weight 34g, Wingspan 24 cm.

The House Sparrow's behaviour is quite unwary. Constantly chirping, they move about in boisterously noisy groups. Their long association with people means that they rarely hide from view and will hop confidently amongst people's feet if suitable food is lying on the ground.

Across the UK a number of factors have been cited as potentially contributing towards the dramatic decline in House Sparrow populations. These factors can be grouped under four main headings:

★ Reduced food supplies, particularly of aphids which are an essential part of the young nestlings' diet in early spring. Reduced aphid numbers could have been caused by a number of factors, e.g. direct habitat destruction as urban gap sites are regenerated or perhaps by toxic chemicals contained in lead-free petrol. Outside breeding areas feeding flocks may have been adversely affected by agricultural changes, including the large scale switchover to grass silage production from hay making in the west of Scotland, as well as the switch to autumn sown cereals, meaning that few stubble fields remain.

★ Loss of nest sites through various types of urban renewal programmes and activities, affecting both commercial and domestic properties.

★ Disease, with both Salmonella and Trichomoniosis (a protozoan parasite carried by Feral Pigeons) being mentioned by a number of sources.

★ Predation, although the usual three urban predators which have been cited as potentially adversely affecting House Sparrow populations: Magpies, Sparrowhawks and domestic cats have been dismissed by ornithologists as having an insignificant effect.

Opportunities and Current Action

There is currently no national House Sparrow Action Plan responding to the UK Biodiversity Action Plan.

At the time of writing no action has been taken in the LBAP Partnership area to conserve the House Sparrow and little survey information seems to be available.

The main opportunity seems to be the possibility of exploiting national media coverage about the plight of the House Sparrow to discover more about the status and requirements of the species in this Local Biodiversity Action Plan area.

Objectives and Targets

Objective 1	Increase knowledge of the status, distribution and population trends of the House Sparrow in the LBAP area.
Objective 2	Increase knowledge of the habitat requirements of the House Sparrow in LBAP area. – Particularly at its surviving urban nesting colony sites
Objective 3	Increase awareness of the House Sparrow and its conservation requirements in LBAP area.
Objective 4	Establishment of productive dialogue with land and site owners who are potentially sympathetic to the plight of the House Sparrow in the UK.
Objective 5	Implementation of trial House Sparrow conservation projects, concentrating on the establishment, re-establishment and reinforcement of nesting colonies in suitable habitats within urban areas.
Objective 6	Ensure House Sparrow information and data is recorded and disseminated appropriately.

We will achieve these objectives by:

Action	Actioned by	Timescale
Carry out field surveys to identify locations and sizes of as many House Sparrow nesting colonies as possible.	Greenspace teams RSPB SOC Ranger Services UWS	2009 - 2011
Encourage, commission or complete ornithological field surveys on a selective sample of nesting colonies to investigate habitat requirements of House Sparrows during the nesting season (and outside if feasible).	Greenspace teams UWS RSPB SOC Biodiversity Officer Ranger Services	2010 - 2012
Compilation, launch and management of public information appeal about locations of House Sparrow colonies in various formats: survey forms on partners' web-sites; e-mails to contact lists (including established citizens' panels; local members' groups); printed recording forms and leaflets made available in libraries, community centres, visitor centres; press appeals as opportunities arise.	LAs RSPB SOC Ranger Services	2009 - 2011
Production of materials which increase the positive perception of House Sparrows in East Renfrewshire, Inverclyde and Renfrewshire, e.g. leaflets, newsletter and press articles, local media appearances	Urban LBAP Group	2009-2012
Launch of a schools nest box erection project to supplement work already being completed in enhancing school grounds.	Greenspace teams Starling Learning	2009-2012
Monitor research happening at a national level and in other parts of the UK. Participate in this research where appropriate and when resources permit at a local level.	UWS Carts Greenspace/Inverclyde Greenspace RSPB SOC Biodiversity Officer	2009-2012

Links with Other Action Plans

Urban, Farmland Passerines, Pipistrelle Bat.

Further information can be obtained from the Biodiversity Officer 0141 842 5281.

