INTRODUCTION TO THE LOCH LOMOND & THE TROSSACHS NATIONAL PARK

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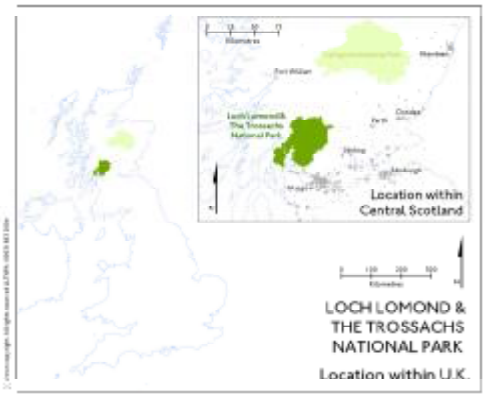
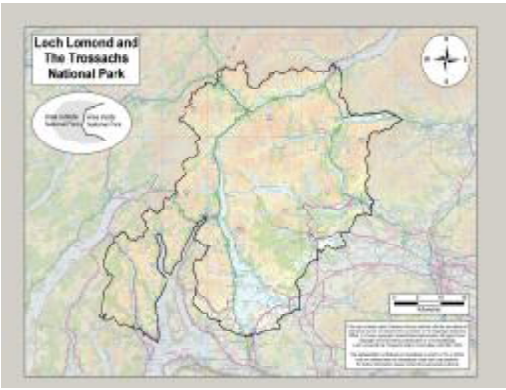
The first part of this presentation is intended to help set the context for today's conference, by providing some background on the National Park and the issues and activities in it. The second part will go on to look at some aspects of the Park's ecology and issues relating to it.

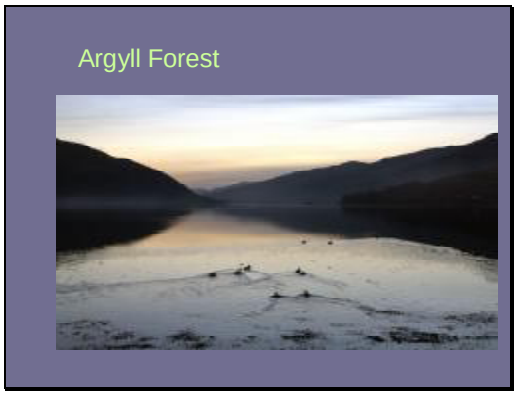
The Loch Lomond and The Trossachs National Park became the first to be designated in Scotland when it was established on 8th July 2002.

The National Park is in close proximity to most of Scotland's cities. Dundee, Edinburgh, Stirling, Glasgow are all within a drive of one hour or so of it.

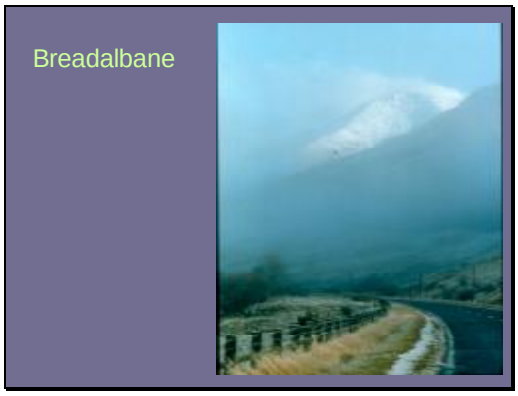




It covers 186,340 hectares (460,440 acres), extending from The Holy Loch on the Cowal peninsula to St Fillans at the Eastern end of Loch Earn, and from Balloch to Tyndrum. The boundary extends to 350 km (220 miles). In broad terms the Park is comprised of the following four distinct areas:



The "Argyll Forest" is centred around Loch Eck and the Firth of Clyde sea lochs, Loch Long, Loch Goil and the Holy Loch. The area is extensively afforested, with the great majority of the woodland falling within the Argyll Forest Park, owned and managed by the Forestry Commission



"Breadalbane" is centred on Strathfillan, Glen Dochart and Balquhidder Glen, where the highest mountains are located. At 1174m (3821 ft), Ben More is the highest mountain in the park.

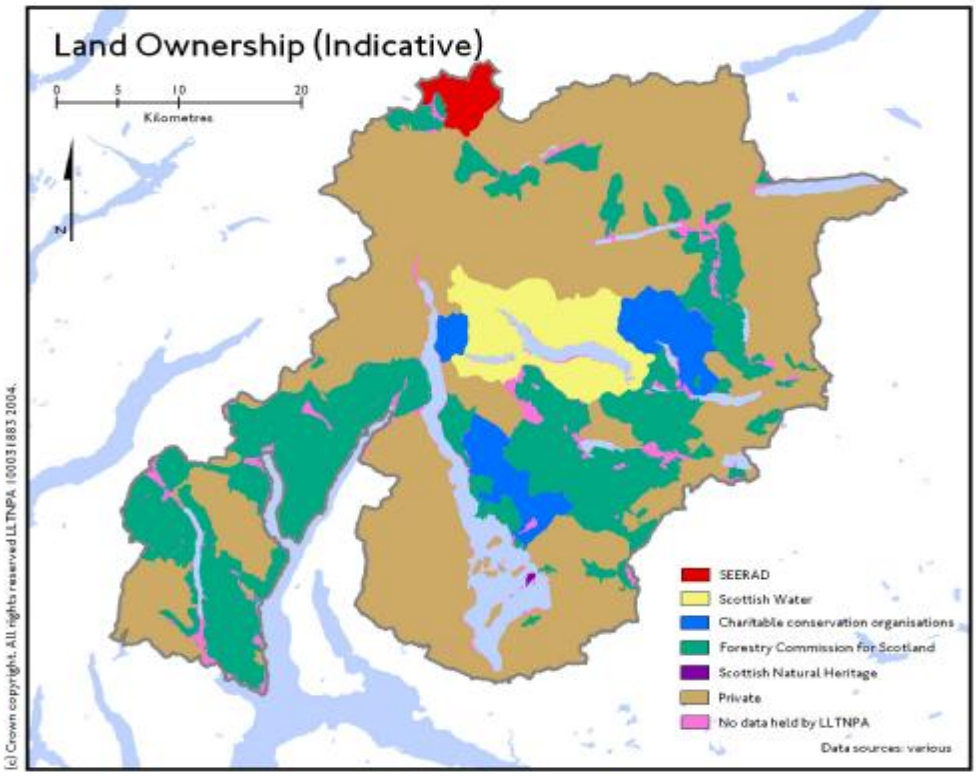
Loch Lomond

Loch Lomond is the largest expanse of fresh water in Great Britain, with extensive oakwoods on its shores, many islands and surrounding hills including Ben Lomond.

