Current Status - UK and Local

Lowland heathland is a priority for nature conservation because it is a rare and threatened habitat. The UK supports one fifth of the international total of this habitat. There is also an action plan for Upland heathland, estimated to be in excess of 2 million hectares in Scotland; however declines of over 20% since the 1940's have been estimated. Dwarf shrub heaths are recognised as being of international importance because of their restriction to the western seaboard of Europe.

In the LBAP Partnership area there are a number of heathlands ranging in scale and type. The extensive moorland of the Clyde Muirshiel Regional Park is an obvious key area of extremely high regional importance, having escaped other pressures of land use management in recent years such as forestry and intensive farming. The heathland habitat can extend to the surrounding farmland fringes of the Regional Park, where the surviving heaths can provide a dramatic contrast of vegetation types. Grazing pressure has reduced the influence from heather, commonly resulting in a higher species diversity consisting of intricate mosaics of acid grassland and rush-dominated mires. Notable examples occur north of Lochwinnoch (e.g. Barnshake, Ladymuir etc.), but others occur on the upland fringes such as Marshall Moor, Craig Muir, Moyne Moor and sites on the Liboside hills (e.g. Middleton and Killoch Hill). Note should also be made of the several relics preserved as golf course roughs e.g. Ranfurly, Paisley and Fereneze golf courses.

Most of the above examples are predominantly wet heaths, but with fragments of dry heath. The latter tends to be very scattered and often occurs at a small scale e.g. on rock outcrops, steep embankments and along some upper valley slopes. However at many such sites they can make a valuable contribution to the local diversity. Strictly lowland types (e.g. of sandy soil) are very rare in the urban fringe.

Main Sites supporting Dwarf Shrub Heath

Site name	District	Area ha.
Moyne Moor	East Renfrewshire	62*
Middleton	East Renfrewshire	15*
Craig Muir	Renfrewshire	2.3
Hillside	Inverclyde	-
Barnshake	Inverclyde	-
Kaim Mire	Renfrewshire	-
Paisley Golf Course	Renfrewshire	-
Duchal Moor	Inverclyde	133
Laigh Linthills	Renfrewshire	67
Blood Moss	Inverclyde	12
Leap Moor	Inverclyde	12
Overton	Inverclyde	385
Burnhead/ Whitemoss Moor	Inverclyde	186
Queenside Muir	Renfrewshire	46
TOTAL		844.3

*figures are a measure of the site, not just the heath habitat

Ecology and Management

Typically heathlands support a range of other habitats including acidic grasslands, mires and flushes (including rush pastures) and scrub (notably gorse) or scattered trees (e.g. birch and rowan). Heather (*Calluna vulgaris*) and blaeberry (*Vaccinium myrtillus*) are the main shrubby dominants, but a number of grassland species are also to be found such as Sheep's Fescue (*Festuca ovina*), Wavy Hair-grass (*Deschampsia flexuosa*), Tormentil (*Potentilla erecta*) and Heath Bedstraw (*Galium saxatile*) with a range of bryophytes (mosses and liverworts), typically *Hypnum cupressiforme s.l., Pleurozium schreberii and Dicranum scoparium*) and lichens (notably *Cladonia spp.*). Wet heaths are usually distinguished by the presence of species such as Crossed-leaved Heath (*Erica tetralix*), Purple Moor-grass (*Molinia caerulea*), and Deergrass (*Trichophorum cespitosum*), and bog-mosses are usually present (*e.g. Sphagnum capillifolium and S. compactum*).

Heathlands are also important for the associated fauna. Mammals include: Mountain Hare (*Lepus timidus*), and Stoat (*Mustela erminea*). A range of birds are associated with heath such as Hen Harrier (*Circus cyaneus*), Merlin (*Falco columbarius*), Raven (*Corvus corax*), Snipe (*Gallinago gallinago*), Skylark (*Alauda arvensis*), Wheatear (*Oenanthe oenanthe*), Stonechat (*Saxicola torquata*), Meadow Pipit (*Anthus pratensis*), Red Grouse (*Lagopus lagopus*), Curlew (*Numenius arquata*) and Golden Plover (*Pluvialis apricaria*). Common Lizard (*Lacerta vivipara*) relies on this habitat, as do lepidoptera including the Large Heath butterfly (*Coenonypha tullia*), and Golden-ringed Dragonfly (*Cordulegaster boltonii*) and Black Darter (*Sympetrum danae*) dragonflies.

Modern agriculture, and its associated economy, differs from traditional farmland management systems. Protected examples of heathland mostly exist as isolated sites surrounded by intensively managed land containing high concentrations of soil nutrients. Despite this, there are management methods that can be used within modern systems to preserve the biodiversity of heathlands:

- Muirburn – Well managed muirburn, undertaken by trained professionals, can rejuvenate heather stands, encouraging the growth of new shoots.
- Grazing – Plant and animal diversity can be increased by low to moderate grazing. Grazing management requires decisions on which species and breed of animal to use, stocking rates, and seasonal factors.

Today, the upland Heaths within the LBAP Partnership area, as with the rest of the UK, are typically managed for grouse shooting or free range stock farming, the level of which may not be sustainable.

Inverclyde
Renfrewshire
East Renfrewshire
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Heather moorland © Lorne Gill/SNH

Dwarf Shrub Heath

Habitat Definition

Dwarf Shrub Heaths are characterised by vegetation dominated by members of the heath family (*Ericaceae*). Typically they occur on acidic soils, including peats, of a low nutrient status. In general there are two main sub-divisions: Dry and Wet Heaths. The former is characteristic of lowland areas, usually on freely draining, often sandy or gravelly soils, or rock outcrops. Wet Heaths are more typical of upland areas (moorland) with high rainfall or impeded drainage, and are associated with shallow peat formation. Both types share strong affinities with a range of acidic grasslands, which often co-exist in dynamic habitat mosaics.

In this plan, all areas supporting heather dominated vegetation are included, but also some areas where grasses, rushes and sedges are more prominent (usually heavily grazed areas but where short cropped heather persists). The plan covers some upland areas of blanket bog (e.g. substantial areas of the Clyde Muirshiel Regional Park), where bogs modified by drainage and burning management merge with more typical heaths, and can be considered under the general term of moorland. Wetter areas of bog, including raised mires on deep peats, and other associated wetter mires are excluded.

Factors Causing Loss or Decline

Information is limited on the former coverage of heathlands in the LBAP Partnership area. The long history of agricultural management of rural areas over the years may have reduced the coverage (or quality of relics). In more recent times, intensive agricultural pressure and urbanisation in the lowlands are likely to be the main causes of further loss. Many of the surviving remnants are on marginal ground, some in urban areas, which has escaped intensification or development. More specifically, adverse impacts include:

- **Agricultural intensification** – particularly fertilisation, ploughing or drainage
- **Overgrazing** – heavy grazing reduces heather cover, results in the spread of less palatable grasses and can contribute to nutrient enrichment
- **Woodland planting** – schemes often target the agriculturally less productive marginal habitats
- **Lack of Management** – encourages the spread of scrub, notably birch or gorse, and bracken
- **Built developments** – causing direct loss of sites, both to urban fringe and local central sites such as old quarries
- **Recreational pressure** – trampling and intensive treatment of relic heathland in parks and golf courses
- **Poorly managed muirburn** – inappropriate burning of heather.

© Forestry Commission

Opportunities and Current Action

- The Clyde Muirshiel Regional Park (CMRP) is subject to a management regime, although this is directed at conserving the heathland to support grouse shooting and sheep grazing. The Park Management Committee is developing a Management Plan aimed at restoring heather cover. The principal tool to achieve heather regeneration is the Macaulay Hill Grazing Management Model which is used to generate estimated grazing potential from current heather and grass cover. Application of the model at Hardridge Farm (Duchal Moor) began in the summer of 2001. An action plan for Hardridge includes prescriptions for muirburn and the restoration of areas for Juniper.
- Several of the heathlands are included within Sites of Importance for Nature Conservation (SINCs) recognised by the relevant Local Authority, where there is a presumption against damaging developments.
- The Clyde Muirshiel Regional Park is currently working with farms in the Park area and the Farming and Wildlife Advisory Group (FWAG) to promote conservation via moorland management plans, under the Rural Stewardship Scheme. Under this scheme the reduction of sheep numbers and the introduction of cattle may be used to assist in the control of rush pasture and heather recovery. Bracken control may also be used to promote heathland.
- CMRP, SNH, RSPB and shooting tenants of Misty Law Moor are working in partnership to develop a demonstration site for the regeneration of heather moorland for the benefit of raptors and game birds.

Action Plan

The UK Upland Heathland habitat action plan has a general aim to maintain the current distribution and extent of the resource, but also sets a target of an increase of 5% by habitat enhancement and restoration. Generally, it is hoped to stop fragmentation of the habitat through maintaining upland blocks greater than 10km^2. The UK costed Habitat Action Plan for Lowland Heathland has two main objectives: "to maintain and improve, by management, all existing lowland heathland"; and, "to encourage the re-establishment of a further 10% by 2005".

Objectives and Targets

Objective 1: Establish baseline percentage heather cover at all known sites.

Objective 2: Ensure no loss in area or reduction of quality of the current heathland sites.

Objective 3: Introduce sympathetic heathland management.

Objective 4: Increase the current area of heathland through restoration and positive management.

Objective 5: Assess the impact of moorland management on farms managed by the Regional Park.

Objective 6: Promote awareness and value of heathlands to landowners, managers and the general public.

Objective 7: Review this plan on an annual basis, beginning in 2005.