Current Status - UK and Local

UK Biodiversity Status: Species of Conservation Concern.
LBAP Partnership Area Status:
Local Priority Species

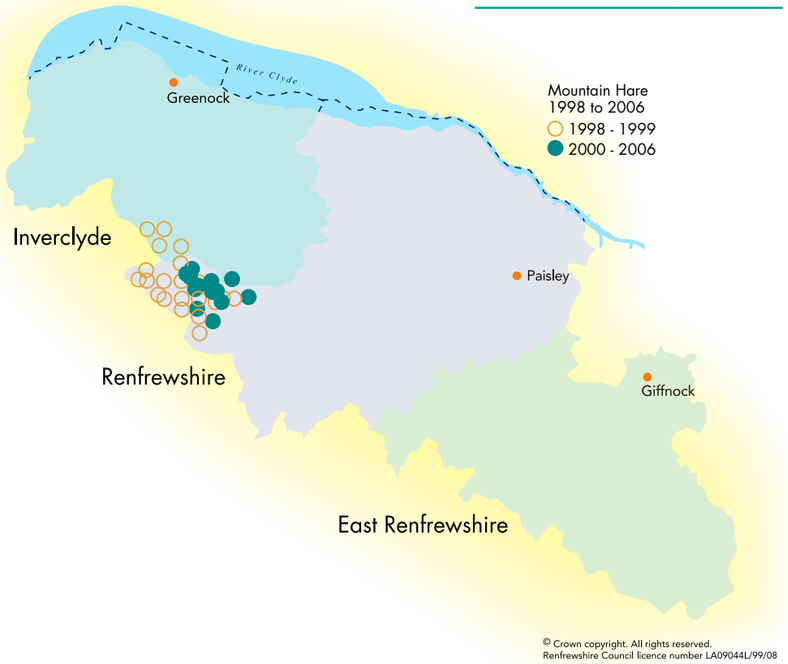
Mountain Hares are indigenous to Britain and are found in moorland areas. Their usual habitat is short, new heather for feeding and longer, more mature heather for shelter and protection from predators.

Mountain Hares are native to Ireland and the Highlands of Scotland, but were introduced to many Scottish islands in the 19th century. Areas of the Scottish lowlands were colonised from introductions to Ayrshire in the mid-19th century and they were released into the Peak District and South Yorkshire Pennines around 1880. A small introduction to North Wales, around Bangor, was made in 1885 and also on some Scottish Islands including Orkney, Shetland, Mull and Skye.

There has been no systematic recording of Mountain Hares in Clyde Muirshiel Regional Park, but it is suspected that numbers have declined recently. Game bag records are available since 1901 when 300 were noted as killed in one season on the Mistylaw Hills (The Southern Upland Partnership 2005). Small populations have been observed by Ranger staff and the general public around the Hill of Stake and Misty Law. The recorded distribution is mainly in the moorland ground at Clyde Muirshiel (Fig 1).

Many isolated Mountain Hare populations in Britain have died out, so it is important that the conservation of this species is highlighted. The current estimate of the UK Mountain Hare population is approximately 350,000, of which only some 500 are found outside Scotland in the Pennines and Peak District. This UK population is presently considered to be in decline. Mountain Hares are listed in Annex V of the EC 1992 Habitats Directive that prohibits certain methods of taking or killing wild animals.

Mountain Hare Sightings



Ecology and Management

High densities of Mountain Hares are usually found on moors managed for grouse where burning has produced a mosaic of different aged stands of heather ideal for both hares and grouse. In Scotland, heather is the main plant species eaten with the remainder of the diet including mainly grasses (wavy hair grass, tufted hair grass, mat grass), and a small amount of blueberry and sedge species. Young pioneer heather that grows after rotational burning is preferred. During deep snow hares will also eat gorse, soft rush and bark and twigs from willow, rowan, juniper or birch. It has been noted however, that where there is a mix of heather moorland, upland pastures and broadleaf woodlands, Mountain Hares preferred either upland pastures or woodland habitats and moorland was usually avoided. Although the use of woodlands is related to the plant cover as well as weather and time-of-year, it is thought that moorland in itself does not determine the presence of Mountain Hares.

The females give birth to a litter of 1-5 leverets between February and September. The young are born with their eyes open and feed on milk for the first 3 weeks of life.

There is no clear cyclic pattern for the Mountain Hare population in Scotland and there is no firm evidence that they show regular fluctuations as noted in Scandinavia every 3-4 years or every 10 years in North America. There is evidence however, that some hare populations in Scotland are regulated by parasites and that this may contribute to population instability (Newey 2005).