The Trossachs

The Trossachs has numerous small to medium-sized lochs and intricate scenery. It includes Loch Katrine and the popular tourist attraction, the "Sir Walter Scott". It also holds extensive areas of forestry, much of it in the Forestry Commission-owned Queen Elizabeth Forest Park.

LAND OWNERSHIP AND LAND USE IN THE PARK

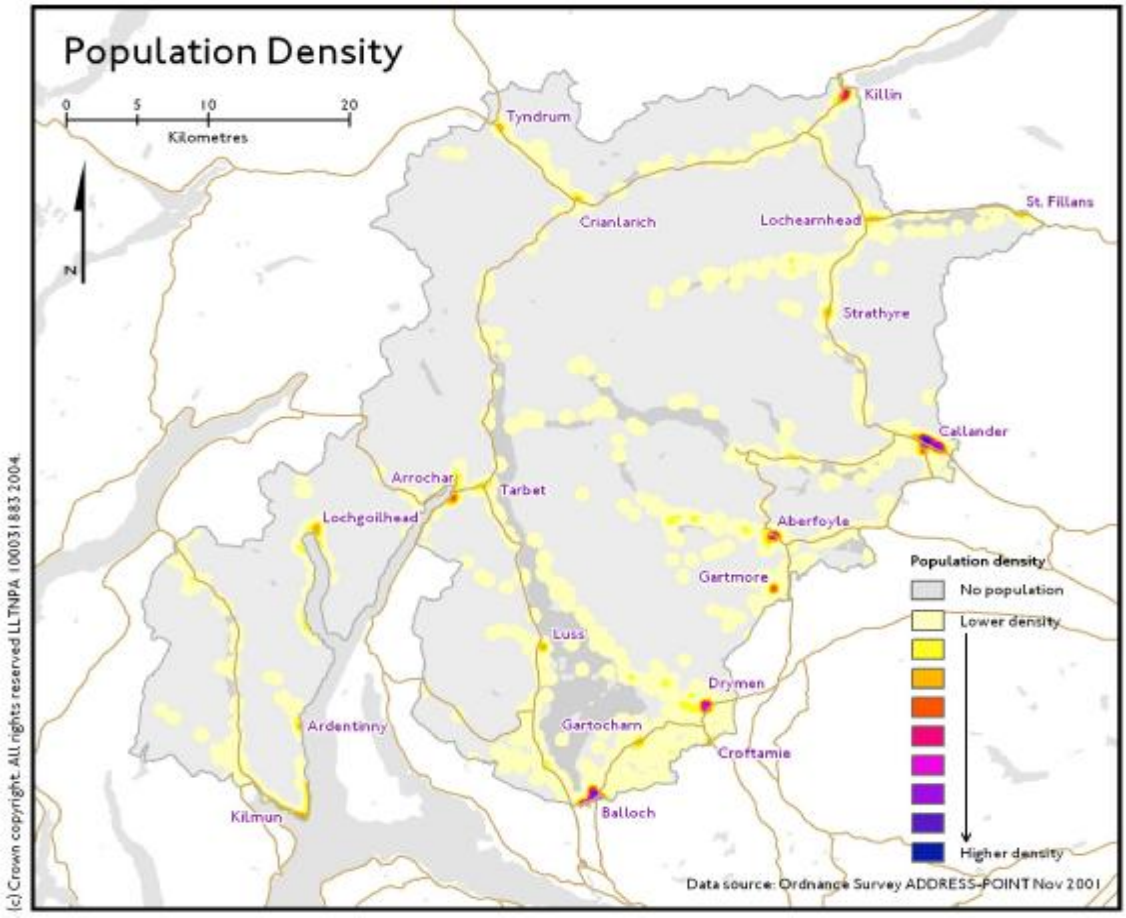


Significant parts of the National Park are in state ownership, especially by the Forestry Commission as well as Scottish Water, the Scottish Agricultural College and SNH. Other large areas are owned by public conservation charities the RSPB, National Trust for Scotland, Royal Scottish Forestry Society and Woodland Trust Scotland. The majority of the National Park is privately owned. The National Park Authority itself owns very little: mostly small parcels of land such as car parks and picnic areas at visitor facilities.

In summary, 31% is publicly owned, 4.5% is owned by Charitable Conservation Organisations, 56% is in private ownership and 6.5% consists of water bodies.

Housing

The Park is home to a large number of people. The Park boundary runs through the middle of Balloch (below, right) in the Vale of Leven at the north end of the greater Glasgow conurbation. Callander (below, left) is the largest settlement in the Park, housing approximately 3000 people.