We will achieve these objectives by:

Action	Actioned by	Timescale
Surveying existing heathland to assess status and conservation needs	LAs SNH CMRP	2004/05
Developing policies which promote management practices which enhance and restore heathland habitats	LAs SNH FWAG	2004/05
Developing policies to presume against loss to development or agricultural intensification	LAs FWAG CMRP	2004/07
Introducing restoration work at appropriate sites and sympathetic management at all sites by 2007	SNH LAs CMRP Landowners & managers	2004/07
Developing and implementing an integrated moorland management plan in the Regional Park by 2005	CMRP SNH	2004/05
Working with Partners to promote good practice literature	SNH LAs	2004/05
Monitoring and recording actions towards these objectives	LBAP Steering Group LBAP Officer Local Records Centre	Ongoing annual

Links with Other Action Plans

Black Grouse, Broadleaved & Mixed Woodland, Hen Harrier, Juniper, Mires, Unimproved Grassland.

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

Mires

Recognition of fens as distinct units can be difficult with various gradations to bogs, swamps in deeper water or rush dominated pastures or marshes, often derived from modified fens, on agricultural land. Elements of the latter, dominated by Sharp-flowered Rush (*Juncus acutiflorus*) or Soft-rush (*J. effusus*) are covered by this plan.

The fine classification of minerotrophic mires or fens is extremely complicated due to a number of factors such as vegetation composition, local geology, chemical and nutrient status of the water supply and the pattern of water movement within the fen. However, there are two broad types that are often recognised:

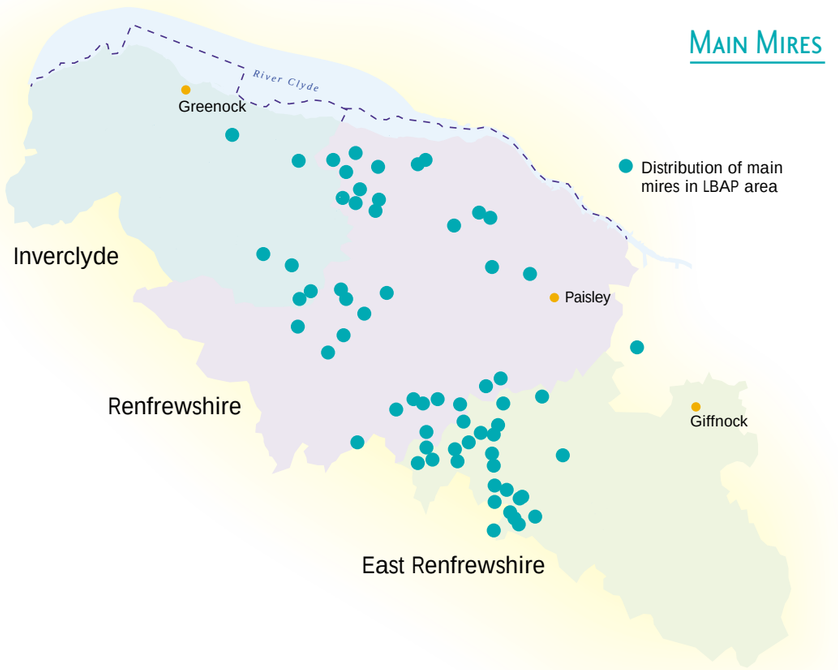
- Poor fens occur in acidic waters (pH ≤ 5), are typically deficient in minerals (such as calcium) and are usually found in upland north and west Britain. Their vegetation is normally composed of short sedges, rushes and *Sphagnum bog-mosses*.
- Rich fens, in contrast, are well supplied with mineral enriched calcareous water (pH > 5) sourced from base rich (alkaline) rocks (notably chalk and limestone). The vegetation may appear similar to that of poor-fens, but differs in species composition and is usually much more diverse.

A further distinctive type of fen, occurring on more nutrient rich fen peats, is Tall Herb Fen. This is a visually attractive type dominated by tall herbaceous species but sensitive to grazing pressure; typical species are Meadowsweet (*Filipendula ulmaria*), Angelica (*Angelica sylvestris*) and Valerian (*Valeriana officinalis*).

Current Status - UK and Local

The UK is thought to host a large proportion of the fen surviving in the European Union. Many of these are isolated depressions in rural landscapes, but large examples exist such as in Norfolk (Broadland), Fermanagh (Lough Erne) and Speyside (Insh Marshes).

Main Mires



The LBAP partnership area supports a number of mires of high nature conservation interest. Notable fens include several near Kilmacolm (including Glen Moss, Corsliehill, Shovelboard and Barmufflock). Fens associated with bogs occur at Hartfield, Knockmade and Moyne Moor, and other scattered examples include Dargavel, Carsewell, Dykehill, Loch Libo and a number of sites on the Liboside hills.

Ecology and Management

Fens are considered to be dynamic, seminatural systems and in general management is needed to maintain open fen communities and their associated species richness, and to prevent succession to carr woodland. Traditional management has included grazing, cutting for hay, burning, peat cutting or scrub clearance. Fens support internationally and nationally significant species of birds, insects, snails, butterflies, and wild flowers .

Mires act in a number of different ways to regulate our environment. These functions include water purification, flood prevention, and carbon storage. Carbon storage is particularly important to offset the increase in carbon dioxide which contributes to global warming.

Factors Causing Loss or Decline

Little information is available on recent or past losses of mires within the LBAP Partnership area, although it is likely that there has been a substantial loss in area and quality over recent history. In terms of lowland mire in Scotland as a whole, the trends are as follows:

- 1940s baseline - less than 0.3% of the area of Scotland
- 1940s-1980s change - 44% reduction in area
- Dynamics of change - biggest reductions due to afforestation and through drainage to rough grassland
- 1980s outcome - less than 0.2% of the area of Scotland.

Key threats include scrub succession, hydrological change caused by drainage works for agricultural intensification, global warming, nutrient enrichment (e.g. input from agricultural run-off or pollution) and direct loss from infilling or urban spread.

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Mires

Habitat Definition

This plan covers peat-forming vegetation, generally occurring on peat greater than 0.5m depth, with the water table at or just below the surface for most of the year. The main focus of the plan is the minerotrophic mires, often called fens, which receive water from rainfall as well as drainage from the catchment area; the latter source results in a varied input of nutrients and minerals to the fen water table. This is an important distinguishing factor separating fens from other mires such as blanket or raised bogs which receive their water mostly from direct precipitation. Raised bogs may be integral features of mire complexes and, where present, need to be considered as part of the management regime. Blanket bogs are upland features, but may grade into minerotrophic mires at their margins or in depressions, often associated with bog pools; however they are not considered central to this plan, but are partly covered within the Dwarf Shrub Heath plan.

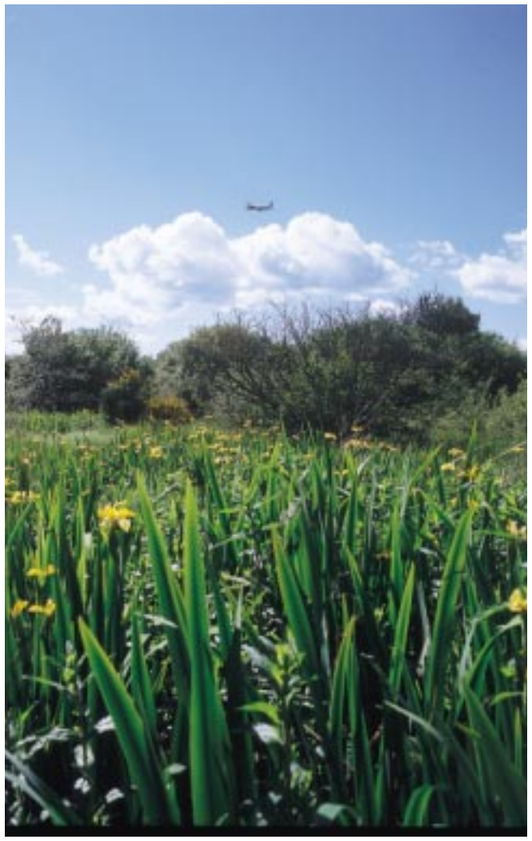
Opportunities and Current Action

The quality of the mires at Glen Moss, Shovelboard, Barmufflock, Loch Libo, Dargavel, Brother and Little Lochs are recognised through their designations as SSSIs. Most of the other larger fens or mires within the Local Authority areas are identified as SINCs, within the relevant Local Plans, where there is a presumption against damaging development.

SEPA's Habitat Enhancement initiative (HEI) provides grants for groups or individuals to pay for habitat restoration at local sites.

Action Plan

Mires (including Ferns) are becoming an increasingly rare habitat nationally and many have suffered due to neglect in recent years. If fens are to remain as important habitats within the LBAP Partnership area, and have their wildlife interest enhanced, they will need to be protected from further loss and receive sympathetic management. Management plans for the main wetland sites will help to recognise the value and needs of fens within the larger habitat mosaics. Further wetland creation projects could be an important source of new sites.



Paisley Moss LNR © Graham Burns

Objectives and Targets

Objective 1	Establish the area and quality of all key mire sites.
Objective 2	Maintain the current extent and quality of key mire sites.
Objective 3	Promote sympathetic management of all mires.
Objective 4	Increase the total area of mires throughout the LBAP Partnership area.
Objective 5	Review this plan on an annual basis, beginning in 2005.

We will achieve these objectives by:

Action	Actioned by	Timescale
Surveying existing and potential mire sites to assess ecological status and conservation needs	LAs BSBI UoP	2004-05
Ensuring no further loss in extent and quality of existing mire habitat	LAs SNH	2004-07
Encouraging sympathetic, site-specific management regimes	FWAG LAs	2004-07
Encouraging the creation of new mires at urban or agricultural wetland creation schemes	FWAG SNH	2004-07
Monitoring and recording actions towards these objectives	LBAP Steering Group LBAP Officer Local Records Centre	Annual

Links with Other Action Plans

Black Grouse, Dwarf Shrub Heath, Hen Harrier, Standing Waters.