The Mountain Hare's main predator is the fox but wildcats and eagles are also important. Hen harriers, buzzards and stoats take leverets.

Factors causing loss or decline

It is suspected that there are two main reasons for the reduction in numbers of Mountain Hares. The overgrazing of heather moorland has allowed rough grassland to become predominant and the activities of sport shooting and control of mountain hare by gamekeepers. Recent agricultural policies have encouraged farmers to increase sheep numbers to levels where overgrazing of heather moorland can become a problem. The resultant change of vegetation on heather moorland from overgrazing is detrimental to Mountain Hares by reducing heather vital for both feeding and shelter. In addition, Mountain Hares are also at risk from changes in land use. As grouse moors have become a less profitable land use, many moorland areas have been afforested or heather management has become limited. Young forestry plantations can initially support

Inverclyde
Renfrewshire
East Renfrewshire
LBAP

Mountain Hare

Lepus timidus scoticus

The Mountain Hare is smaller than the Brown Hare, with a more rounded shape, and without a black upper surface on the tail. They also have shorter ears and legs than the Brown Hare with a head and body length of 50-60cm weighing 2.5-4kg.

They are also known as blue hare due to their summer colour form when they have a grey/black coat. In winter they are partly, or completely white.

large numbers of hares. However, as the trees mature, the canopy closes and lack of vegetation cover reduces hare numbers.

Although the Mountain Hare is not a managed game species, large numbers are shot. Predation may also have an effect on mountain hare numbers. The effect of over-shooting or even low levels of shooting in small populations is likely to contribute to the localised extinction of many populations, because many populations are small and highly fragmented, they are highly vulnerable to over-exploitation. There is evidence of hybridisation between brown and mountain hares, which may threaten the mountain hare's genetic diversity, however, further research is required to establish the extent of this threat.

Despite the potential threat to the British Mountain Hare population there is no national conservation strategy.

Objectives and Targets

Objective 1	Identify current population distribution of Mountain Hare
Objective 2	Identify key habitats and assess condition
Objective 3	Identify potential for appropriate habitat management
Objective 4	Promote public awareness of local Mountain Hares.

We will achieve these objectives by:

Action	Actioned by	Timescale
Establish a monitoring programme to determine habitat use, population and distribution of the Mountain Hare in Clyde Muirshiel Regional Park	CMRP	2009 - 2012
Provide species distribution information to the LBAP Partnership	CMRP	2009 - 2012
Encourage landowners to incorporate Mountain Hare conservation into their land management practices	CMRP Heather Trust	2009 - 2012
Ensure any development proposals do not negatively impact on existing populations potential sites.	LA's	2009 - Ongoing
Encourage landowners to observe a voluntary code of practice not to shoot Mountain Hares for a ten year period while their numbers are monitored.	CMRP Heather Trust	2009 - 2012
Encourage members of the public to be involved in the recording of the Mountain Hare.	CMRP UWS Biodiversity Officer	2009 - 2012
Run promotional events to promote interest in Mountain Hares.	Biodiversity Officer Paisley Museum CMRP	2009 - 2012