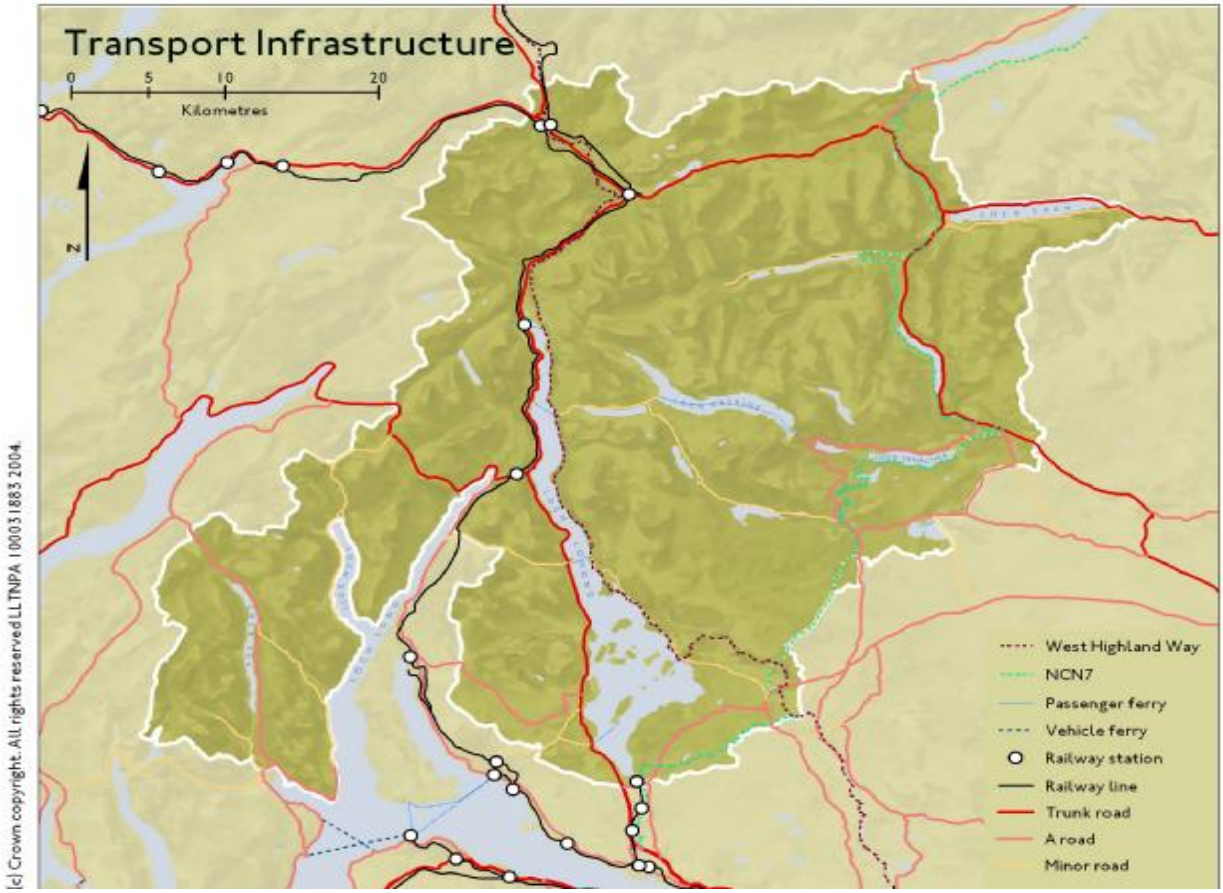


In total , there are 15,600 residents within the Park. The majority of people live in a few large settlements such as those already mentioned but low-density residential housing is widely dispersed throughout the area..

Leisure And Recreation

The area is highly accessible from the major centres of population within the Central Belt resulting in high levels of recreational use by day visitors, and well as having considerable national importance as a tourist destination. Some three million people live within about 1 hour's travel of the Park. The development of infrastructure for visitors and the sheer numbers of people all have their impacts. The range of recreational activities brings about conflicting desires from different types of user. Fast, powered craft and quieter activities such as dinghy sailing or canoeing don't co-exist easily.

Transport



Two of the three trunk roads and one of the 2 railway lines from the central belt to the Highlands run through the Park. 85% of all visitors come to the Park by car. The majority of bulk freight is carried by road. In the eastern half of the Park, there are three significant dead end roads that attract their own difficulties of traffic management.

Vehicle pressure on the roads tends to lead to engineering solutions to bring improvements to traffic flow. Congestion on the A82 led to significant road works on west Loch Lomond side, with significant visual and landscape impacts.

The highly visible sections by Inverbeg and the Firkin cut shown below are extreme examples. However the trend continues.

Water Supply

The Park is also extremely important as a water supply, for hydro-electricity and drinking water.

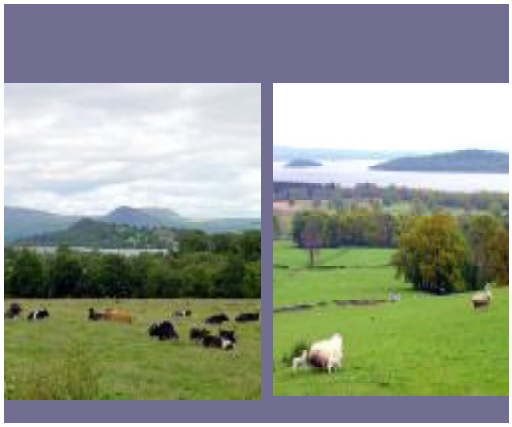
Loch Lomond and the reservoir complex at Lochs Katrine, Arklet and Finglas supply more than 1 million people, with 593 mega litres of water per day. Loch Sloy, Loch Venachar, Loch Arklet, and Glen Finglas reservoir are all substantially enlarged or entirely created by dams. Even in Loch Lomond, water levels have been slightly raised by the construction of a barrage across the Rive Leven in Balloch.

The Sloy hydro-electric scheme pictured above came into operation in 1950. Sloy is the largest conventional hydroelectric power station in the UK. It generates 152.5 MW with 4 turbines, giving it twice the capacity of Scottish Hydro-electric's next most powerful conventional hydro-electric station at Errochty on the Tummel

scheme. It can reach full load within 5 minutes of a standing start, making it ideal for use during times of peak demand.

Farming

A large proportion of the Park is used for farming, mostly livestock farming of cattle and sheep. Hill sheep are especially significant in both numbers and extent. In total there are 349 farms, covering 100,000 ha. 88,000 ha are rough grazing. About 4% of the local human population derive some income directly from farming. In 1993, the Park had 211,000 sheep and 14,700 cattle. In 2003 that had fallen to 165,000 sheep and 13,600 cattle.



The economic conditions in farming such as the introduction of single farm payments can be expected to continue the trend towards further reductions of grazing in the high uplands and conversion of lower reaches into forest. Over time, these changes will have consequential impacts on vegetation type and thus scenic properties.