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

Current Status - UK and Local

Over the last 50 years or so the nature conservation interest of grassland has been reduced because of agricultural improvement (such as drainage, artificial fertilizers, ploughing, reseeding, heavy stocking, and altered silage cutting regimes). This produces 'Improved Grasslands' characterised by brighter green, more uniform swards with many fewer plant and associated animal species.

The scope of this plan is focused on all of the remaining types of unimproved grasslands, as they each have similar conservation goals. Grasslands often occur as part of vegetation mosaics, with heaths, rush pastures or other wetlands, or form important glades or rides within wooded areas, and their conservation should be considered as part of the wider ecological picture.

Ecology and Management

Traditionally managed grasslands, whether continually grazed or seasonally cut for hay, tend to support a diverse range of low growing grasses, herbs and bryophytes. These vary depending on drainage and soil types, and can themselves host a diverse wildlife interest, ranging from invertebrates to small mammals and breeding birds.

Acid Grasslands

Acid grasslands are probably one of the most extensive seminatural habitats in Britain, but there is very little information on their true extent or conservation management. National estimates suggest that 1,200,000ha occur in the uplands but in the lowlands it is unlikely to exceed 30,000ha. Much of the upland type comprises low diversity swards. Species rich acid grasslands are usually associated with lowland communities developing on skeletal soils, where a number of nationally rare, often annual species occur.

In the LBAP Partnership area most of the acid grasslands are associated with upland pastures, particularly in and around the Clyde Muirshiel Regional Park, but also on other high ground along the Gleniffer Braes or Lochliboside Hills, and on higher ground to the south of East Renfrewshire. Smaller fragments occur throughout the area, most notably along the steeper slopes of watercourses, on isolated high ground (e.g. Neilston Pad, Garscube and Howcraig Hills), local rocky ridges and on localised sandy soils (natural or former quarry areas etc.).

Acid grasslands develop where the underlying rock is acidic or on surface deposits such as sand and gravel. In general acid grasslands support a lower diversity of vascular plants than some neutral or calcareous grasslands, although bryophytes and lichens may provide some compensation. Typical indicative species include grasses such as Sheep's-fescue (*Festuca ovina*), Mat-grass (*Nardus stricta*), Wavy Hair-grass (*Deschampsia flexuosa*), and other plants such as Tormentil (*Potentilla erecta*) and Heath Bedstraw (*Galium saxatile*). Heather (*Calluna vulgaris*) and Blaeberry (*Vaccinium myrtillus*) may be present at low frequencies but their presence tends to reflect affinities and close association with heathland habitats. A frequent feature of upland rocky outcrops are acidic grasslands characterised by English Stonecrop (*Sedum anglicum*), Sheep's-sorrel (*Rumex acetosella*) and Early Hair-grass (*Aira praecox*), with other species, and notably a number of bryophytes and lichens. Other species indicative of higher diversity acid grasslands include Birds Foot Tefoil, *(Lotus corniculatus)*, Heath Milkwort *(Polygala serpyllifolia)*, Mountain Pansy *(Viola lutea)*, Mouse Ear Hawkweed *(Pilosella officinarum)*, Eyebrights *(Euphrasia spp.)*, *(Danthonia decumbens)* Sedges *(Carex spp.)* and a number of bryophytes.

Calcareous Grassland

Areas of chalk or limestone, which typically support calcareous grasslands, are absent or rare in the LBAP Partnership area. Some areas of basaltic rock can be richer in base elements, and various flushes or rock exposures along valleys and hillsides can support species indicative of high soil pHs. The same is true for some glacial deposits and also artificial soils such as mine spoil, railway ballast and other waste ground. Although hinted at in several places, no mapping in the local area has recorded calcareous grassland. Typical indicative species include: Mouse-ear-Hawkweed (*Pilosella officinarum*), Bird's-foot-Trefoil (*Lotus corniculatus*), Fairy Flax (*Linum catharticum*), Field Gentian (*Gentianella campestris*), Frog Orchid (*Coeloglossum viride*), Wild Thyme (*Thymus praecox*), Early-purple Orchid (*Orchis mascula*), Fragrant Orchid (*Gymnadenia conopsea*), Burnet-saxifrage (*Pimpinella saxifraga*), Flea Sedge (*Carex pulicaris*) and Glaucous Sedge (*Carex flacca*).

Neutral Grassland

Neutral grasslands cover a wide range of communities occurring on more fertile, neutral soils. They also include rank vegetation on waste ground, roadside verges and poorly draining marshy or inundation areas. Traditionally occuring in lowland areas, often along river flood plains, their management may have excluded stock during early summer for the taking of a hay crop before resuming winter grazing. With the demise of such management and the increase in development pressures in lowland areas, traditional neutral grasslands are extremely rare, if not absent, within the LBAP Partnership area.

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Renfrewshire
East Renfrewshire
LBAP

© Keith Watson

Unimproved Grasslands

Habitat definition

Grassland encompasses herbaceous (i.e. non-woody) vegetation, on generally dry ground usually dominated by grasses; such a definition covers the extensive areas of enclosed agricultural land (including upland pasture), roadside verges, open ground by water courses, waste ground, neglected land and recreational areas. Almost all grasslands are the product of human activity created from woodland clearance and drainage of wetlands and maintained by grazing, cutting or burning. Before the influence of humans on the British landscape, grasslands are considered to have been limited to natural clearings in woodlands, high altitudes above the tree limit and coastal areas.

For classification purposes unimproved grasslands are often split into three main types, reflecting the soil pH: Acid, Neutral or Calcareous. The distinction between the types can vary, depending on the underlying geology, soil depth and flushing, but can also be muddied by intensity of agricultural treatment.

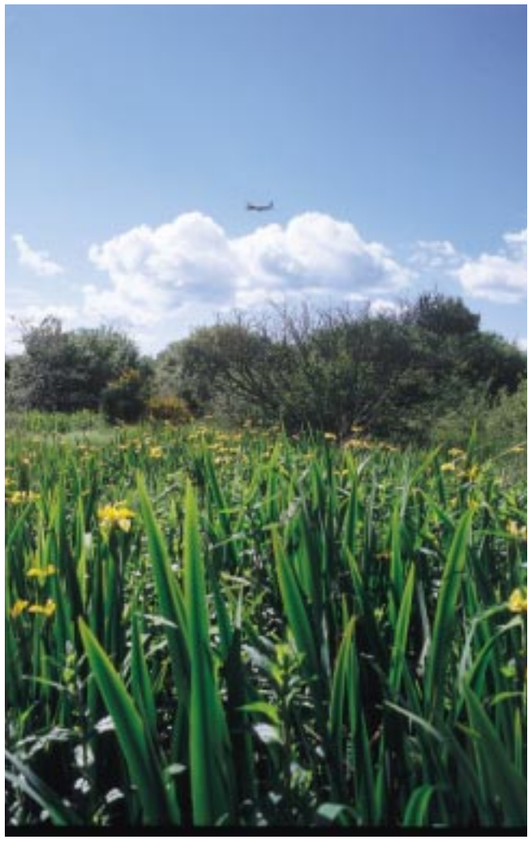
Opportunities and Current Action

The quality of the mires at Glen Moss, Shovelboard, Barmufflock, Loch Libo, Dargavel, Brother and Little Lochs are recognised through their designations as SSSIs. Most of the other larger fens or mires within the Local Authority areas are identified as SINCs, within the relevant Local Plans, where there is a presumption against damaging development.

SEPA's Habitat Enhancement initiative (HEI) provides grants for groups or individuals to pay for habitat restoration at local sites.

Action Plan

Mires (including Ferns) are becoming an increasingly rare habitat nationally and many have suffered due to neglect in recent years. If fens are to remain as important habitats within the LBAP Partnership area, and have their wildlife interest enhanced, they will need to be protected from further loss and receive sympathetic management. Management plans for the main wetland sites will help to recognise the value and needs of fens within the larger habitat mosaics. Further wetland creation projects could be an important source of new sites.



Paisley Moss LNR © Graham Burns

Objectives and Targets

Objective 1	Establish the area and quality of all key mire sites.
Objective 2	Maintain the current extent and quality of key mire sites.
Objective 3	Promote sympathetic management of all mires.
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Objective 5	Review this plan on an annual basis, beginning in 2005.

We will achieve these objectives by:

Action	Actioned by	Timescale
Surveying existing and potential mire sites to assess ecological status and conservation needs	LAs BSBI UoP	2004-05
Ensuring no further loss in extent and quality of existing mire habitat	LAs SNH	2004-07
Encouraging sympathetic, site-specific management regimes	FWAG LAs	2004-07
Encouraging the creation of new mires at urban or agricultural wetland creation schemes	FWAG SNH	2004-07
Monitoring and recording actions towards these objectives	LBAP Steering Group LBAP Officer Local Records Centre	Annual

Links with Other Action Plans

Black Grouse, Dwarf Shrub Heath, Hen Harrier, Standing Waters.

