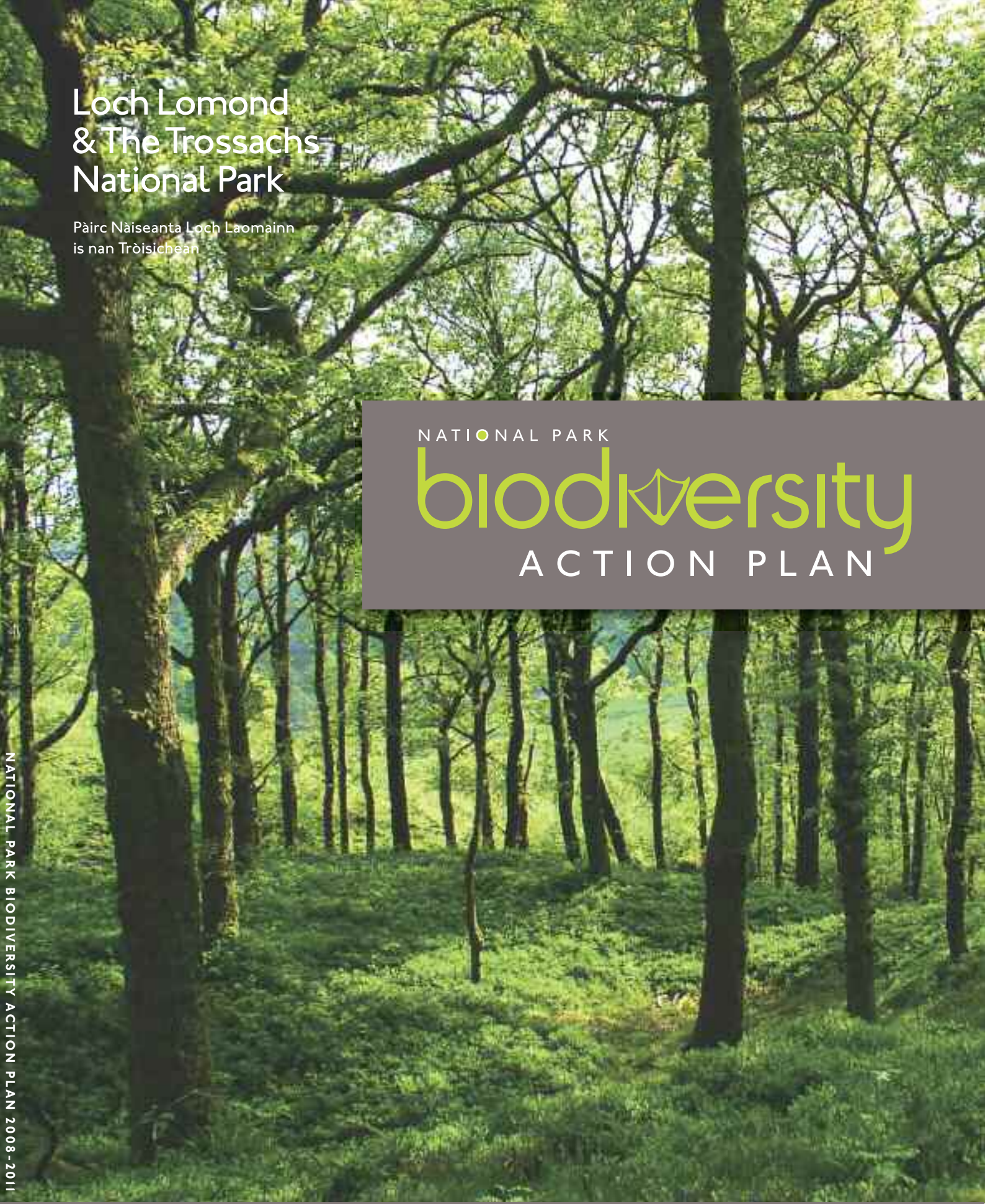


Loch Lomond & The Trossachs National Park

Pàirc Nàiseanta Loch Laomainn is nan Tròisichean

NATIONAL PARK

biodiversity

ACTION PLAN

2008-2011

NATIONAL PARK BIODIVERSITY ACTION PLAN 2008-2011

NATIONAL PARK

biodiversity ACTION PLAN

FOREWORD

Hello, this Biodiversity Action Plan is fundamental to the National Park making a difference to our environment. This Plan is a core part of delivering on the Scottish Government's strategic priorities for the nation, in particular the commitment to a Greener Scotland, and on our own National Park Plan 2007-2012.

Our ambition is that the Loch Lomond & The Trossachs National Park will be seen as the location of choice for leading edge work to conserve and enhance Scotland's biodiversity. In the coming years the Park Authority and our partners will actively pursue landscape-scale restoration of active floodplain wetlands, extensive native woodlands and widespread control of damaging invasive species. We will also model and demonstrate the effects of climate change on the natural environment in a way that everyone can relate to.

With hard work and good will on the part of land owners, community groups, non-governmental organisations (NGOs) and government agencies, nature conservation can be accomplished here on a grand scale. The forestry re-structuring on east Loch Lomondside and The Great Trossachs Forest projects are already set to give us the largest native broadleaved woodland in Scotland. We need similarly ambitious work to retain and enhance the diversity of our farmland as well as our lochs and rivers and the marine coast of the National Park. In this period of great economic changes affecting upland farming, it is important to recognise that the valued biodiversity of the National Park has been greatly shaped by traditional use of the land for food production from agriculture and field sports. The goal must be to combine the benefits from that long history of land management with the more recent concept of biodiversity. If we get it right, we can maintain a living, working landscape while also producing more robust and more self-sustaining ecosystems on a large scale that have a greater capacity to remain viable in the long-term in the face of climate change and other pressures.