Links with Other Action Plans

Brown Hare, Hen Harrier, Unimproved Grasslands, Dwarf Shrub Heath

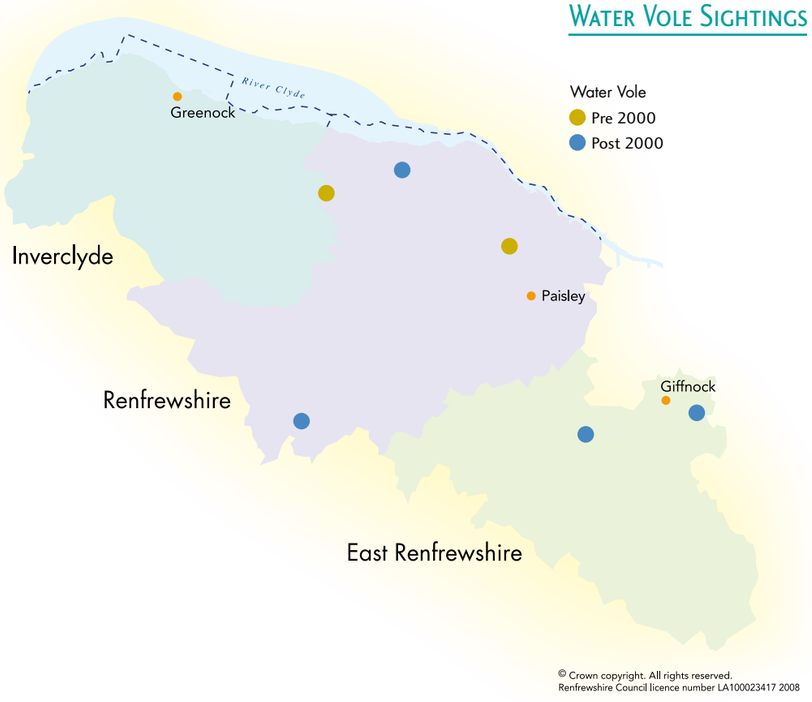
Current Status - UK and Local

UK Biodiversity Status: UK Priority Species
LBAP Partnership: Local Priority Species
Habitat and individuals are protected under the Wildlife & Countryside Act, 1981, as amended

The Water Vole was once widsespread throughout Britain but the species has suffered a significant decline in recent years. It is estimated that field signs have disappeared from 94% of previous sites. Studies have indicated that population densities are lowest in Scotland. Surveys carried out in Scotland have shown that the Water Vole has vanished from entire catchments in the north-east.

Currently information about the distribution of Water Voles in the LBAP area is rather patchy. There are historical records from the 70s and 80s for the mammal on the Black Cart Water near Inchinnan, Renfrewshire and at Glen Moss Nature Reserve on the border of Inverclyde and Renfrewshire. A recent survey found that East Renfrewshire seems to be the remaining stronghold for these mammals with evidence of their presence on the Aurs Burn and at Woodfarm. There was further evidence of their presence at Barr Loch, Lochwinnoch in Renfrewshire and ecological surveys for the redevelopment of the Royal Ordnance Factory in Bishopton found the mammals to be present on the Dargaval Burn and in associated ditches.

Water Vole Sightings



Ecology and Management

Water Voles are herbivorous, feeding on a variety of waterside plants. 227 different species of plant were identified from feeding stations throughout Britain in 1993. Their diet changes depending on the seasons. In winter roots and bark of trees become a large part of their diet. In autumn, the Water Vole will consume the fruits of trees that drop their fruit at this time of year.

A single Water Vole has a series of burrows. The burrows consist of residential burrows which, in turn, are made up of many entrances and interconnecting tunnels, food storage chambers, nest chambers and bolt holes which consist of short tunnels that end in a single chamber. In wetlands, sometimes the Water Vole will weave a nest as a large ball of vegetation into the bases of sedges and reeds.

When they are not in the burrow, the Water Voles' activity is usually confined to runs in dense vegetation found within two metres of the water's edge. This diurnal animal depends on dense vegetation, not only for food but also for cover from predators. Water Voles live in colonies, usually spread out along a watercourse. The voles are separated by social status. Separation is established by the breeding females and reinforced by frequent interactions between individuals. The length of the watercourse they inhabit determines the size of the home range. It can range from 30 – 150 metres for females and 60 – 300 metres for males. The greater lengths are usually when the habitat is poor.

Spring stimulates the breeding season which lasts from March to October. During this season home ranges are marked by discrete latrine sites found close to burrows and at boundaries. These consist of flattened piles of droppings with fresh droppings on top. These latrines are scent-marked by territory holders. Females produce 2 to 5 litters each year, each consisting of 5 to 8 young. Most young reach sexual maturity after their first winter but it is thought that young born before July may breed that autumn. These mammals need to produce lots of young because mortality rates are very high, particularly in winter when the loss of individuals can reach 70%.

The presence of Water Voles can be detected by field signs, for example burrows, latrines containing cylindrical faeces with blunt ends, feeding remains and pathways in vegetation. Field signs may be difficult to find where population densities are low. Field signs almost vanish in the winter months as Water Voles spend the majority of their time underground.