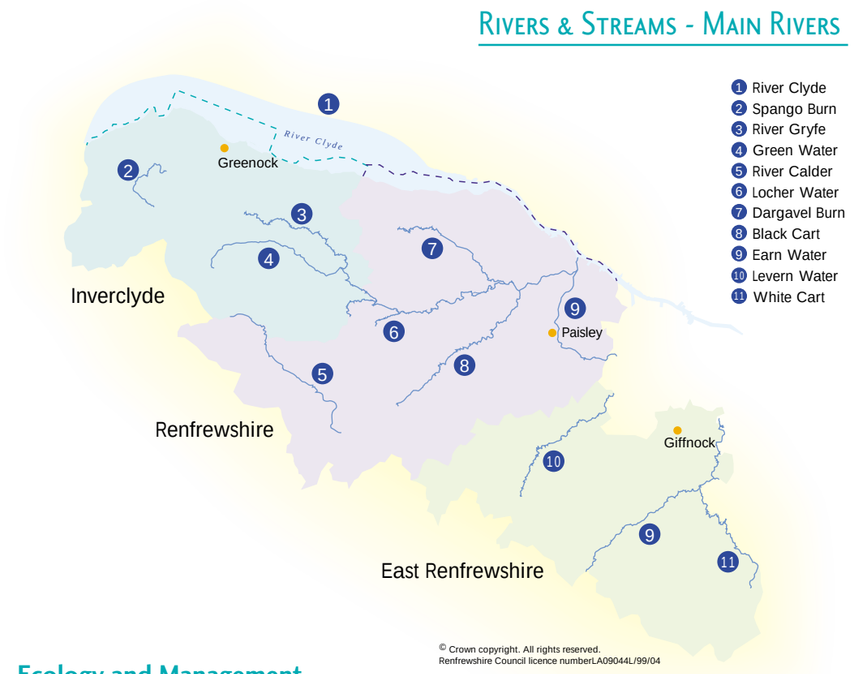
Further Information can be obtained from The Biodiversity Officer 0141 842 5281

Current Status - UK and Local

A wide variety of riverine habitats occurs in the LBAP Partnership area, ranging from fast flowing upland streams to slow flowing deep sections of river. In this area the main rivers are the White Cart Water, Black Cart Water, Gryfe and Calder. They are relatively small rivers with the longest being the White Cart Water, which is 35km in length from its source south of Eaglesham to where it joins the Clyde Estuary at Renfrew. There are also a number of tributaries that feed these rivers such as the Levern Water, Kittoch Water, Earn Water, Green Water, Dargavel Burn and Locher Water and some smaller watercourses such as the Spango Burn. There is also a series of burns flowing down from the Clyde Muirshiel plateau. Land use in the area varies greatly - there is forest, moorland, agriculture, towns, villages, industrial areas, motorways and parks amongst others, and each type of land use presents different problems and challenges for biodiversity and those who manage it. Rural and urban influences still affect the Cart catchment even now in the 21st century, although there have been significant improvements in water quality in lower river areas due to the closure or upgrading of many sewage treatment works and the closure of polluting industries.

Based on invertebrate samples taken by SEPA the biological quality of the rivers in the LBAP Partnership area is generally good to fair, although short stretches of the Black Cart Water and the river Gryfe are classed as poor. Of the local rivers regularly monitored by SEPA, the Earn Water, the Locher Water and Dargavel Burn (both tributaries of the Gryfe) and the River Calder are classed as excellent quality.

Rivers & Streams - Main Rivers



Ecology and Management

The White Cart supports a good fishery throughout its length, with Perch, Eels, Flounders, Bullheads, Brown and Sea Trout and Atlantic Salmon present in river lengths appropriate to their biology. The quality of this river has improved over the last 40 years or so, partly as a result of older sewage treatment works closing down and existing ones being upgraded. Agricultural run-off has occasionally caused problems in the upper reaches.

One of the main tributaries of the White Cart, the Levern Water is also of fair to good quality. The closure of a number of industries in the catchment, and the rebuilding of Neilston Sewage Treatment Works (STW) has led to improvements in its water quality. There are however, aesthetic problems with litter in the lower stretches.

The Black Cart supports a healthy fishery and it is thought that Atlantic Salmon now spawn here. In the upper to middle reaches this river is of good to fair water quality, and is one of only a few rivers in Scotland to support a population of the rare Saucer Bug (*Aphelocheirus aestivalis*). Currently both Johnstone and Linwood STWs cause organic enrichment on the lower reaches, resulting in a decline in water quality. This will be improved when the sewage is transferred to the upgraded Erskine works. Work is expected to be completed by 2005.

The River Calder feeds Castle Semple Loch with smaller contributions coming from the overflows of the Kilbirnie and Barr Lochs. Barr Loch was once a meadow with the Dubbs Water draining Kilbirnie Loch into Castle Semple Loch. To preserve some of the marshy habitat in the area, the Dubbs Water, which drains from Kilbirnie Loch, is channelled around the outside of the Barr Loch. There is an opportunity to manage the area as seasonally flooded wetland (3 Lochs Project). To alleviate flooding in the vicinity of Calder Bridge, Lochwinnoch, excavation has recently been carried out. Other aspects of the catchment should however be examined to suggest alternative methods of flood management.

The Gryfe is an important source of water for the people of the area, with Scottish Water (SW) using the river water to fill two large reservoirs. This river is also an important spawning river for Sea Trout and Atlantic Salmon. The upper reaches of the Gryfe are occasionally subjected to diffuse agricultural pollution and were classified by SEPA as poor quality for 2001. This is a deterioration from previous results. Further downstream the quality remains good to fair, with the construction of the Gryfe Valley Sewer now intercepting sewage and trade effluent discharges for treatment at Linwood STW. The closure of the Royal Ordnance Factory in Bishopton has significantly improved the quality of the Dargavel Burn, one of the main tributaries of the Gryfe.

SEPA are currently writing a River Basin Characterisation Report to identify significant pressures on the water environment. This is to fulfil conditions under the Water Framework Directive and is being undertaken in conjunction with Local Authorities and other responsible authorities.

Factors Causing Loss or Decline

Rivers and streams are affected by reductions in water quality and quantity, changes in flow regime and degradation of the physical structure of banks and channels. More specifically these impacts include:

- **Physical habitat destruction and simplification**. Continued pressure for development in urban and rural areas along with high land values leads to the desire to minimise space taken by river corridors. This often results in culverting and 'hard' engineering methods being used to contain and minimise channel dimensions. This consequently reduces habitat diversity and potentially increases the risk of downstream flooding and bank erosion. The Cart catchment is particularly susceptible to flooding in its lower reaches and is monitored by SEPA 24 hours a day. In rural areas overgrazing can also lead to bank erosion. Man made structures such as weirs and locks can create barriers that prevent fish passage, thus reducing salmon and sea trout spawning areas. The Black Cart at Plum Weir and the River Calder at Lochwinnoch are both affected.

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Rivers & Streams

Habitat Definition

Rivers and streams play an important part in the recreation and amenity value of an area. They provide space for fishing, walking, cycling, canoeing and various other water and riverbank activities.

In their natural state, watercourses are dynamic environments, creating a range of aquatic, marginal, riparian (river edge) and floodplain habitats that are determined by factors such as slope, flow, water speed and substratum. Each natural river or stream therefore comprises a variety of physical habitats such as riffles, runs, islands, exposed sediments, gravel bars, eroding bankside cliffs, and silt deposits, and these in turn support a wide range of plants and animals. In general terms, the more diverse the range of physical habitats that exist, the greater the species diversity will be. Engineered rivers (in urban areas and industrial or intensively agricultural landscapes) generally have a smaller range of habitats and consequently a reduced biodiversity.

A particularly important feature of rivers and streams for diversity is their linear nature, which means they act as wildlife corridors to allow the dispersion and migration of species, and the interconnection of otherwise fragmented populations.

- **Poor water quality**. This falls within the statutory remit of SEPA. Most problems can be resolved given adequate resources both for identification of the problem and cost of rectification. Urban areas are traditionally difficult to deal with due to the complexity of drainage work, multiple sources of pollutants, and diffuse pollutant inputs from industrial areas and road drainage. SEPA predicts that by 2010 diffuse agricultural pollution will be the major cause of river water quality degradation in Scotland, as many sewage effluent problems are likely to have been addressed through water authority investment programmes

- **Non-native plant species**. Concern has been expressed that introduced plants that originally escaped from gardens are now replacing native flora along our river banks. A number of non-native plants are very visible along our rivers, eg Giant Hogweed, Japanese Knotweed and Himalayan Balsam, but their impact on the indigenous biodiversity has still to be determined

- **Non-native animal species**. Predation by American Mink can affect Water Vole populations, although to date there is no recorded evidence of this locally. Their ranges do not overlap to any significant extent within the Partnership areas, and Water Voles have seriously declined even when Mink appear to be absent

- **Public attitudes to river corridors**.Watercourses are sometimes perceived as a source of smells and nuisance species (eg weeds, midges) and are potentially viewed as 'waste ground' if not maintained as part of parkland or amenity open spaces.Consequently, river corridors are frequently used as dumping grounds and fly tipping is a major problem with stretches of the Black Cart, White Cart, Levern and Spango Burn all being affected. If these habitats were regarded as a valuable local asset, people may be more inclined to report such activities.This negative perception also stops people using rivers and streams for recreation

Opportunities and Current Action

Rivers and streams are offered better legal protection than most natural habitats through several pieces of legislation, both UK and European. Gross point-source pollution is largely under control in the area and attention is turning towards the control of diffuse pollution such as run-off from roads and agriculture. There is increasing recognition of the importance of river habitats as a key element of river quality. In addition:

- River management schemes such as the River Clyde Fisheries Management Trust and the Clyde River Foundation coordinate fisheries management in their areas

- Water quality monitoring and hydrological recording is undertaken by SEPA, with each of the larger rivers in the area having several monitoring sites. Targets are in place to improve 30% of poor and seriously polluted rivers to at least fair quality by 2010. SEPA and Scottish Water have statutory responsibilities for pollution control. These organisations reduce pollution in watercourses through the regulation of discharges and effective treatment of effluent respectively

- SEPA's culverting policy has a presumption against culverting in order to minimise impact on the environment. If culverting is not permitted this will help to reduce loss of habitat, and prevent flooding

- Sustainable urban drainage systems (SUDS), such as swales, infiltration basins, detention / retention ponds, wetlands and reedbeds are being installed at new developments. This offers potential solutions to many urban water quality problems, reducing flooding and preventing contaminated surface water run-off from polluting adjacent watercourses, whilst adding to the amenity and conservation value of the development

- SEPA's Habitat Enhancement Initiative (HEI) provides limited grant aid for groups or individuals to pay for aquatic habitat restoration at local sites

- SPA / SSSI designations have been applied to important river and stream habitats in the LBAP Partnership area such as the Black Cart Water at Barnsford Bridge and the Inner Clyde Estuary

- Local Plans currently identify Sites of Importance for Nature Conservation (SINCs) where a site has important habitats or species. These sites are subject to a number of protective policies as a result of their inclusion in the plan. Local Plans recognise the importance of wildlife corridors, such as rivers, to the biodiversity of the area

- Carts Greenspace currently helps to manage Local Nature Reserves and other wildlife sites along the White Cart Water, Brock Burn and River Clyde

- Carts and Lower Clyde Greenspace both contribute to improving access to and along rivers, making them more of a focus as a recreational resource

- The European Water Framework Directive could have positive implications for many waterways leading to the improvement of water quality and tighter controls on diffuse pollution. This directive will require the adoption of integrated catchment management for all river systems and will have implications for rural land use.