If the people of the National Park choose to, there is no reason why we cannot reverse the declines in our familiar farmland wading birds in all our straths and lowland farmland. With effort and imagination perhaps we can see the return of corncrakes as regular summer residents of the Endrick marshes and restore populations of freshwater pearl mussels throughout the lengths of our major salmon rivers. We could halt and reverse the further spread of dangerous invaders such as the ruffe or prevent the introduction of the parasite *Gyrodactylus salaris* that threaten our native fish. If the current Knapdale trial is successful, perhaps by 2030 we will host one of the first restored populations of beaver in Scotland? If the nation decides to reintroduce them after their long absence, surely this first National Park is a place where ambitions of such a scale should be realised.

The three-year work programmes in this document will be important steps along the way, generating measurable improvements. Our ambition is that by 2030 the biodiversity gains in the National Park will be obvious for everyone to see and enjoy.

Flona Logan
Chief Executive

March 2009

ACKNOWLEDGEMENTS

We are very grateful to the following people and organisations who worked with the National Park Authority staff to produce the National Park Biodiversity Action Plan (NPBAP):
Ivan Clark, Scottish Natural Heritage (SNH); Yvonne Boles, Royal Society for the Protection of Birds (RSPB) Scotland; David Anderson, Stuart Chalmers and Katy Freeman, Forestry Commission Scotland (FCS); Damien Hicks, Scottish Environment Protection Agency (SEPA); Daye Tucker, Scottish Rural Property and Business Association (SRPBA); Marina Curran-Colthart, Argyll & Bute Council (ABC); Richard Smith, Stirling Council (SC); Gillian Telfer, West Dunbartonshire Council (WDC); Catherine Lloyd, Tayside Biodiversity Partnership; David Clyne, Woodland Trust Scotland (WTS); Lucy Sumsion, Farming and Wildlife Advisory Group (FWAG) Scotland; Robin Mair and Sandra Stewart, Scottish Agricultural College (SAC); James Fisher, National Farmers Union Scotland (NFUS).

Images were supplied by courtesy of the following people and organisations:
David Anderson, Scott Ashworth, Alan Bell, Yvonne Boles, Laurie Campbell, Jim Downie, Katy Freeman, Callum McNeill-Ritchie, Janet Swailes, Scott Nisbet, Alison Wilkie, Sheila Winstone, Dr. Colin Adams, Chris Calvey, Debbie Gourlay, Jo Hamilton, David Mitchell, Gavin Young, Paul Symington, SNH, RSPB Scotland, SEPA, FCS, Butterfly Conservation, Glasgow University, Lancashire & Cheshire Wildlife Trust and Forestry Commission.

CONTENTS

1. INTRODUCTION

"This concept of biodiversity embraces all living things, from the tiniest garden ant to the Caledonian granny pine. Biodiversity is everywhere, in window box and wildwood, in roadside and rainforest, in snowfield and seaside and sky.

We depend on biodiversity for our quality of life. What we don't save now, our children and grandchildren will have to pay for later."
- Magnus Magnusson KBE

The Loch Lomond & The Trossachs National Park Biodiversity Action Plan (NPBAP) has been developed to conserve and enhance the habitats and species that contribute to the National Park's special qualities. This plan is the framework for delivering the aspirations as set out in the Scottish Biodiversity Strategy while providing the local context for delivery on the ground in the National Park. Conserving and enhancing biodiversity is central to the National Park and this plan details what can be delivered while aiming high in its ambition. Initially, it covers the three-year period from April 2008 to March 2011. It will be updated and rolled forward annually, keeping it closely linked to the corporate planning cycles of the National Park Authority and other major partners.

Why have a Biodiversity Action Plan for the National Park?

The National Parks (Scotland) Act 2000 provides the basis for National Parks in Scotland and sets out four statutory aims:

- **To conserve and enhance the natural and cultural heritage of the area**
- **To promote the sustainable use of natural resources of the area**
- **To promote understanding and enjoyment (including enjoyment in the form of recreation) of the special qualities of the area by the public, and**
- **To promote the sustainable economic and social development of the area's communities**

Under the Act all of these aims must be pursued collectively, however if a conflict arises between achieving conservation and enhancement of the natural and cultural heritage and the other aims, then the Authority must give greater weight to the first aim.

The high biodiversity of the area was one of the main reasons for the original designation of the National Park and its ongoing conservation and enhancement is essential for the delivery of the first aim of the Park. The biodiversity health of the Park will be a key test of the achievement of truly sustainable economic and social development of the area, and is critical to the ongoing enjoyment by residents and visitors alike.

National and local context

The Scottish Biodiversity Strategy vision for Scotland in 2030 is that:

'Scotland is recognised as a world leader in biodiversity conservation. Everyone is involved; everyone benefits. The nation is enriched.'

The NPBAP is part of the effort to ensure that this vision becomes a reality. This action plan will contribute to the aims, objectives and actions described at a national level and to the delivery of a number of other strategies and plans relevant to the biodiversity of the National Park. The principal ones are:

National Park Plan 2007-2012
State of the Park Report 2005
UK Biodiversity Action Plan
Scottish Biodiversity Strategy
Scottish Natural Heritage Species Action Framework
Scottish Forestry Strategy
Local Biodiversity Action Plans for Argyll and Bute, Stirling and Tayside
Loch Lomond & The Trossachs Local Woodland and Forestry Framework
Forestry Commission Scotland Cowal & Trossachs Forest District Nature Conservation Strategy
Scottish Rural Development Plan (SRDP) Regional Priorities

The *State of the Park Report 2005* provides a comprehensive overview of information and issues pertaining to the National Park, including biodiversity. *The National Park Plan 2007–2012* provides the main policy context for the NPBAP. The Scottish Forestry Strategy, Scottish Biodiversity Strategy and SRDP Regional Priorities help to set the policy environment within which the NPBAP sits. At the same time the National Park Authority will use problems encountered in implementing the NPBAP to influence the future development of these national and regional strategies.