Forestry

The National Park has 50,452 ha of woodland, consisting of:

- **34,307 ha conifer: mostly Sitka spruce- 80%, larch 8%, Norway spruce 5%**
- **7,568 ha broadleaf; mostly birch-38%, oak 21%**
- **5,550 ha open space in woodlands**
- **3,027 ha mixed, felled, coppiced or windblown woodland.**

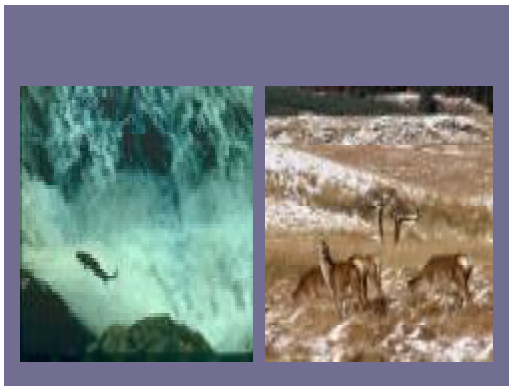
Restructuring of the commercial plantations as the timber crops reach maturity is a major process on a truly industrial scale.

Minerals

The area has a long history of extraction of minerals for a variety of purposes. There are redundant quarries and mines for gold, lead and slate, with some conspicuous remnants such as the big slate quarries near Luss and Aberfoyle. There are also operational sand & gravel quarries at Callander. The Tyndrum Gold mine pictured above is currently mothballed but could re-open, depending on the price of gold on the international markets.

Field Sports

Angling for game fish, especially salmon and coarse fish, notably pike, as well as deer stalking are widespread in the Park. These are a significant income generator and employer in the smaller rural communities.



INTERNATIONAL CONTEXT

The wide range of economic and other activities in the Park make it comparable in many ways to other National Parks in Britain. Its context internationally is also worth considering. Clearly this National Park is not largely uninhabited or a wilderness as might be the case in many other Parks worldwide. IUCN, the World Conservation Union defines six categories of "Protected Area".

I Strict nature reserve/ wilderness area

II National park

III Natural monument

IV Habitat / species management area

V Protected landscape/ seascape

VI Managed resource protected area

Category 2. "National Park" is defined as areas managed mainly for ecosystem protection and recreation. The selection criteria include that they should contain one or more entire ecosystems not materially altered by current human occupation or exploitation, and that ownership and management should normally be by the highest competent authority of the nation.

Category 4 areas are defined as being managed mainly for conservation through management intervention, with ownership and management by the national government. Scotland's National Nature Reserves fit partly into this category.

Category 5 areas are managed mainly for landscape/seascape conservation and recreation. They should possess a landscape of high scenic quality with diverse associated habitats, flora and fauna along with manifestations of unique or traditional land use patterns as evidenced in human settlements and local customs, livelihoods and beliefs. The area should provide opportunities for public enjoyment through recreation and tourism within its normal lifestyle and economic activities.

Category 6 areas are managed mainly for sustainable use of natural ecosystems. Selection criteria include that the area should be at least two thirds in a natural condition.

The loch Lomond & The Trossachs National Park fits squarely into Category 5, as do the other UK National Parks.

STATUTORY PURPOSE OF NATIONAL PARKS IN SCOTLAND

The National Parks Scotland Act defines four aims that must all be delivered by National Parks in this country. In reverse order, these are:

Aim 4 To promote sustainable economic and social development of the communities of the area
Aim 3 To promote understanding and enjoyment of the special qualities of the area by the public, including enjoyment in the form of recreation
Aim 2 To promote the sustainable use of the natural resources of the area
Aim 1 To conserve and enhance the natural and cultural heritage of the area

Natural heritage is defined in the Act. It has three components:

- **Natural beauty and amenity**
- **Geology and physiography**
- **Flora and fauna**

NATURAL BEAUTY AND AMENITY

The National Park has a landscape of exceptional quality and diversity, which includes numerous large freshwater lochs, sea lochs, mountains forest and open ground, supporting a rich diversity of plants and animals. The Park is renowned for its scenic beauty, and three areas have been designated as National Scenic Areas (NSAs) - one covering almost the whole of the Loch Lomond basin and surrounding hills, another is the other in the core area of the Trossachs and a third the transition from lowland to highland at St. Fillans, Loch Earn. There is an exceptional variety of landscape types within the area, including :

- **Vast expanses of water,**

- **Rolling, relatively low-lying farmland on the more fertile soils along the southern margins of the Park,**

- **Policy parklands and designed landscapes around big houses such as Rossdhu.**

- **and the contrast between these managed landscapes and the wild upland landscapes further north and west.**

- **There is also a significant stretch of coastline, 62 km long, around the fjordic sea lochs in the south west.**

GEOLOGY AND PHYSIOGRAPHY

The National Park contains a wealth of geological features, including some of national and international importance. The Highland Boundary Fault that separates the Highlands from the Scottish Midland Valley across Scotland is the most well-known of these. Within the Park, the fault runs from Arden through Balmaha, Aberfoyle and

Loch Venachar and its trace is clearly demonstrable within the islands of southern Loch Lomond.

The diversity of the Park's landscape derives from the effects of Highland Boundary Fault which divides the Park into two distinct regions with vastly differing soil types and topography.

Famously much of the current land form was created by glacial action but land form continues to be a dynamic process. A major thunder storm in August 2004 caused significant land slips in Glen Ogle (below) and several other locations around the Park. Older scars from similar events can be seen on many other hillsides.

FLORA AND FAUNA

The flora of the Park ranges from the wide-spread and conspicuous features such as the bluebell-carpeted oakwoods to much less well known plants such as alpine bistort and purple saxifrage which are restricted to a few upland locations. Similarly the fauna ranges from widespread or familiar species such as badgers to much less well-known species like the freshwater peal mussel.

Priority species from the UK Biodiversity Action Plan that have been recorded in the Park are listed in the following table.