Action Plan

Rivers and streams within the LBAP Partnership area should be managed to maximise their potential as wildlife habitat and wildlife corridors, within the constraints imposed by the need for the protection of life and property. Their amenity and recreational value to the people of the area should also be a consideration.

Objectives and Targets

Objective 1	Maintain and improve habitat and water quality in rivers and streams.
Objective 2	Incorporate the protection and improvement of rivers and streams into routine public sector decision-making and operations.
Objective 3	Maintain and protect rivers and streams supporting natural and seminatural assemblages of animals and plants.
Objective 4	Increase public awareness of biodiversity, the wildlife value of rivers and streams and their importance as an asset to the community.
Objective 5	Review this plan on an annual basis, beginning in 2005.

We will achieve these objectives by:

Action	Actioned by	Timescale
Ensuring that all statutory water quality and discharge consent standards are maintained	SEPA SW	2004-07
Promoting the adoption of Sustainable Urban Drainage Systems (SUDS) principles	SEPA LAs SW	2004-07
Developing policies which promote management practices that enhance and restore riverine habitats	SEPA LAs SW RCFMT Landowners / managers	2004-07
Advocating the use of soft engineering techniques where intervention is unavoidable	SEPA SW LAs	2004-07
Encouraging and supporting local community projects	Greenspace Projects LAs LBAP Officer	2004-07
Monitoring and recording actions towards these objectives	LBAP Steering Group LBAP Officer Local Records Centre	Ongoing / annual

Links with Other Action Plans

Pipistrelle Bats, Otter, Atlantic Salmon, Water Vole, Standing Open Water, Unimproved Grassland, Broadleaved & Mixed Woodland.

Further Information can be obtained fromThe Biodiversity Officer 0141 842 5281

Current Status - UK and Local

The standing water habitats within the LBAP Partnership area consist mostly of artificially created standing waters, mainly reservoirs and flooded quarry holes, but there are also larger natural lowland lochs. These habitats in the LBAP area range from the naturally acidic and peaty Loch Thom, Queenside Loch and Long Loch, to the more mineral rich, alkaline lowland lochs around Lochwinnoch. Some lowland lochs have a high eutrophic status due to the influence of nutrient run-off from agricultural activity, and many smaller water bodies are used as stocked fisheries with increased disturbance for nesting birds and an altered ecosystem.

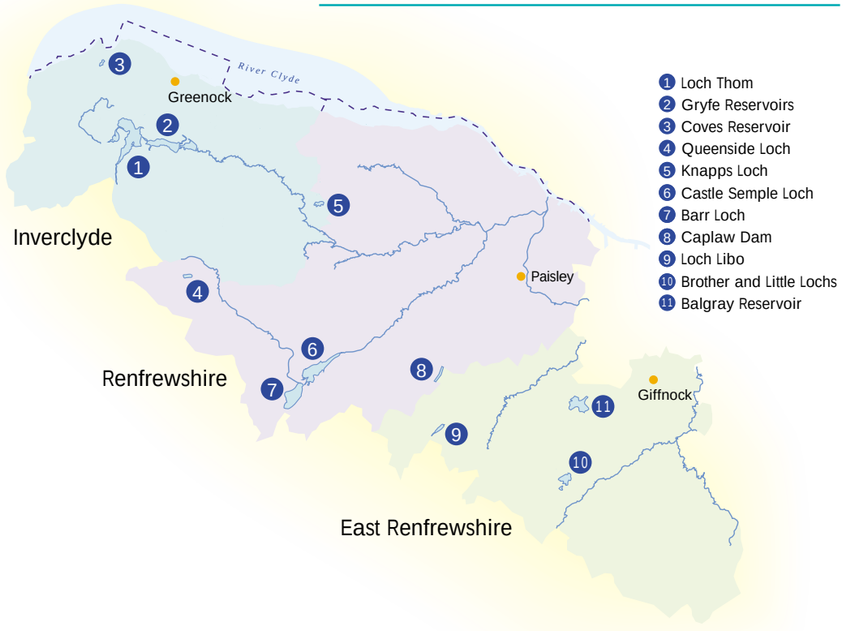
In the LBAP Partnership area several areas of open standing water are of national importance and are designated as Sites of Special Scientific Interest. These include Castle Semple and Barr Lochs, Brother and Little Lochs and Loch Libo. The largest areas of open standing water are locally important for wildlife and some are used for recreation, such as Castle Semple Loch, Loch Thom, the chain of reservoirs to the south of Greenock and Gourock, and the reservoirs between Barrhead and Newton Mearns.

Castle Semple and Barr Lochs are of high conservation value being designated as a SSSI because of their wetland flora and adjacent breeding bird habitat. Part of the area is an RSPB reserve with Castle Semple Loch also being used for watersports. Atlantic Salmon also pass through this loch on migration between the Black Cart Water and the River Calder.

Loch Libo is designated as a SSSI because of its aquatic and emergent plant communities which include some rare species of sedge. The area is also important for wildfowl and for woodland birds in the bordering woodland area. The loch is managed by the Scottish Wildlife Trust.

Little and Brother Lochs include intact open water basin-fens. Both have a high diversity of wetland communities, placing them amongst the best freshwater wetlands in the area. The lochs have well developed fringes of emergent vegetation communities, including a number of species which are rare or local, reed beds and plants characteristic of nutrient poor environments. Both lochs are known to be used by small populations of a wide range of wintering bird species.

Standing Waters - Main Lochs & Reservoirs



Ecology and Management

Standing open waters can support numerous aquatic plants and mammals as well as providing feeding and roosting sites for birds and habitat for other species including fish and invertebrates. Open water habitats are usually classified according to their nutrient status, which is generally defined as:

Oligotrophic (nutrient poor) waters are poor in plant nutrients and are typical of northern and western Britain. Their waters are clear because plankton is sparse, and the biomass of lower plants and animals is low. Little and Brother Lochs are oligotrophic.

Eutrophic (nutrient rich) waters are naturally rich in plant nutrients, though many lochs receive inputs from agricultural run off and sewage, and are typical of lowland Britain. They can support large amounts of a few species of vegetation and a wide variety of animals, and many are important breeding and wintering sites for waterfowl. Castle Semple and Barr Loch and Loch Libo are good examples of this type of habitat.

Mesotrophic (intermediate) waters are transitional between oligotrophic and eutrophic waters; they have more nutrients than typical upland lochs, but tend to have clear water and typically support a diverse mixture of submerged water plants and associated animal life. Potentially, they have the highest biodiversity of any loch type. Caplaw Dam, Coves Reservoir and Knapps Loch are all mesotrophic.

Due to the enclosed water movement of standing open waterbodies, disturbance (e.g. drainage or pollution) at any single point within the habitat's system or surrounding catchment will affect the whole ecosystem of the habitat. Given that these habitats receive the majority of their water input from the surrounding land, this ultimately means they are vulnerable to the use of that land, such as direct discharges into them. Sustainable management, such as Catchment Management Planning (CMP), is required to ensure that wetland habitats and their associated flora and fauna can be conserved alongside the direct and indirect demands that humans place on them.

Factors Causing Loss or Decline

The natural process in losing this habitat usually involves siltation and vegetational succession. Undoubtedly, the greatest factor in modern times has been the influence of mankind. Utilising water bodies for a variety of purposes, such as domestic water supply, industrial abstraction, amenity and recreational use are examples of the multiple, often competing, activities placing significant demand on the standing open water resource. These activities are generally lacking

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Clyde Muirshiel Regional Park

Standing Waters

Habitat definition

Standing open waters include natural systems such as lochs and lochans as well as man-made waters such as reservoirs and gravel pits, with size varying from 38,500 ha right down to ponds a few metres across. Ditches with open water for at least the majority of the year are also included. The open water zone lies beyond the limits of swamp vegetation, but may contain submerged, free-floating or floating-leaved vegetation. Wetland habitats that come under the definition of mires (fens) are considered in a separate habitat action plan.

Clyde Muirshiel Regional Park

coordination and integration which can lead to the different interests being insensitive to the potential cumulative impact(s) on waterbodies, such as reductions in water quality and quantity with resultant loss of biodiversity. Examples of human influence adversely impacting standing water habitats include:

- **Eutrophication** - an increase in nutrients caused primarily by nitrates or phosphates in sewage, fertilizer and urban run-off. High nutrient levels in the water may lead to a loss of biodiversity and domination by some water plants or blue-green algae
- **Acidification** - where the water becomes more acidic (pH decreases), caused primarily by acid rainfall
- **Siltation** - increase in suspended solids (turbidity) in the water from sources including soil erosion, agricultural run-off, industrial organic discharge, etc
- **Water level reduction** - within the water catchment as a result of over abstraction, drainage pond in-filling or breaching dams due to legislation e.g Leperstone
- **Introduction of invasive species** - a small number of introduced plants have become invasive and are aggressively dominant. Plants such as these reduce diversity by out-competing the native community of waterside plants
- **Increasing recreational pressures** - boating and water sports may cause erosion to the banks of popular lochs, as well as causing disturbance to particular species of breeding waterfowl
- **Blue-green Algae** - occasionally problems can occur with blooms of potentially toxic blue-green algae. Some of these algae can cause illness in humans and animals and all blooms should be avoided. Local fish and invertebrate populations can be affected by reduced oxygen supplies when the algae dies and decomposes. SEPA is working to reduce or limit factors contributing to nutrient enrichment, which causes blue-green algae to grow in such great numbers.