What is happening already?

The NPBAP will build on a range of previous work in the National Park. In particular, it takes as its starting point the Local Biodiversity Action Plans (LBAPs) for Argyll and Bute, Stirling and Tayside areas that were produced and agreed by a wide range of partners in the period before the establishment of the Park. One of the main purposes of the NPBAP is to improve the co-ordination and delivery of actions identified in the LBAPs. It also aims to facilitate and coordinate the implementation of other existing initiatives across the Park area. For example, the Loch Lomond basin was covered by one of the original Environmentally Sensitive Area (ESA) schemes and the Loch Lomond catchment was a pilot area for catchment management planning work in Scotland. We want to ensure that we continue and add to all the good agri-environment and catchment management work in the Park over the past 20 years under the ESA and other programmes.

The National Park contains 60 SSSIs, 8 SACs, 1 SPA and 1 Ramsar site designated under national and international legislation. Progress with bringing designated sites into favourable condition is a national objective of great importance to the biodiversity of the National Park and significant efforts are being made on the sites here. Work to achieve this objective is being coordinated nationally and is dealt with separately outside of the National Park Plan. For this reason, the management of these designated sites is not included as a part of the NPBAP.

Other significant projects in the Park include the Great Trossachs (see over page) Forest project, the replacement of conifer plantations with native woodland on east Loch Lomond and programmes of work for red squirrel and black grouse. We want to expand on these projects and ensure that further ideas for the management of biodiversity in the Park are produced and resourced in the future. Appendix 1 to this document summarises many of the current actions for selected habitats and species.

CASE STUDY

The Great Trossachs Forest

The Great Trossachs Forest is a landscape-scale native woodland restoration project stretching from Inversnaid on east Loch Lomond through the Loch Katrine water catchment to Glen Finglas and the Pass of Leny. The total project area is about 16,650 hectares. 2,000 ha carries established tree cover and 4,400 ha of new woodland is developing by natural regeneration or is proposed for planting with native tree species. The potential for 6,400 ha of native woodland would make it the biggest native woodland in the UK. The three sites are managed by neighbouring landowners: RSPB Scotland, Forestry Commission Scotland and Woodland Trust Scotland, who, along with British Petroleum, make up the Scottish Forest Alliance. The alliance is a unique collaboration between the private and public sector committed to restoring much of Scotland's lost native woodland and rebuilding biodiversity through landscape-scale habitat enhancement.

Habitat enhancement of native woodland and open moorland lies at the heart of this project, which will result in new native woodland of high biodiversity value in all areas that are best suited to its establishment. The woodland will consist of a wide range of types determined by site characteristics including aspect, hydrology and soil type. It will include high canopy oak woodland, areas of Caledonian pine, pasture woodland and wet alder woods. In montane areas and on forest edges scrub will form an important feature. The interfaces between woodland and open ground habitats will have the characteristics of more natural woodland with a mosaic of scrub and open ground rather than abrupt fenced edges.

The area will not be entirely afforested. Large areas of moorland, montane, wetland and grassland habitats will be retained covering more that 10,000 ha and enhanced through conservation management. Grazing, by both domestic livestock and wild deer, will be a key component of management, resulting in a dynamic system with habitats expanding and contracting over time in response to natural processes.

The whole area will be managed with people in mind – for the enjoyment of visitors and local people, to benefit local communities aesthetically, socially and economically and to become a focus of the National Park. It will be a showcase for wildlife and habitat enhancement, and for revealing the long history of the ways in which people have interacted and modified their environment. While each organisation will continue to have independent specific aims for the land that they manage, this coherent and long-term partnership will continue to provide significant gains for biodiversity and people on a landscape scale.

Production of the NPBAP

This plan for the National Park was drafted by a small working group of representatives from a range of government agencies, non-government organisations (NGOs) and land owner representative groups. It was then put through a six-week public consultation in autumn 2008 and edited to incorporate key points raised in consultation responses. The final plan was adopted by the National Park Authority's board in December 2008. A consultation report is available separately, which summarises the consultation process, the issues raised and how they have been addressed in arriving at the final plan.

What is this plan about?

The plan is divided into sections that range from what the National Park Authority will be doing about biodiversity to individual species and habitat work programmes. It builds on the work put in place by the Local Biodiversity Action Plans that already cover the Park and is meant to complement not replace those documents. The plan will undergo a formal review every year as a rolling three-year business plan linked to the corporate planning cycles of the main organisations aiming to deliver it. Progress and outcomes will be reported each year as part of the National Park Authority's corporate planning system. It will also feed into the monitoring and reporting systems for the National Park Plan 2007-2012 and the Scottish Biodiversity Strategy.

Achieving the vision

The National Park Authority is responsible for leading and coordinating the production and implementation of the NPBAP, as one action in Corporate Plan 2008-11. It is also at the heart of one of its three key themes, conservation management. However, successful implementation of the NPBAP will depend on the continued enthusiastic participation of the wide range of partners who helped to produce it. In particular, the participation and support of the National Park's communities and landowners will be essential.

The organisations and people involved with biodiversity in the National Park want to develop an ambitious programme of projects that will help to conserve and enhance the resource that so many people from Scotland and across the world want to come and see and enjoy. To that end, as well as the committed three-year work programmes, the NPBAP also has a vision statement and associated long-term outcomes that we aim to deliver by 2030 (the same timescale as the Scottish Biodiversity Strategy). Progress towards these long-term outcomes will be assessed as a part of the management process for this plan. Some actions in work programmes began before the development of the NPBAP. Many others, such as forestry work, will take longer to complete than the three-year period covered by this first version of the NPBAP. Actions whose timescales extend beyond the initial three-year plan are indicated with a # symbol in the work programmes.