Inverclyde
Renfrewshire
East Renfrewshire
LBAP

Water Vole *(Arvicola terrestris)*

The Water Vole is a rodent, belonging to the subfamily Arvicolinae along with other voles, lemmings and musk-rats. It has a typical vole-like appearance with a rounded body, blunt muzzle and short round ears which are almost hidden by the thick fur around the vole's head and nape. The Water Vole is commonly mistaken for the Brown Rat (*Rattus norvegicus*) but the Water Vole is smaller with a shorter furry tail.

Factors causing loss or decline

The main reasons for the substantial decline in numbers include;

- Direct habitat loss
- Habitat fragmentation
- Predation by American Mink *(Mustella vision)*
- Pollution

Habitat loss and degradation is thought to be a major factor in the decline of the Water Vole. This can occur from insensitive river engineering, bank protection and maintenance work, for example de-silting operations. Also urbanisation of a floodplain is a direct cause of habitat loss and can lead to sparse vegetation along the watercourses. It is not just a problem in urban areas. Heavy grazing pressure from domestic livestock strips the riparian vegetation and livestock also trample the banks, making it untenable for Water Voles. Vegetation is also drastically reduced through inappropriate management by mowing or strimming of the banks. This also makes the voles more susceptible to predation.

Fragmentation of populations can also increase the rate of local decline. Small isolated populations may be vulnerable to genetic restriction. The only way that survival can be ensured is by increasing the connectivity between the various populations which allows expansion and dispersal of the Water Voles. This can be achieved through habitat enhancement and restoration projects.

The Water Vole has many predators but the American Mink poses a particular threat. The American Mink was introduced to the UK for fur farming in 1929. As the fur farming industry declined Mink were released into the wild and they were first recorded breeding in 1957 on the River Teign in Devon. The female Mink is small enough to fit inside a Water Vole burrow and can kill entire colonies at once. Water Voles appear to be more tolerant of disturbance by people than Mink, a factor which may allow Water Voles to survive better on waterways near paths.

Another factor thought to be causing the decline of the Water Vole population is pollution. Contaminants of the freshwater and riparian habitats include organo-chlorine insecticides and their metabolites, alkylphenols, polychlorinated biphenyls, heavy metals and farm waste pollution. The effect of these contaminants on Water Voles remains unknown and may have had a direct effect in the past, but improved environmental legislation, monitoring and enforcement of discharge consents and the diminished use of most of these contaminants have led to improved water quality throughout Britain.

Opportunities and Current Action

There are basic principles when it comes to conserving Water Voles which include ensuring habitat connectivity exists between colonies, maintaining abundant riparian vegetation and also minimising the possibility of Mink colonisation. Water Vole management varies depending on the habitat. In upland habitats, management should focus on reducing grazing levels in catchment areas either through reducing stock levels or fencing the banks, introducing riparian corridors in woodland schemes and protecting known habitats from burning of moorland. In lowland habitats management should focus on fencing banks and maintaining bank-side vegetation. In urban areas it is growing increasingly important for developers and planners to look beyond the boundary of a particular site for successful maintenance of the overall metapopulation.

Mink control alone cannot be regarded as a solution to declining Water Vole populations although evidence suggests that targeted control in key areas within a river catchment has been an effective tool for maintaining current populations of Water Vole. At the moment there is little information on the level of trapping that would be required to allow recolonisation by Water Voles. It is unlikely that Mink control will be a viable option in the LBAP area, as the main focus of the limited resources will be habitat protection and enhancement.

Objectives and Targets

Objective 1	Establish baseline status (abundance and distribution) of Water Vole populations.
Objective 2	Maintain the current population of Water Vole in the LBAP area.
Objective 3	Implement appropriate management of existing and potential Water Vole habitat.
Objective 4:	Promote awareness of Water Voles to stakeholders and the general public.

We will achieve these Objectives by:

Action	Actioned by	Timescale
Update survey information to identify current population distribution and status	SNH Biodiversity Officer	2009-2012
Ensure current populations are recognised and given appropriate protection from detrimental effects	LAs SEPA	2009-ongoing
Identify sites with potential for appropriate habitat management	LAs SNH	2009-2010
Identify sites with potential for appropriate habitat creation	LAs SNH	2009-2010
Implementing habitat management and/or creation projects	LAs SNH	2011
Raising public awareness	SEPA Biodiversity Officer Urban LBAP Group	2009-ongoing

Links with other Local Biodiversity Action Plans

Otter, Rivers and Streams, Urban Area