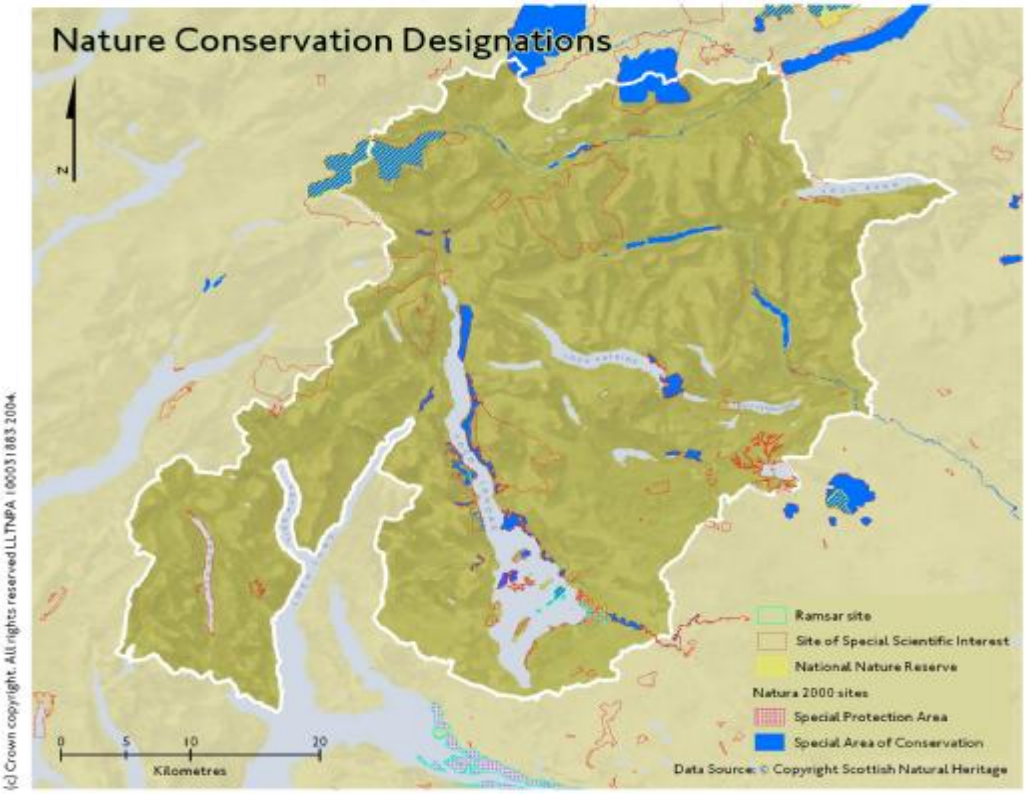
Latin Name	Common name	UK Distribution/ trend	Current Distribution in National Park
Mammals			
Sciurus vulgaris	red squirrel	Big decline in England & Wales in last 50 years. Recent modest expansion in range and number in Scotland.	Widespread
Lepus europaeus	brown hare	Decline in numbers since the early 1960s	Widespread in lowland areas
Arvicola terrestris	water vole	Catastrophic decline in range and numbers across UK	A number of discreet populations in the Park
Lutra lutra	European otter	Rapid decline in numbers from the 1950s to 1970s. Decline now appears to have halted and many sightings reported in former habitats.	Widespread
Pipistrellus pipistrellus *Pipistrellus pygmaeus*	pipistrelle bat	Significant decline in numbers this century. Recent discovery that there are two distinct species of pipistrelle bat in the UK	Widespread. Populations of the two pipistrelle species unknown
Birds			
Alauda arvensis	skylark	Declined by 54% in UK between 1969 and 1991	Widespread
Caprimulgus europaeus	nightjar	Decline in range of 52% between 1968 and 72 and 1992 in UK. Scattered populations in central Scotland	Patchy records of calling males
Crex crex	corncrake	75% decline in breeding population from 1968 to 1991	Occasional passage records
Carduelis cannabina	linnet	Declined by 56% on U.K farmland between 1968 and 1991	Small numbers in lowland areas of the Park
Emberiza schoeniclus	reed bunting	Decline in numbers in recent years	Widespread in suitable habitat
Melanitta nigra	common scoter	A rare breeding species in the UK	Irregular summer visitor
Miliaria calandra	corn bunting	Declined by 76% in UK from 1968 to 1991	Extinct in Park since 1970s
Muscicapa striata	spotted flycatcher	62% decline in woodland and a 70% decline in farmland in UK between 1968 and 1991	Widespread but scarce.
Passer montanus	tree sparrow	76% decline on UK farmland from 1972 to 1996	Recorded around Thornhill east of the Park.
Perdix perdix	grey partridge	75% decline in UK breeding population from 1968 to 1991	Very rare on farmland and moorland fringes.
Pyrrhula pyrrhula	bullfinch	75% decline on farmland and a 47%	Widespread in suitable

		decline in woodland in UK between 1968 and 1991	habitat
Tetrao tetrix	black grouse	Recent UK population estimate (1996) is 6,510 lekking males compared with an estimate of 25,000 in 1990.	Declining in range and population size.
Tetrao urogallus	capercaillie	Declined rapidly throughout its range in Northern Europe over recent decades.	Breeding population of around 30 individuals largely confined to Loch Lomond islands
Turdus philomelus	song thrush	Declining throughout the UK	Widespread
Invertebrates			
Boloria euphrosyne	pearl bordered fritillary	Declined very rapidly over the last 50 years in the south of England. Still widespread in Scottish Highlands	A number of records from the NE area of the Park
Hydroporus rufifrons	a water beetle	Current status is unclear	Recorded from the Endrick mouth
Margaritifera margaritifera	freshwater pearl mussel	Most populations in Scotland no longer producing young	Evidence of small, ageing populations in some rivers in the Park, but not thought to be currently viable
Rheumaptera hastata	argent and sable moth	Declined throughout much of England	Unknown
Xylena exsoleta	Sword-grass moth	Substantial decline since the 1960s in UK. Still widespread in Scotland	Identified in four 10km squares
Vascular plants			
Athyrium flexile	Newman's lady-fern	Endemic to central Scotland, but now classified as a variety of the commoner *A. distenifolium.*	A few montane locations
Centaurea cyanus	cornflower	Major decline across Britain	One location
Cochlearia micacea	mountain scurvy grass	Restricted to basic soils in arctic–alpine sites	A few montane locations
Juniperus communis	juniper	Evidence of long-term decline in parts of UK	Widespread but patchy, showing little evidence of regeneration
Lycopodiella inundata	marsh club moss	Undergone a marked decline in the UK	A few localities
Melampyrum sylvaticum	small cow-wheat	Appears to be in decline	Found in Coille Coire Chuilc and around Ben Lomond.
Najas flexilis	slender naiad	Found exclusively in Scotland, where it has been recorded from 34 lochs within 18 ten km squares since 1980	Found in the Lake of Menteith
Pilularia globulifera	pillwort	Declining. Only recorded in 90 locations since 1970	Locations at Lochs Lubnaig & Lomond
Salix lanata	woolly willow	Occurs in only 12 locations in Scotland. All but one of these populations are very small (less than 100 plants)	Found at one location in the Park
Liverworts			
Marsupella stableri	a liverwort	No evidence of any widespread or substantial loss of its British populations over the past century	Stronghold in parts of Breadalbane hills
Lichens			
Catillarea aphana	a lichen	Recorded from only six localities in the UK	Recorded from one location on Loch Lomond-side.
Gyalecta ulmi	elm gyalecta	Recorded from six sites in Scotland	May occur just within northern boundary
Mosses			
Bryoerythrophyllum caledonicum	Scottish beard moss	Recorded from only 12 10 kilometre squares	Recorded from two Breadalbane locations
Ditrichum plumbicola	a moss	Endemic to Europe. Scattered distribution in UK	One record from Tyndrum lead mine spoil