The action plans in each section also include 'unfunded proposals', actions that we think would bring substantial benefits to biodiversity but for which resources were not available at the time of writing. We will strive to find the resources to implement these over the life of the plan.

Funding and resources

The main constraint to biodiversity projects is limited funding. A major task for the partners in the NPBAP throughout the plan period is the hunt for the necessary resources to sustain and expand the programme of work.

The existing staff and budgets of the public sector agencies and NGOs are the main core resource for undertaking targeted biodiversity management work. Inevitably, the time and money available in any one year are always less than the scope of the potential work. The National Park Authority and the other agencies will work together to ensure close alignment of priorities to maximise the effectiveness of conservation effort in the Park.

Most of the National Park is privately owned. The farmers and other land managers make very valuable contributions to biodiversity management, such as maintenance of grazed habitats, culling of deer and control of foxes, within the constraints of their running businesses and maintaining a profit margin. State support is available through agri-environment and forestry schemes such as the new Rural Development Contracts but these funds depend on landowners generating successful applications and are not targeted specifically at the National Park. Significant efforts are required by Scottish Government, public agencies and NGOs to raise awareness of relevant funding opportunities, by landowners and their advisors to generate applications and by the scheme's operators to assess, award and administer the contracts and payments.

Other funding sources such as the Heritage Lottery Fund, the European Union LIFE programme, charitable trusts and sponsorship by large corporations outwith the National Park are all potentially available and have played a significant role in recent and current projects. These all depend on concerted efforts to develop attractive projects that meet the criteria of such funders.

One avenue that emerged strongly during the draft NPBAP's consultation is the contribution that local expert naturalists can make to the survey and recording of the many less well documented species. These include rarer flowering plants, lower plants, invertebrates and fungi. With liaison and coordination, this group have great scope to help increase our detailed knowledge of the biodiversity of the National Park.

Next steps

This document sets out work programmes for the projects that the NPBAP partnership intends to deliver in the next three years from the available resources. It also identifies some ambitious projects and work areas, which could be delivered if additional resources are identified. With the publication of this plan, it is time to begin the job of implementing the agreed projects, and of turning the proposed projects into reality.

2. VISION

The Vision for 2030

The National Park is widely recognised as a leading area in the conservation and enhancement of its habitats and species and for community, visitor and volunteer involvement in conservation action and delivery. The biodiversity gains in the National Park are obvious for everyone to see and enjoy.

Aspirational Outcomes for 2030

Species and habitats

Biodiversity Action Plan priority species and habitats are secure in terms of numbers, range, quality and extent. The balance between economic land management and habitat conservation and enhancement is well understood and the National Park is the location of choice for implementing innovative nature conservation work on a landscape scale and a leader in nature-based tourism. Populations of declining and threatened species, including farmland waders, water vole, powan, red squirrel, wildcat, black grouse, capercaillie and freshwater pearl mussel, have all expanded back into areas previously occupied thanks to landscape-scale habitat management projects and targeted species management work. In particular, the Loch Lomond capercaillie are reconnected to their nearest neighbours in Perthshire as a single meta-population.

Species management projects are underway using keystone species to improve ecosystem structure and function, including wild beaver and greater use of cattle and pigs as management tools whose grazing and trampling are necessary for maintaining the health of our wetlands and forests. The National Park is used as a model in feasibility studies for species reintroduction proposals under the Habitats Directive to fully examine all aspects of such proposals.

Invasive species

The spread of invasive non-native species has been slowed, halted or reversed with control and removal of mink, grey squirrel, Japanese knotweed, *Rhododendron ponticum* and other damaging species over large areas.

Designated sites

The suite of sites with statutory nature conservation designations (National Nature Reserves (NNRs), Sites of Special Scientific Interest (SSSIs), Natura 2000 and Ramsar) are all in favourable condition and the Loch Lomond NNR has been expanded to encompass more of the SSSIs on east Loch Lomondside. More community wildlife sites are established and some are formally designated as Local Nature Reserves (LNRs).

Climate change

Habitat health, extent and connectivity have been improved to create networks that allow species to adapt to climate change. Habitats that act as carbon sinks or to mitigate against floods and droughts are protected from damage and enhanced and we have a fuller understanding of the impacts of climate change on the National Park.

People

Conservation and enhancement of biodiversity are central to the sustainable development of communities. People are involved in the stewardship of the National Park, which is seen as a resource that must be protected both for its own sake and because it provides opportunities for development and employment. The Park's land managers and accommodation providers are knowledgeable and enthusiastic about their local wildlife. Communities and visitors make a direct contribution through volunteer work and management of community wildlife sites. It is considered the norm for businesses in the Park to contribute to local conservation programmes, recognising that the Park's habitats and species are a valuable business asset. The communities, land managers, NGOs and public agencies in the Park work together to plan and deliver environmental benefits.

Education

School children, students, researchers and the general public are able to draw on a growing and accessible resource of information on the value and state of Scotland's biodiversity, and practical ways to enhance biodiversity at all levels from gardens to landscapes. All school grounds in the Park have wildlife features in them. Schools locally and across Scotland make active use of the Park as a nature classroom at sites such as Inchcailloch and Cashel. The University of Glasgow's Scottish Centre for Ecology and the Natural Environment (SCENE) at Rowardennan and Scottish Agricultural College Kirkton are at the forefront of a vibrant programme of higher education and lifelong learning in the Park. A network of high quality visitor centres including the David Marshall Lodge at Aberfoyle provide leading edge information and interpretation for visitors and there is a strong programme of outreach work to excluded and minority groups outside the Park, all informed by customer feedback.

National Park Authority

The National Park Authority is an exemplar in implementing the Scottish Biodiversity Duty.