Clyde Muirshiel Regional Park

Opportunities and Current Action

- SEPA has statutory responsibilities for pollution control of standing waters, and will assume responsibility for control of water abstraction when the Water Framework Directive comes into operation
- SEPA has developed and implemented a 'Total Phosphorus Policy' for the protection of standing waters in Scotland
- SEPA's Habitat Enhancement Initiative (HEI) provides limited grant aid for groups or individuals to pay for aquatic habitat restoration at local sites e.g. pond creation
- Carts Greenspace currently helps to manage local Nature Reserves and other wildlife sites along the White Cart Water, Brock Burn and River Clyde
- Clyde Muirshiel Regional Park monitors water quality at Castle Semple Loch and has attempted to control blooms of blue-green algae using barley straw. East Renfrewshire Council carries out similar work at Rouken Glen Park
- The reduction of nutrient input into Castle Semple Loch, by the creation of a reedbed at Blackditch Bay, is planned for 2004
- Regular waterfowl surveys are undertaken at most waterbodies in the LBAP Partnership area
- Macrophyte surveys of the lochs within Clyde Muirshiel Regional Park are planned, on a rolling programme of seven lochs per year
- SPAs, SSSIs and Sites of Importance for Nature Conservation (SINCs) are currently identified in Local Plans. These sites are subject to a number of protective policies as a result of their inclusion in the plans.

Action Plan

Standing open waters within the LBAP Partnership area should be managed so as to maximize their potential as wildlife habitats, whilst balancing socio-economic needs and demands. Their amenity and recreational value to the people of the area should be taken into account.

Objectives and Targets

Objective 1	Maintain and improve water quality in standing waters.
Objective 2	Ensure that local authority policies exist to protect and improve the biodiversity of existing standing waters.
Objective 3	Maintain and protect standing waters supporting natural and seminatural assemblages of animals and plants.
Objective 4	Increase the area of open water and habitat quality.
Objective 5	Increase public awareness of biodiversity, the wildlife value of standing waters and their importance as an asset to the community.
Objective 6	Review this plan on an annual basis, beginning in 2005.

We will achieve these objectives by:

Action	Actioned by	Timescale
Ensuring that all statutory water quality and discharge consent standards are maintained	SEPA SW	2004-07
Promoting the adoption of Sustainable Urban Drainage System (SUDS) principles	SEPA LAs SW	2004-07
Developing policies which promote management practices that enhance and restore standing water habitats	SEPA LAs SW	2004-07
Encouraging and supporting local community projects	Greenspace Projects LAs RCFMT	2004-07
Creating new ponds where appropriate and improving the habitat of existing ponds	SEPA SWT FWAG CMRP LAs	2004-07
Monitoring and recording actions towards these objectives	LBAP Steering Group LBAP Officer Local Records Centre	Ongoing / annual

Links with Other Action Plans

Pipistrelle Bats, Otter, Mires, Rivers & Streams.

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

Current Status - UK and Local

In the LBAP Partnership area of East Renfrewshire, Renfrewshire and Inverclyde a broad range of woodland types are found, ranging from intensive, commercial conifer plantations to relic ancient or semi-natural woodland of high conservation value (see Table 1). In addition to their intrinsic habitat interest, the woodlands also make an important contribution to the landscape and amenity value of the partnership area, as can be readily seen on hillsides fringing the Greenock coast and the upland slopes to the south and west of the Paisley conurbation. In general, woodland within the partnership area is distributed among a large number of small sites, often linear in shape and regularly associated with the river valleys.

Table 1. East Renfrewshire, Renfrewshire & Inverclyde Woodland Area by Type (FC, 2001).

Woodland Classification	Area (ha)
Seminatural woods	358ha
Mixed	641 ha
Plantations of Broadleaved trees	2660ha
Plantations of Conifers (non-native)	1873ha
TOTAL	5532ha

Woodlands within the LBAP Partnership area are protected by a range of policies and designations, such as Sites of Special Scientific Interest (SSSIs), Sites of Importance for Nature Conversation (SINCs)and Tree Preservation Orders (T.P.O.s).

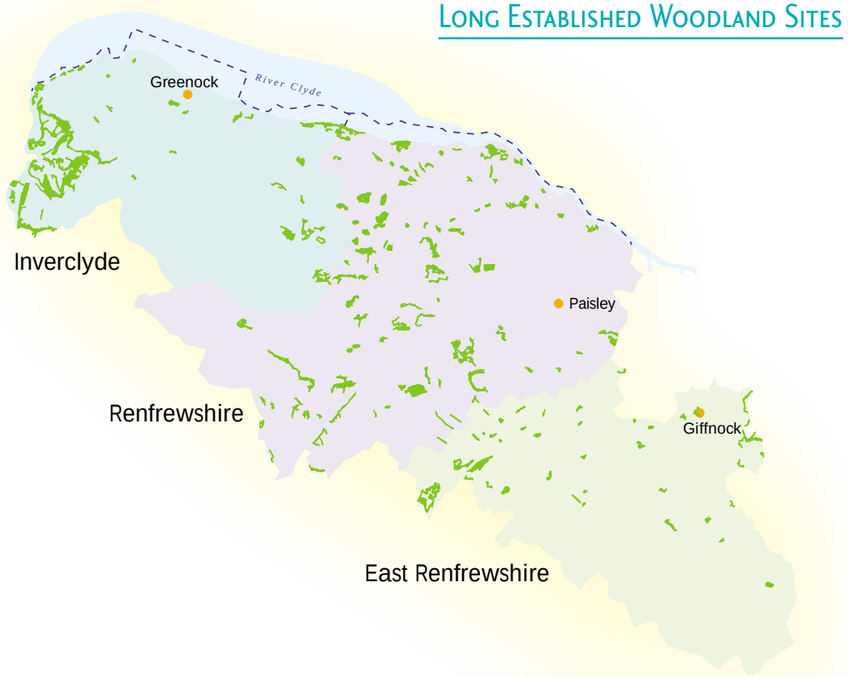
Ecology and Management

Broadleaved woods often support a wide variety of species in their ground layer including bryophytes[1], lichens, ferns, fungi, invertebrates, birds and small mammals. Ancient or long-established woodlands can be particularly valuable, as mature relatively undisturbed woods can support a diverse range of habitats and rich plant and animal communities.

Riparian woodlands are corridors of trees that grow alongside watercourses, and are important in providing food, dens, roosts, and nesting sites. They serve as important migration routes between habitats. Such woodlands also benefit the watercourse and the wildlife that lives in it, by providing cover and shade over the water for fish and attracting insects, that in turn are food for other wildlife. The root systems form a buffer zone that stops sediment and other pollutants entering the stream while holding the banks in place.

1 Bryophytes are small primitive plants consisting of mosses, liverworts, and hornworts.

Long Established Woodland Sites



Deadwood is a key microhabitat within woodland sites. Standing, diseased and dead timber, as well as fallen dead wood, is important for a range of invertebrates, fungi and bryophytes.

In socio-economic terms, broadleaved and mixed woodlands can also be important to the local community for their aesthetic and recreational value.

Factors Causing Loss or Decline

For hundreds of years, woodland clearance for agriculture, and development pressure have reduced woodland cover throughout the Partnership area. Some of these activities are still relevant today and causing loss and fragmentation of woodland resources, and leading to a less robust woodland ecosystem. The main factors affecting woodlands today are considered to be as follows:

- Land use pressures such as flood prevention, river engineering, transport, housing, industrial and business developments
- Invasion by non-native species such as rhododendron, sycamore and beech can shade out the ground flora and radically alter soil conditions
- Lack of woodland management leading to loss, invasion or dereliction
- People pressure e.g. recreational use, vandalism
- Over grazing by stock on farm woodlands preventing regeneration.

Opportunities and Current Action

Statutory protection such as the Habitats Directive, Wildlife and Countryside Act 1981 (as amended), Regional Planning Guidance and National Planning Policy Guidance (NPPG14) Natural Heritage provides the basis for habitat protection.

National forestry policy and NPPG 14, Natural Heritage encourage replacement planting where trees are lost to

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Birch tree (Betula pubescens) © Lorne Gill/SNH

Broadleaved & Mixed Woodland

Habitat Definition

The scope of this habitat plan covers a number of woodland types, including all broad-leaved or mixed broad-leaved and coniferous woodlands, small patches of scrub and related features such as glades and rides. It excludes commercial and non-native coniferous plantation. Carr woodlands, hedgerows and associated field marginal features are also not covered, being better represented as part of separate habitat action plans.

Woodland Classifications:

Ancient woodland: sites that have been continuously woodland and were recorded as being of semi-natural origin on either the 1750 'Roy' maps or the OS First Edition maps c.1860.

Seminatural woods: sites composed predominantly of native trees and shrub species, which have not been planted. Many woods are semi-natural even though they contain a few introduced trees, for the latter do not change the character of the wood.

Long-established woodland of plantation origin: sites which appear to be plantation woodland in c.1860 AD but are not shown as woodland at all in 1750 AD. These woods have a proven continuity as woodland for at least 140 years and may have considerable conservation interest.

development or other uses, and in particular seeks to conserve ancient seminatural woodland. Designation as Sites of Special Scientific Interest (SSSI) ensures compulsory consultation with SNH over some management operations or other development proposals.