Note. The table lists all priority species from the UK 1998 list which are recorded as occurring in the Park in the Interim Committee or Stirling Council Area Local Biodiversity Action Plan Audits.

DESIGNATED SITES

There are 61 Sites of Special Scientific Interest (SSSIs) within the Park area. Some of them are very large, like Ben Lomond, Ben More and Ben Vorlich.



Many SSSIs are also designated as Natura 2000 areas under European Directives. There are 8 Special Areas for Conservation (SACs) within the National Park, for the protection of rare, endangered or vulnerable natural habitats and species of wild plants and animals other than birds. Ben Lui and Meall na Samnha SACs are designated for their rare flora, including sub-arctic willow scrub. The Tay, Teith and Endrick Water are SACs for salmon and lampreys. These sites include several lochs and extensive stretches of riparian woodland as well as the rivers themselves. Loch Lomond Woods and Trossachs Woods SACs are designated for their Atlantic oakwoods. There is also one Special Protection Area (SPA) for wild birds; the Loch Lomond SPA which covers both the mouth of the Endrick Water with its overwintering Greenland white fronted geese and the Luss Islands with their population of capercaillie.

Many of the species and habitats mentioned above are widespread throughout Scotland. What aspects of the Park's biodiversity could be said to be truly distinctive?

LOCHS AND RIVERS

The numerous lochs and rivers in the National Park together form a tremendous nature conservation resource.

Loch Lomond, is the largest area of freshwater in Britain, covering an area of 71 square kilometres and is 36 kilometres in length. The northern end of Loch Lomond is extremely deep, at around 180 metres.

Loch Lomond and Loch Eck are 'unique sites' in terms of the high diversity and unique combination of fish species present. There are nineteen species of freshwater fish in Loch Lomond including the largest of only two natural populations of Powan *Coregonus lavaretus* in Scotland, the other being in Loch Eck.

Loch Eck is the only Scottish site where arctic charr and powan co-exist and the only British site where they co-exist with Atlantic salmon and sea trout. Powan have also been introduced to Loch Sloy to try and protect the species and extend their range.

The Trossachs lochs including Achray and Venachar, right, hold several populations of arctic charr though some of these seem to have disappeared in recent years.

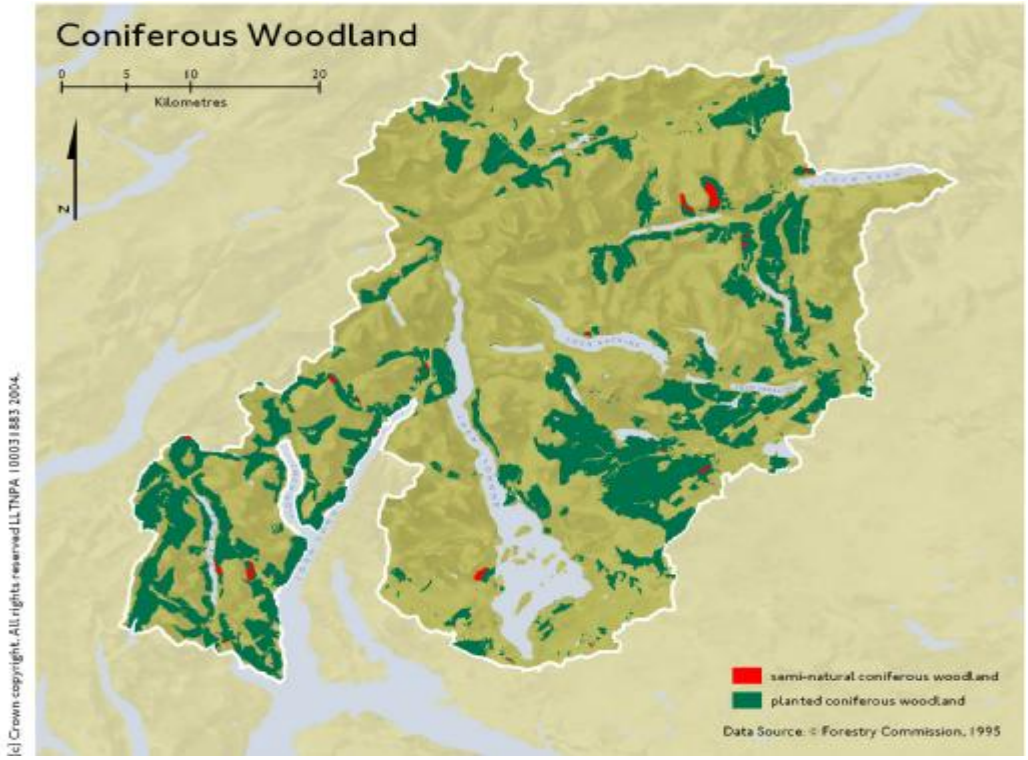
Also of particular note are the populations of lampreys. The presence of river, brook and sea lampreys is a qualifying feature for the Special Area for Conservation status under the Habitats Directive given to the River Teith and River Tay SACs.