Landscapes and ecosystems

The National Park's landscapes are attractive and diverse; and terrestrial and marine ecosystems are self-sustaining, healthy, productive and rich in biodiversity. Keystone species are present and actively shaping their environment, adding to the structural diversity and biodiversity present. Development control and land-use planning is strategic and integrated, taking full account of the complex relationships between different elements and activities in landscapes, seascapes and ecosystems, in both time and space. In the sea lochs, plastic litter is greatly reduced and coastal sewage discharges meet the highest standards. The marine regional plan covering the Firth of Clyde and the National Marine Plan fully recognise and provide management and protection for the coastal ecosystems of the Park. Fully functioning flood-plains are restored along rivers with extensive wetland and wet grassland restoration is in place, further hard engineering of loch shores has been replaced by soft engineering and the removal or redesign of erosion and flood-sensitive infrastructure. Native fish populations thrive and the threatened spread of alien invasive fish, plants and parasites has been largely controlled. Excess nutrient enrichment of rivers and lochs has been eliminated. Most ancient woodland sites have been restored to native tree cover. The ecological quality of many woodlands has been greatly enhanced by the widespread introduction of grazing, browsing and disturbance by large mammals at ecologically appropriate levels that encourage natural regeneration and structural diversity. On the moorlands and mountains, development of a natural tree-line is underway in appropriate locations, heather and other heath species have re-established to replace swards of coarse grasses in many places, sub-montane scrub and tall herb communities are spreading to a more natural extent, and many dense bracken stands on sheep-walk have been reduced or removed.

Knowledge

Anyone who wishes to learn more about the biodiversity of the National Park in general, or about specific issues or opportunities, has ready access to stimulating and appropriate information underpinned by well-managed, extensive and high quality data. Wildlife recording and monitoring schemes are well established and supported. Visitors to the National Park can easily access opportunities to experience wildlife first hand with the help of local nature tourism businesses and ranger services.

3. COPING WITH CLIMATE CHANGE

Climate change is arguably the single biggest issue facing us as we look to conserve and manage the existing biodiversity of the National Park. It is imperative that we understand the changes that will have an impact on our landscapes and habitats. There is, however, a high level of uncertainty in the predicted impacts of climate change on biodiversity. Management will need to be adaptable and perceptions of existing historic landscapes may need to alter. We will need to encourage a greater tolerance of new, emergent, landscapes and changes in the distribution of habitats and species as they adjust to shifts in climatic zones from altered patterns of temperature, rainfall and wind. The combined effects of habitat fragmentation and climate change are two of the biggest problems facing wildlife. The main trend over time has been for areas of habitat to become ever smaller and more isolated, causing local extinction, disrupting natural processes and making it ever more difficult for species to move around the landscape. This will intensify the effects of climate change, as populations need to move to stay within climate ranges or face extinction.

Some habitats in the National Park are effective carbon stores, peatlands being the most significant existing store. Collectively, UK peat bogs hold more carbon than the forests of UK and France put together. However, increasing temperatures and potentially reduced summer rainfall could turn these carbon stores into carbon sources.

The National Park is also a source of two major river systems and the home of some of Scotland's most significant lochs and reservoirs. It needs to play an important role in securing sustainable water supplies and in alleviation of flood risks, both likely to become more important under predicted climate change scenarios.

Objectives

We have identified seven objectives for safeguarding and enhancing biodiversity in the face of climate change:

1. **Conserve and enhance the existing biodiversity resource to make it more robust and better able to cope with climate change impacts.**
2. **Improve ecological connectivity to allow species to move and habitats to adjust in response to climate change.**
3. **Adopt an evidence-based approach to decision-making for biodiversity which recognises that the resource is constantly changing and may do so more rapidly due to climate change.**
4. **Protect and enhance the capacity of forests, woodlands, peatlands and soils to act as carbon sinks.**
5. **Conserve and manage water resources and the aquatic environment and identify adaptation measures to mitigate the effects of lower rainfall, droughts and increased storm events.**
6. **Protect key habitats from development impacts.**
7. **Promote land use that limits carbon emissions.**

Actions

Actions under the Habitats and Species Enhancement and Invasive Species Programmes will be developed with these objectives in mind. In addition, some specific actions to help meet these objectives are in Table 1.

Table 1. Climate Change Work Programme

Project Ref. No.	Project Title	Key outputs and outcomes	Start & End Dates in three-year plan		Resources in place? Who?
CC 1	Climate change impact predictions on the National Park	Review current information on the predicted ecological effects of climate change on Scotland and how it may impact on the National Park. This will be a part of a wider review of climate change effects on the Park.	2008	2010	Yes, NPA.
CC 2	Integrated Habitat Network	Develop an Integrated Habitat Network (IHN) Model for the National Park.	2008	2009	Yes. NPA, FCS, SNH.
CC 3 See also FW 6	Local Forestry and Woodland Framework- biodiversity and climate change	Incorporate the IHN into policies in the Loch Lomond & The Trossachs Local Woodland and Forestry Framework.	2008	2009	Yes. NPA, FCS, SNH.
CC 4	Local Plan- biodiversity and climate change	Incorporate the IHN into policies in the Local Plan. Draw up Local Plan policies that: • protect carbon storing habitats from development that damages their storage capacity. • protect water bodies, flood plains and coastal areas from development that damages their ability to respond to changing flow regimes and sea levels. • actively encourage energy efficiency and renewable energy generation that does not damage the special qualities of the National Park. • promote energy efficiency in new housing developments.	2007	2009	Yes. NPA.
CC 5	Agriculture and carbon emissions	Provide two training events for the agricultural sector on management of carbon emissions.	2008	2008	A&B LBAP Partnership & Agriculture Forum.
Unfunded Proposals (See Achieving the vision, page 6)					
CC 6	Flood plain management	Habitat restoration projects on flood plains to maximise their potential to slow down storm flood flows.			
CC 7	Visitor footprint	Better public transport provision combined with a robust footpath and cycle network to reducing the total carbon footprint of visitors to the National Park.			
CC 8	Awareness	Raise awareness of residents and visitors of the local impacts of climate change on biodiversity as a part of the NPA's Climate Change Awareness Raising Strategy.			
CC 9	Forestry and carbon management	Further develop existing forestry trends for enhancement of existing native woodlands, expansion and greater connectivity of woodlands and more use of broadleaves to create ecosystems that are more robust in the face of change and that give carbon sequestration benefits. Further promote local markets for native timbers and appropriate wood-fuels to create economic incentives for woodland management and to reduce carbon emissions from transportation.			
CC 10	Climate change monitoring	Develop and record simple ecological markers - eg appearance of new southern species or reduction in arctic alpine plants that can be detected in other work and noted as local indicators of climate change.			