The felling and planting of woodland is regulated by the Forestry Commission in accordance with the UK Forestry Standard. The Forestry Commission has produced Forestry Practice Guides 1 – 9[2] relating to the management of semi-natural woodlands. Guidance on ways of creating new native woodlands is available in the Forestry Commission's Bulletin 112.

2 Numbers 1 and 2 of the guidelines are not applicable to Scotland.

Significant inventories of woodlands include the Forestry Commission's National Inventory of Woodland and Trees, initiated in 1995, which provides information on the extent, distribution and composition of woodland in the whole of Great Britain. Information on woodland type and management is also collected through local woodland initiatives (e.g. Treewise).

Scottish Natural Heritage (SNH) holds an Inventory of Ancient, Long-established and Seminatural Woodland for Scotland on GIS, as well as other woodland information such as the Scottish seminatural woodland inventory.

The Scottish Wildlife Trust also carries out site species surveys and monitoring programs, as does the Clyde Branch of the Scottish Ornithologists' Club (SOC). These can contribute to local and national recording schemes via Biological Recording in Scotland (BRISC).

Grant aid on managing, protecting, expanding and increasing the value of woodland to society and the environment is available from the Forestry Commission. Agri-environment schemes can include woodland prescriptions or require the agreement holder to seek management advice and provide

incentives for woodland and wetland management. Sources of funding include:

- Forestry Commission
- Scottish Natural Heritage
- EU – LIFE Nature Fund
- Landfill tax.

Action Plan

The objectives aim to maintain the current extent of ancient seminatural woodland and to increase the total extent of UK priority woodland habitat types within the Partnership area. The other aim is to ensure that the ecological value of existing broadleaved and mixed woodland is improved and associated socio-economic benefits are enhanced and promoted for public benefit. This would involve:

- Restoring some of the former areas of ancient sites for priority woodland habitat types that have been planted with non-native conifers since World War II, or are currently dominated by other non-native species.

- Encouraging the expansion of broadleaved and mixed woodland as a result of promoting natural colonisation and by planting species mixtures of site native and local genetic provenance. Sites will be selected where existing woodland habitats will become linked to each other, thus developing a Forest Habitat network.

Objectives

Objective 1	Maintain the current extent of ancient seminatural woodland.
Objective 2	Identify and assess woodland areas of important nature conservation value.
Objective 3	Increase the total extent of native woodland habitat within the LBAP area.
Objective 4	Ensure the ecological value of other broadleaved and mixed woodland is improved.
Objective 5	Promote woodlands for socio-economic and public amenity benefits.
Objective 6	Review this plan on an annual basis, beginning in 2005.

We will achieve these objectives by:

Action	Actioned by	Timetable
Ensuring no further loss in extent and quality of existing woodland habitat	FC SNH LAs	2004-07
Reviewing available survey information to establish size and condition of main sites	LAs CMRP	2004-05
Encouraging natural regeneration, colonisation and native tree planting in appropriate sites	FC LAs	2004-2010
Encouraging sympathetic, site-specific management regimes	FC SNH LAs	2004-07
Promoting an appreciation of the value of woodlands to local communities	Greenspace Projects LAs	2004-07
Monitoring and recording actions towards these objectives	LBAP Steering Group LBAP Officer Local Records Centre	Ongoing / annual

Links with Other Action Plans

Pipistrelle Bats, Brown Hare, Rivers & Streams.

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

Current Status

Around 20% of the LBAP area is considered to be urban in nature, with the majority of the population resident in the main urban settlements. This concentration of population means that urban habitats are of particular importance in raising awareness of biodiversity and encouraging interest in the environment.

Urban habitats within the LBAP area are, by their nature, subject to development and recreational pressures. Some of these sites are protected by national or local designations. A map of designated sites within the partnership area is shown in the introductory text.

Policies within Local Plans prepared by each individual Council also seek to protect and enhance the environment, including areas which are urban in nature. These include the promotion of Tree Preservation Orders to protect street trees and urban woodland, and policies which seek to protect important urban greenspaces from development. There are however many less obvious 'every day' sites which contribute to biodiversity and nature conservation which are not subject to designations. Household gardens and roadside verges are just two examples.

Ecology and Management

Although the quality of habitat can vary, the wide variety of urban greenspace throughout the Partnership area provides a range of valuable habitats for small mammals, amphibians, invertebrates and birds. Seminatural features such as woodland and watercourses are particularly valuable, forming wildlife corridors within established urban areas and creating a 'Green Network' of habitats. These are important in providing food, dens, roosts and nesting sites and can also serve as migration routes.

Derelict buildings are often used as roosting and nesting sites for birds and bats, as are urban trees and woodlands throughout the Partnership area. Birds such as Swifts and House Sparrows also indicate the quality of the environment, providing an insight into air quality and the food chain of plants and insects on which birds feed. Urban parks, cemeteries and churchyards, with their variety of hedgerows, trees and grassland, provide a rich mosaic of mini habitats for a number of species. Disused railways and road verges in particular may also provide wildlife corridors through urban areas. Scrub and hedgerows in these areas have considerable habitat value.

In urban areas gardens are important for a wide variety of wildlife including mammals such as Foxes, Grey Squirrels and Hedgehogs. Birds are attracted by nest boxes and well stocked bird tables. Established bushes, shrubs and climbers can be important for shelter and nest sites. Water features such as ponds are well used by birds and provide important habitats for amphibians such as the Common Frog. A variety of plants also provide food for larvae and pollen, nectar for adult insects such as butterflies, bees and other invertebrates. Particularly good plants are meadow grasses, Buddleia, Michaelmas Daisy, Lady's Smock, nettles and ice plant, as well as a variety of annuals.

Factors Causing Loss or Decline

Greenspaces within built up areas are inevitably subject to pressures which may affect the quality of habitats and species. The main factors affecting urban habitats are:

- Development pressures resulting in fragmentation of habitats and wildlife corridors
- Unsympathetic management of formal and informal greenspace
- Growth of invasive species, for example Japanese Knotweed and Giant Hogweed

Opportunities and Current Action

Ownership and management of urban greenspaces is varied, with responsibility ranging from local authorities, developers and businesses to individual householders. Working together, there are a number of opportunities to improve management of these greenspaces for the benefit of wildlife. They include:

- Improving the consideration given to biodiversity in everyday actions of agencies, organisations and businesses
- Encouraging householders to use gardens in wildlife-friendly ways such as composting, providing microhabitats and reducing input of chemicals
- Promoting actions which the public can adopt to improve biodiversity
- Declaration of further Local Nature Reserves

Much is already implemented to achieve these aims. The Carts Greenspace and Lower Clyde Greenspace Projects within the LBAP Partnership area, for example, have been established to promote accessible greenspace, including the improvement and enhancement of local greenspace. Initiatives undertaken have seen the creation of new green spaces and the enhancement of those which already exist, with new tree

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Urban Area

Definition

The scope of this plan covers urban habitats within the LBAP Partnership area.

Urban habitat cannot really be categorised as an ecological unit in the same way as woodland or moorland might as it is a diverse mosaic. The urban environment includes many 'patches' of managed green space that support a range of wildlife, for example business parks, cemeteries, churchyards, golf courses, hedges, public parks, road and railway verges and residential gardens. In addition to these 'managed' areas there are ancient or seminatural habitats such as woodland, wetlands and rivers which continue to exist in urban areas. Demolition sites, disused railway lands or unexploited industrial land may also support biodiversity. Together these areas form the urban biodiversity resource.

A Broad Habitat Statement for urban areas is included within 'Biodiversity: the UK Steering Group Report' (1995). The statement sets out an objective to:

"Maintain the existing diversity and extent of wildlife in all urban areas, expanding the range and distribution of rare and common species and enabling this resource to be used as an educational tool."

planting, path networks and the creation of new habitats which contribute to biodiversity.

Urban greenspaces have considerable potential to foster interest and appreciation of biodiversity at a local level. The Greenspace Projects have a strong community focus and aim to foster understanding and appreciation of the environment, encouraging communities to become involved and above all to bring a sense of ownership to their green spaces. The Projects also work to promote understanding and awareness of the environment in schools through the development of wildlife gardens.

Similarly rangers at the Country Parks and Regional Park within the LBAP area work to raise awareness through talks, guided walks, school and community projects, and have the potential to foster interest and appreciation of biodiversity.

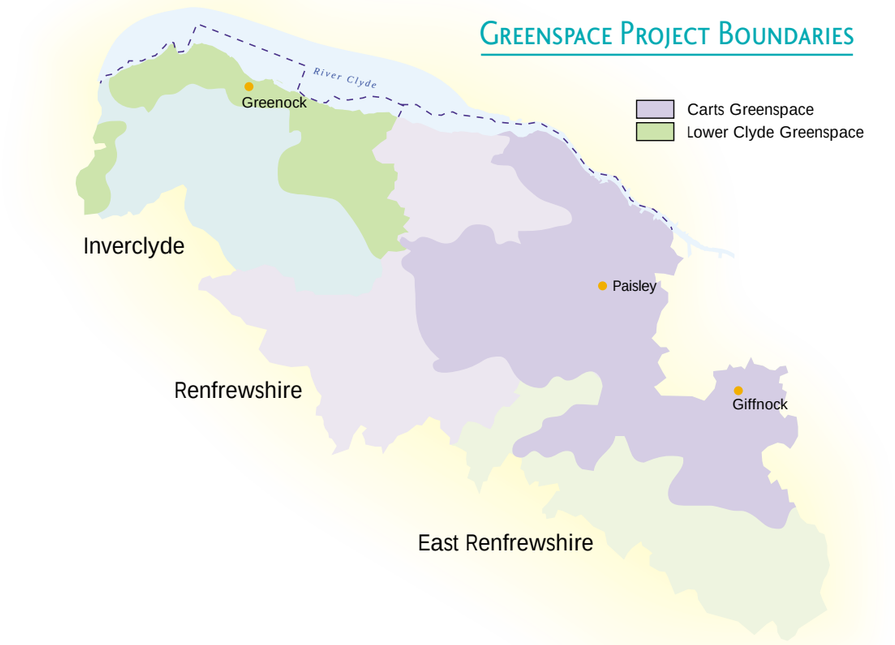
Further opportunities may include:

- Raising awareness of biodiversity in urban areas through environmental education, the LBAP website and working in partnership with key stakeholders, including the community
- Encouraging the use of urban greenspace for environmental education, for example promoting planting schemes, wildlife gardens, community woodlands and community projects

- Encouraging the use of parks and raising awareness of biodiversity within parkland areas
- Promoting guided walks in urban areas to encourage interest in local habitats.