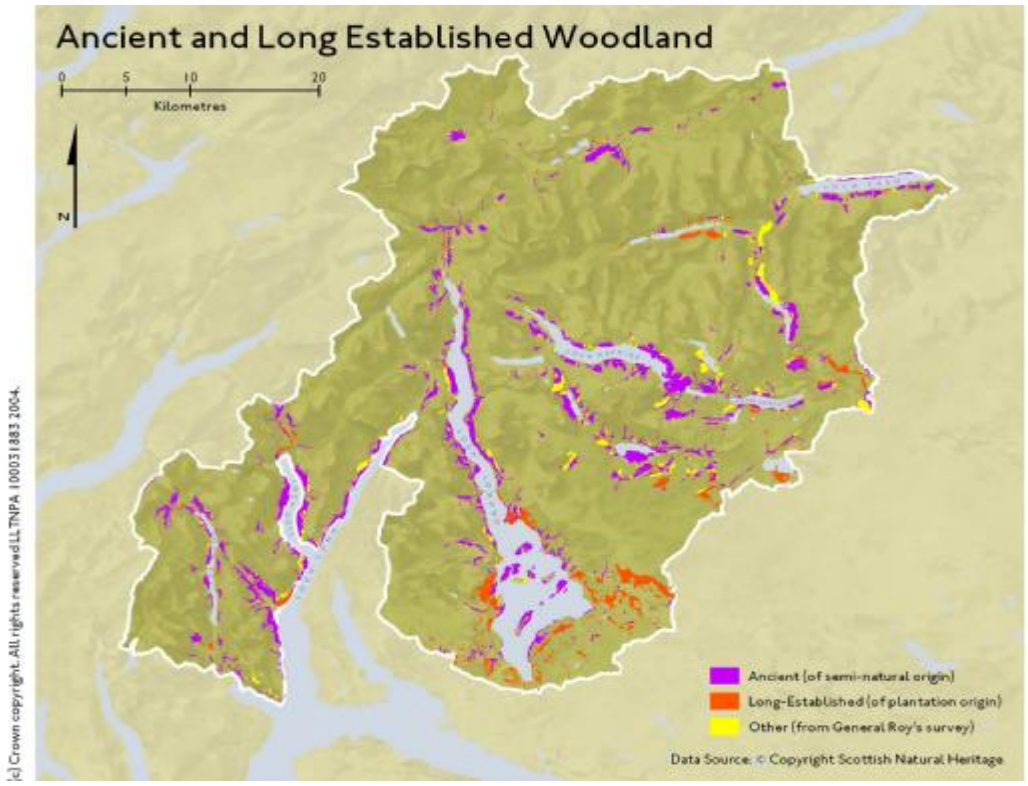
The Endrick mouth, right, is a real biodiversity hotspot. It is an SPA for overwintering geese, a Ramsar site as a wetland of international importance and a part of the Loch Lomond National Nature Reserve. It holds a wide range of wetland habitats and associated species such as the Loch Lomond dock, a plant whose distribution in the UK is restricted to a few sites around Loch Lomond, as well as large numbers of breeding and overwintering waders and wildfowl. The River Endrick, from its mouth at Loch Lomond up to Fintry, is also an SAC for its river and brook lampreys and Atlantic salmon. Its river lampreys are unique in the UK in that they don't migrate to estuarine water to feed as adults but instead feed on powan and other fish in Loch Lomond.

Other significant wetlands are found in Strathyre, around Loch Eck and the north end of Loch Lomond.

WOODLAND AND FOREST

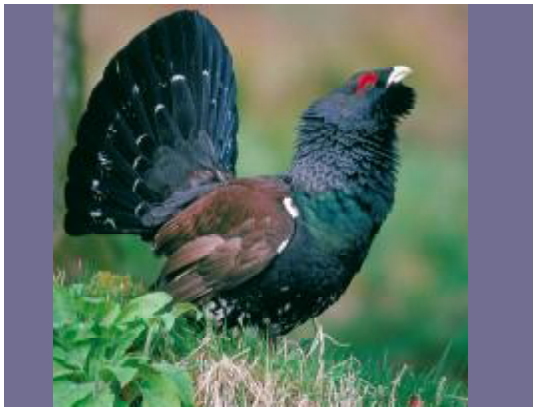
The Park has over 50,000 hectares of woodland and forest. The majority consists of productive commercial plantations, largely comprised of introduced coniferous species. Crucially the Park also has a very extensive native woodland resource. The relationship between the two is illustrated in the following maps of coniferous woodland and ancient and long-established woodland.





Ancient woodland sites which were recorded as being semi-natural on the oldest maps (either the Roy maps form 1750 or the first edition Ordnance Survey from 1860), and have been continuously wooded since then, form 8.5% of the woodland cover of the National Park area. A significant proportion is underplanted with conifers but that is being steadily removed as restructuring of productive forests takes place. Very significant broadleaf woodland expansion is underway, particularly on east Loch Lomondside and at Glen Finglas, but also via the widespread development of a forest habitat network embedded into Forestry Commission plantations, particularly along riparian corridors. Extensive felling on the east shore of Loch Lomond: for conversion to broadleaved woodland can be seen below.

The Loch Lomond SPA includes the Luss Islands with their small remnant population of breeding capercaillie (right). The hope is that these birds will benefit from much of the woodland restructuring and improved woodland management now underway.



The scale of the Forestry Commission ownership, plus land under other owners sympathetic to nature conservation objectives means that a truly enormous native woodland resource is deliverable in the Park, while still allowing for very significant commercial timber production.

Oak Woodland

The Atlantic oakwoods on both sides of Loch Lomond are a candidate Special Area for Conservation (SAC) and are home to summer visitors such as redstarts, pied flycatchers and wood warblers.