4. DELIVERING THE SCOTTISH BIODIVERSITY DUTY

The Scottish Biodiversity Duty in the Nature Conservation (Scotland) Act 2004 gives all public bodies and office-holders the duty to further the conservation of biodiversity so far as is consistent with the proper exercise of their functions.

Leading and coordinating the production and implementation of the National Park Biodiversity Action Plan is a discrete action for the National Park Authority in its Corporate Plan 2008-11. However, biodiversity is integral to may other parts of its work and is central to its key theme of conservation management. In recognition of the need for an integrated approach, the Park Authority will implement the Scottish Biodiversity Duty through the following projects.

Table 2. NPA Biodiversity Duty Work Programme

# denotes a project whose timescales extend beyond this initial three-year plan.

Project Ref. No.	Project Title	Key outputs and outcomes	Start & End Dates in three-year plan		Resources in place? Who?
SBD 1 #	Resources	The Park Authority and partners to advocate at the highest level for the resources needed to deliver the highest level of biodiversity management for this special area.	2008	2011	Yes. NPA.
SBD2 #	Advocacy	The Park Authority board to actively lobby for national strategy documents from forestry to transport, to fully reflect the importance and role of the National Park in delivering a Greener Scotland and have full regard and contribute to the biodiversity objectives of the National Park Plan: • Influence priorities and geography of the Scottish Rural Development Programme (SRDP) regions to align with National Park objectives including effective biodiversity delivery for priority species and habitats. • Advocate the development of Scottish Forestry Strategy standards for the National Park that exceed those in force for other areas. • Advocate Park Authority membership of the marine regional board, retention of planning powers out to three nautical miles and consideration of marine protected areas in the sea lochs and coastline of the National Park. • Raise concerns about practicalities of wildlife legislation.	2008	2011	Yes. NPA Board.
SBD 3 see also CC 4	Planning authority function	Develop Local Plan policies to protect designated sites and UK BAP priority habitats and species and those in the NPBAP, including: • riparian corridors, loch shores and flood plains. • ancient woodlands, long established semi-natural woodlands and hedgerows. • blanket bog and raised bog. • legally protected species and designated sites. • marine habitats. Develop Local Plan policies, supplementary planning guidance or design guidance to promote: • using sustainability check-lists. • incorporating wildlife features in development design. • using native species in landscaping schemes and management plans. • preventing use of invasive species in landscaping schemes.	2008	2009	Yes. NPA.

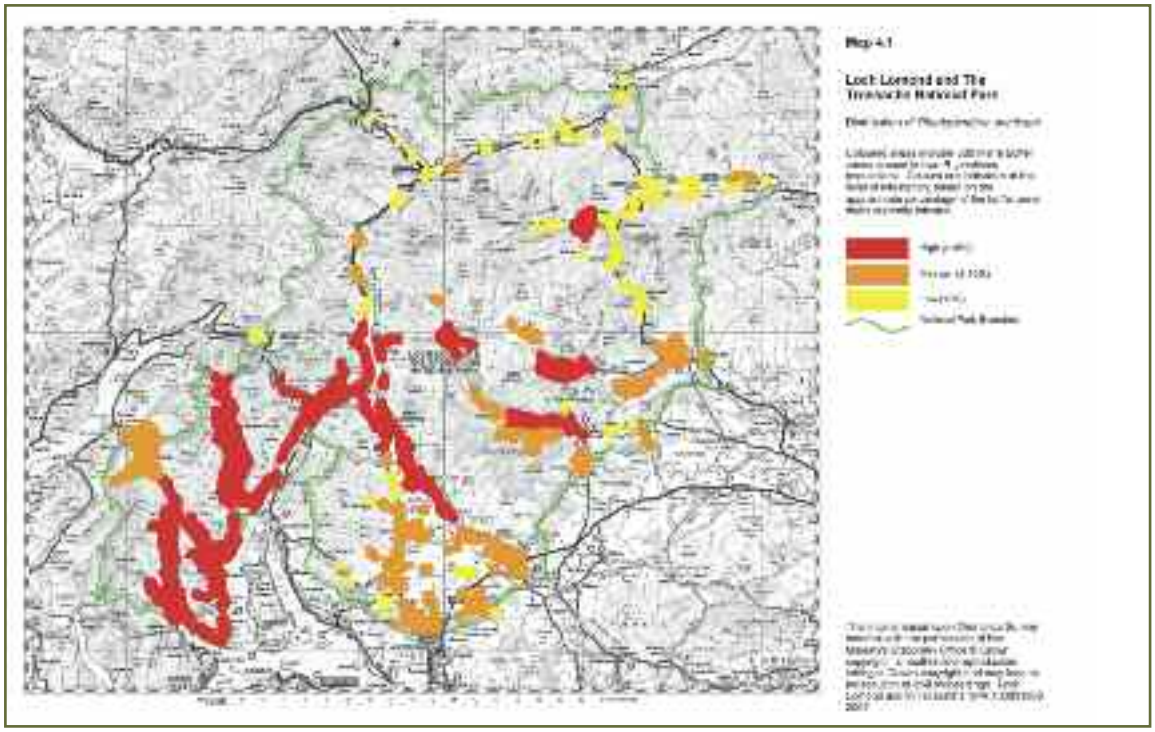
Project Ref. No.	Project Title	Key outputs and outcomes	Start & End Dates in three-year plan		Resources in place? Who?
SBD 4	National Park Biodiversity Action Plan	Lead on the production of the NPBAP and facilitate and coordinate its delivery, monitoring and reporting.	2008	2011	Yes. NPA.
SBD 5	Recreation management	• Implement the Loch Lomond Byelaws regulating recreation and navigation. • Review Byelaw performance and undertake research into issues for 2010 review. • Review the Byelaws in 2010. • Manage existing access sites and infrastructure and develop new paths in ways that safeguard and enhance biodiversity. • Promote responsible behaviour in the natural environment through the Scottish Outdoor Access Code. • Implement Inchcailloch Visitor Management Plan.	2008	2011	Yes. NPA.
SBD 6 see also CC 3	National Park Local Woodland and Forestry Framework	Develop revised Local Woodland and Forestry Framework by 2009 and implement it to promote: • Expansion in extent and quality of native woodlands. • Improved functional connectivity between woodland patches. • Improved age structure design and species composition of timber-producing woodlands to maximise their biodiversity value. • Restoration of missing and under-represented woodland types such as sub-montane scrub, wet woodlands and wood pasture.	2008	2011	Yes. NPA.
SBD 7 #	Environmental Management Strategy (EMS)	Implement the existing EMS to ensure the authority manages its own property and operations with due attention to biodiversity and other environmental considerations, with SEPA as facilities managers for Carrochan. Review the EMS. Review management of Park Authority properties for biodiversity benefits.	2008	2011	Yes. NPA, SEPA.
SBD 8 #	Ranger Service wildlife management, survey and monitoring programme	Continue the survey and monitoring programme to: • Help implement the NPBAP. • Contribute to Park Authority property management. • Contribute to national recording schemes. • Help safeguard protected species from recreational disturbance and persecution through Police partnerships, such as Operation Ironworks.	2008	2011	Yes. NPA.