Action Plan

Greenspaces should be managed in a manner that involves coordination of action between the local authorities, business and local communities. The objectives and targets of this plan seek to realise the potential of greenspaces as wildlife habitats, balanced alongside socio-economic needs and demands. The action plan will seek to maintain the existing diversity and extent of wildlife in all urban areas and expand the range and distribution of rare and common species. An additional target is to enable urban greenspaces to be utilised for education and leisure pursuits.



Objectives and Targets

Objective 1	Identify and assess urban habitats (including buildings) of importance to maintain and potentially enhance biodiversity.
Objective 2	Ensure the implementation of local authority policies to protect and improve the biodiversity of existing urban landscapes.
Objective 3	Encourage local community action to survey, plan for, and manage urban wildlife habitats.
Objective 4	Engage the participation of the business community to increase the habitat quality and biodiversity of their greenspaces.
Objective 5	Increase public awareness of urban biodiversity, the wildlife value of urban habitats and their importance as an asset to the community.
Objective 6	Review this plan on an annual basis, beginning in 2005.

We will achieve these objectives by:

Action	Actioned by	Timetable
Surveying and evaluating urban habitats and establishing their importance	LAs Paisley Natural History Society SNH	2004 onwards
Protecting important sites and encouraging sympathetic management	LAs	2004-07
Providing guidance on best practice for maintenance and enhancement of greenspaces to local groups and land owners	SNH LAs	2004-07
Promoting an appreciation of the value of urban habitats to business, in terms of marketing and environmental management	LAs Chamber of Commerce SER	2004-07
Promoting an appreciation of the value of urban habitats to local communities and encouraging community action	Greenspace Projects LAs SNH RSPB	2004-07
Encouraging integration of green networks in future development proposals	LAs SNH	2004-07
Monitoring and recording actions towards these objectives	LBAP Steering Group LBAP Officer Local Records Centre	Ongoing / Annual

Links with Other Action Plans

Rivers and Streams, Standing Waters, Broadleaved and Mixed Woodland, Otters, Pipistrelle Bats.

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

Current Status - UK and Local

The status of scrub habitat is not particularly well monitored, partly because of its transitional nature, partly because it is hard to define and partly because of a lack of value afforded to it. The Countryside Survey estimated that there was roughly 200km^2 of scrub in Scotland in 1990 but this may have altered considerably because of changes in farming practices. Scrub increased in Britain between the World Wars, and some agricultural land was abandoned since the end of World War 2, however, agricultural intensification has accelerated and many marginal habitats have been taken into production. This may change in the future, with changes in farming subsidies, changes in climate and demand for products such as biofuel.

Currently detailed information about important quality scrub habitat is lacking for the local area so it will be one of our first priorities to determine where these good habitats exist. Obvious hawthorn scrub areas are present on the steeper slopes within Gleniffer Braes Country Park, at Gavin near Howwood, at Fereneze and on the slopes above Greenock and Gourock but work is needed to determine the quality of this resource.

Ecology and Management

Scrub in Britain is almost entirely the product of human activities. Land has been cleared for grazing or development and then a reduction of this activity has allowed scrub to encroach on the open ground.

Scrub can be defined by the stage of development it has reached, as it moves from open stands, to closed canopy and then onwards towards secondary woodland. These stages may be influenced by a number of factors, including timing from when succession started, human intervention such as cutting or burning and the climate. As a scrub habitat moves beyond the primary stages of development, it usually becomes more diverse, with species such as hawthorn, bramble and elder becoming prominent, depending on the soil type and other environmental factors.

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Scrub habitat can be created as part of landscape planting schemes, though these are often of a greater uniformity and contain a higher proportion of non-native species than naturally developing scrub.
Scrub provides an important habitat for many species, including UK BAP and Red Data Book Species such as Song Thrush (*Turdus philomelos*) and Bullfinch (*Pyrrhula pyrrhula*). Diverse scrub is the most valuable for wildlife, with variation in age, species and structure influencing the different species that use the habitat.

Scrub edges and glades are particularly important habitats for grazing mammals like deer or hare and are often rich in flowering plants, though these may soon be out-competed by taller vegetation. The flowers provide nectar for insects and seeds for birds and mammals, whilst taller herbs and grasses growing along the edge of scrub offer shelter for small mammals such as the field vole (*Microtus agrestis*), nest sites for birds and hunting areas for Barn Owls (*Tyto alba*) and Kestrels (*Falco tinnunculus*).

Scrub is an important habitat for a number of bird species, with use seeming to be determined by vegetation structure and species composition. Yellowhammers, (*Emberiza citrinella*), Linnets (*Carduelis cannabina*) and Grasshopper Warblers (*Locustella naevia*) favour young, scattered scrub. Dunnocks (*Prunella modularis*) use low growing, closed-canopy scrub and in Scotland Willow Warblers (*Phylloscopus trochilus*) attain higher densities in tall hawthorn scrub. Song Thrushes (*Turdus philomelos*) and Bullfinches (*Pyrrhula pyrrhula*) favour mature stands of scrub, however, most bird species use a mosaic of vegetation, with different areas for feeding and nesting.

In Strathclyde, Lesser Whitethroats (*Sylvia curruca*), a LBAP species, are recorded in areas where mature hawthorn scrub is interspersed with a dense mosaic of Bramble, Dog Rose, Gorse and Willow.

Factors causing loss or decline

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

- Removal to prevent the loss of grazing or grassland habitat
- Removal to extend arable fields
- Development pressure
- Natural succession of existing habitat to woodland. Invasive species such as Japanese Knotweed and Giant Hogweed

Inverclyde
Renfrewshire
East Renfrewshire
LBAP

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Scrub

Scrub is often defined by the presence of shrubs, stunted trees or thick understorey plants like brambles, although the extent of the coverage of these can vary considerably. Dense scrub may consist of hawthorn or gorse, whilst scattered scrub that is more open includes a wide range of woody species such as willow and birch. The scrub vegetation is usually less than 5m in height, though there may be a few, scattered trees which are taller than this.

Scrub is generally regarded as a transitional habitat, as open habitats, such as former industrial sites, become colonised by successional species. If this process were to continue, the scrub would develop into woodland.On the other hand an environmental change, for example increasing the water level of the site or re-introduction of grazing, may halt or stabilise this process. Scrub often exists as a mosaic with grassland and other vegetation

It should be noted that scrub is a transitional habitat and is naturally in a state of flux. For example, whilst one area of scrub may be lost to development, elsewhere, scrub may be created through a reduction in grazing. The best scrub habitat in the LBAP area usually comprises species-rich mature hawthorn scrub. In the past the habitat value of scrub has often been overlooked, particularly in regards to new developments on brownfield sites that have been vacant for long enough for good habitats to develop.

Opportunities and Current Action

Gleniffer Braes Country Park has been identified as a site with potential for habitat enhancement. Plans are in progress to create new areas of scrub and manage the existing areas within the park to improve the quality of the habitat. The best quality scrub in the LBAP area is usually dominated by Hawthorn with occasional Blackthorn (or Gorse in more coastal locations). Ideally the shrubs should be hand pruned in the first 5 years of growth to maximise branching before being allowed to grow freely to 4m high with an overgrown look to their shape. Furthermore, the most important scrub habitat is usually fairly open in places which allows light to penetrate, so that a diverse, dense understorey can develop. This creates a diverse microhabitat which will, in turn, provide a range of conditions to suit a more diverse range of species.

Management tools to create, enhance or restore good quality scrub habitat will include new planting of shrubs and ground flora species, thinning dark dense stands or modifying the species composition.

Strategic projects like the Glasgow and Clyde Valley Green Network Partnership's, Integrated Habitats Network study have aspirations to increase connectivity between important habitats. This would help some species to migrate or disperse but has particular significance today as the effects of climate change may require species to move more rapidly to cope with an increasingly changeable environment. Scrub has the potential to provide wildlife corridors via scrub nodules connected by hedgerows which could improve connectivity to a range of habitats, such as woodlands or grasslands. LBAP partners will work with developers to ensure that existing scrub is retained wherever possible and landscaping schemes are of nature conservation value.

Objectives and Targets

Objective 1	To determine current extent and status of existing scrub habitats.
Objective 2	Maintain the current extent and quality of scrub habitat
Objective 3	To increase the total extent of quality scrub habitat within the LBAP area
Objective 4	Promote scrub for its biodiversity value

We will achieve these Objectives by:

Action	Actioned by	Timescale
Identify existing quality sites within the LBAP area	LAs SOC RSPB	2009 - ongoing
Develop policy of preventing further loss in extent and quality of existing quality scrub habitat	LAs	2009 - ongoing
Identify sites available for habitat enhancement, management and restoration	SNH LAs SOC	2009 - ongoing
Promote management practices which enhance and restore scrubland	SNH RSPB	2009 - ongoing
Organise promotional events to raise awareness of the importance of scrub for biodiversity	Rangers PNHS	2009 - ongoing

Links with other Local Biodiversity Action Plans

Unimproved Grasslands, Broadleaved and Mixed Woodland, Lesser Whitethroat