Oak is the second most common broadleaf tree species as a result of its favoured status from the 17th to 19th Centuries. The Park contains an exceptionally diverse and extensive area of Atlantic oakwoods, representing a significant proportion of the Scottish total. The Loch Lomond Oakwoods form one of the largest areas of semi-natural woodlands in Britain.

Wet woodlands with trees emerging from seasonally inundated land are a feature in several locations around the Park

Pinewoods

The important remnants of ancient Caledonian pinewoods at Glen Falloch (below left) and Strath Fillan (below right) are perhaps the most 'natural' of the woodland types, though these suffer from a severe lack of regeneration due to past grazing pressures. These remnants are the most southerly surviving natural pinewoods in the UK. They occur very close to the natural transition point from pinewoods to oakwoods as the predominant forest type. The area of ancient native pinewoods is small (67 hectares), but there are several new native pinewood schemes now in place that will help in the long term to expand and reconnect this woodland type over much of its former range.

UPLAND AND MONTANE HABITATS

The occurrence of significant outcrops of limestone geology on the Breadalbane mountains create unusual alpine plant communities such as base-rich flushes and species rich tall herb communities that are rare in the rest of the Highlands.

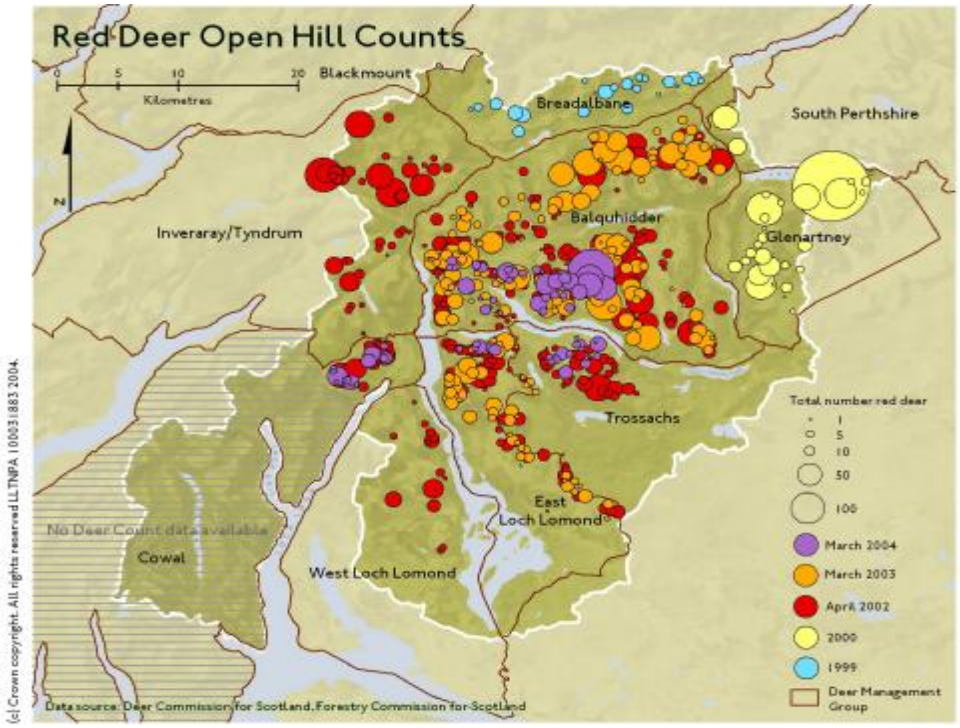
The mountain massifs and upland areas of the Park contain remnants of heather moorland and montane scrub, and support a wide variety of bird species including golden eagle, peregrine, merlin, ptarmigan, twit, golden plover and, on some of the high tops, dotterel. The montane grasslands in the north of the Park are the main UK stronghold for the mountain ringlet butterfly.

The steep slopes with knolls, craggy gullies and cliff faces support many rare mosses, liverworts and lichens and extensive areas of snow-bed vegetation. Heaths, montane grasslands (many derived from heathland) and flushes have developed on the steeper slopes.

GRAZING MANAGEMENT

Perhaps the most significant issue in relation to both woodland and upland habitat management is that of grazing management.

There are a large number of red deer in the Park. Based in the most up to deer group date counts from 2000 and 2002, their total number in the Park is very approximately 10,000 individuals. This is probably a very high number in historic terms. The park also holds approximately 165,000 sheep, the great majority of which are hill sheep.



More integrated control of deer numbers and a reduction in hill sheep have the potential to yield significant biodiversity benefits. In particular, if the practical difficulties can be overcome, there is the potential to reduce grazing pressure in some areas sufficiently to allow reductions in the extent of deer fencing around woodlands. This would allow a scrubby upper woodland edge to develop and form a more natural transition between woodland and open ground habitats with benefits for many species. Conversely, there is a danger that changes to agricultural support under CAP reform may lead to unpredictable effects such as abandonment of upland farming.

Whilst this could yield benefits for some habitats like heather moorland or montane scrub species such as willows and juniper that favour lower grazing pressure, it may be less good for some birds such as ring ouzel and certain butterflies that favour shorter vegetation. A task for the Park will be to attempt to steer the effects, be they ecological, landscape or socio-economic, of such changes.

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Mapping data sources

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Indicative land ownership data derived, collated and digitised by National Park staff from various data sources of variable quality and reliability. Part of this information is compiled from research by National Park staff and local knowledge. Other sources include Argyll & Bute Council, Highlands & Islands Enterprise, Forestry Commission Scotland, Scottish Natural Heritage, Scottish Water.

Population density data derived from Ordnance Survey Address-Point(r) November 2001. Transport Infrastructure data derived from Ordnance Survey Strategi(r)

Nature conservation designations data (Ramsar sites, Sites of Special Scientific Interest, National Nature Reserves, Special Protected Areas and Special Areas of Conservation) derived from data supplied to LLTNPA in November 2003 by Scottish Natural Heritage.

Coniferous woodland data derived from the National Inventory of Woodland and Trees 31/03/1995 from Forestry Commission Scotland.

Ancient and long established woodland data derived from the Inventory of Ancient and Long-established Woodland Sites from Scottish Natural Heritage.

Red deer open hill count data derived from information supplied by Forestry Commission Scotland and Deer Commission for Scotland.