Project Ref. No.	Project Title	Key outputs and outcomes	Start & End Dates in three-year plan		Resources in place? Who?
SBD 9 #	Events programme	Incorporate events with a biodiversity theme in annual events programme.	2008	2011	Yes. NPA.
SBD 10 #	Volunteer development programme	Promote biodiversity as a specific opportunity for volunteer involvement. Work with partners to engage people in biodiversity and give them an opportunity to contribute to the outcomes. Continue existing work such as red and grey squirrel and black grouse surveys where land managers, community groups and other volunteers already participate.	2008	2011	Yes. NPA.
SBD 11 #	Natural Heritage Grant Scheme	Fund biodiversity projects.	2008	2010	Yes. NPA.
SBD 12 #	Community Futures	Make an inventory of environmental projects in completed Community Action Plans 2008-2011 to target thinking and resources and identify potential collaborative projects. Offer biodiversity presentations to community area networks. Assist communities wishing to undertake projects with biodiversity aspects.	2008	2011	Yes. NPA.
SBD 13 #	Sustainable Tourism Charter	Implement sustainable tourism charter document "*A Framework and Action Plan for Sustainable Tourism*".	2008	2011	Yes. NPA.
SBD 14 #	Learning development framework	Expand 'learning outside the classroom' projects beyond existing Eco-Schools and Grounds for Learning work into the wider National Park, using the Loch Lomond National Nature Reserve as a larger venue for learning. Target groups where barriers exist to participation through the John Muir Award scheme. Develop information packs and other educational resources covering biodiversity.	2008	2011	Yes. NPA.
SBD 15 #	Communications and marketing plan	Identify and promote key biodiversity messages to build up relationship with large national organisations and raise National Park awareness.	2008	2011	Yes. NPA.
SBD 16	Land management framework	Develop a Land Management Framework to provide a vision for the future of land management in the National Park and a guide to the allocation of resources to support land managers in achieving National Park and wider rural development objectives. This will build on the Local Woodland & Forestry Framework, the Land Futures pilot, and the Natural Heritage Grant Scheme.	2009	2011	Yes. NPA.
Unfunded Proposals (see Achieving the vision, page 6)					
SBD 17	Biodiversity 'constraints' checking system	Comprehensive IT-based biodiversity constraints mapping available to Planning Officers, developers and the public, through the E-planning initiative, possibly in collaboration with Local Authorities.			
SBD 18	Expanded Natural Heritage Grants Scheme	Enlarge and extend the scope of the Natural Heritage Grant Scheme to complement the Scottish Rural Development Plan.			
SBD 19	National Park wildlife diary	Develop a web-based diary linked to ranger events and tourism businesses, to highlight an opportunity to view 'seasonal' wildlife for every week of the year. It will identify the best places and best wildlife to see in different seasons.			

5. BIODIVERSITY AUDIT PROGRAMME

Why it is important to know what we have?

Substantial information already exists about the biodiversity of the National Park and this was used when preparing the Habitats and Species Enhancement Programme (HSEP) in section 6 of this plan. At least 37 Priority species and 20 Priority habitats from the UK Biodiversity Action Plan occur in the Park. However, the data that exists is not comprehensive and a thorough biodiversity audit of the Park will improve the existing information base. It will also help to identify priorities and set targets for work in future reviews of the HSEP.



The National Park Biodiversity Audit will build on the audit of the Loch Lomond and The Trossachs Interim Committee area and information published in the State of The Park Report to:

- **Confirm and define which UK BAP and Scottish Biodiversity List habitats and species occur in the National Park.**
- **Provide information on: habitat extent, condition and distribution, species range, distribution and population size, and trends in relation to these.**
- **Help to identify habitats and species that are a priority for work in the National Park (for some UK and Scottish high priority habitats and species there may be little or no work required in the National Park).**
- **Provide a baseline for measuring changes.**
- **Estimate the proportion of the nationally determined targets for these habitats and species that should be delivered in the National Park.**

An early action is to collate and review existing records for three plant species, marsh clubmoss, Scottish dock and lesser butterfly orchid, that were shortlisted for possible work under the Habitats and Species Enhancement Programme. Information needs to be gathered to help determine what additional management action they may need.

The National Park Biodiversity List will:

- **Set out all of the habitats and species in the Park of importance for the conservation and enhancement of biodiversity in a handy check-list that summarises the legal and conservation status of each one, such as European protected species, listing in the Wildlife and Countryside Act schedules, inclusion on the Scottish Biodiversity List and UK BAP priority.**

TABLE 3. Biodiversity Audit Work Programme

# denotes a project whose timescales extend beyond this initial three-year plan.

Project Ref. No.	Project Title	Key outputs and outcomes	Start & End Dates in three-year plan		Resources in place? Who?
BA 1	Prioritised audit work	Collate and review existing records for marsh clubmoss, Scottish dock and lesser butterfly orchid.	2009	2009	Yes. NPA, BSBI, PLANT.
BA 2 #	Baseline Audit	Produce the biodiversity audit. This will include the following steps: • Collate existing habitat survey information for the National Park. • Resolve conflicts between overlapping data sets. • Identify which ones give the best available current information. • Identify gaps in survey coverage and estimate the habitats present from other sources such as Land Cover Scotland 1988 and aerial photographs. • Collate existing species survey information for the National Park. • Identify gaps in species survey information. • Produce best estimates and maps of habitat extent. • Produce best estimates and maps of species distribution.	2008	2009	Yes. SNH and NPA.
BA 3	Biodiversity list	Produce a summary check-list of the habitats and species in the audit, listing the legal and conservation status of each one.	2009	2010	Yes. NPA and SNH.
BA 4	Identification of ideal targets	Undertake discussions with national lead partners to estimate the Park's "fair share" of Scottish and UK BAP targets. Inventory work already underway for each habitat and species in the audit and which targets are already on track to be met. Develop achievable targets and timescales for selected habitats and species and highlight priorities for future reviews of the habitats and species enhancement programme.	2008	2011	To be confirmed. NPA and SNH.
Unfunded Proposals (see Achieving the vision, page 6)					
BA 5	Species survey and monitoring Network	Develop a forum of local ecologists including BSBI, SWT, BTCV and other local expert groups to help identify gaps in species survey coverage, ensure all local records are available and to promote co-ordinated recording work.			
BA 6	Biodiversity data management	Fully resourced biodiversity information management systems in place covering the National Park and adjacent local authorities, providing biodiversity data management, record verification, and analysis and information, and promoting active survey and recording work programmes.			

6. HABITATS AND SPECIES ENHANCEMENT PROGRAMME

The central focus of this Biodiversity Action Plan is the Habitats and Species Enhancement Programme (HSEP). The HSEP consists of a small number of three-year costed work programmes where the resources to implement individual projects have been allocated in the business plans of the relevant partner organisations. They also include a number of unfunded proposals which we would like to develop and implement as resources become available. This balance between ensuring that actions happen whilst striving to fund new projects will require active management to keep the necessary momentum in place. It is essential to recognise that there are many other habitats and species in the Park that need conservation effort but they don't all need park-wide programmes and resources dictate that not all of them can have the same level of attention.

Habitats and species selected for work programmes under the NPBAP

The major lesson from LBAPs produced in earlier years was that writing individual action plans for large numbers of species was counter-productive. Far too much of the available time was expended in writing and administration, the plans became too unwieldy to manage or review and the limited resources for implementation meant that the documents became overlooked or seen as wish-lists by key partners. With that background, it was determined from the outset that the NPBAP should generate relatively few work programmes and to strive to keep to actions that could be achieved within identifiable resources. As far as possible the focus is on habitats. Work programmes have only been produced for species where it is felt that there is an immediate need for work beyond management of the habitats they live in. These are mostly large, mobile species dependent on large areas or with complex management requirements. Species and habitats occurring only in SSSIs, SPAs and SACs have also been excluded from work programme production. Efforts to conserve them are driven by national programmes to bring designated sites into ecologically favourable condition and are dealt with separately outside of the National Park Plan and NPBAP.

The habitats and species selection process is not an attempt to identify the most important or valuable species in the National Park. Its main objective is to get from the very large number of habitats and species that occur in the Park down to a small, manageable number of prioritised work programmes as vehicles for targeted conservation work.

The starting point for the work programme selection process was a complete list of all of the habitats and species previously identified for conservation action in published plans covering the National Park. These included the existing local authority-based Local Biodiversity Action Plans for Argyll and Bute, Stirling and Tayside areas, SNH Species Action Framework, Local Woodland and Forestry Framework, Forest District Nature Conservation Strategy and RSPB Scotland priority bird list for the National Park. Many of these habitats and species were in existing plans because they are UKBAP Priorities but some were included because of local significance. The origin of the species and habitats is noted in Table 4.

This list was sifted using criteria agreed by the NPBAP working group to generate a shortlist. This was further considered to identify which work programmes should be produced. Habitats and species on the shortlist were dealt with in one of three ways.

- **Shortlisted habitats and species were grouped as far as possible into convenient broad habitats, for which habitat work programmes were produced.**
- **For species where actions are required beyond management of individual habitats, free-standing species work programmes were produced.**
- **Species where a knowledge gap was identified were either included in the Biodiversity Audit work programme for further collation and review of existing records or included in relevant habitat work programmes for field survey work.**

The full selection process used to identify the habitats and species included in the HSEP is set out in the NPBAP 2008–2011 Technical Report "Selection Process For Habitats and Species Work programmes", available on the National Park Authority website. A summary of the habitats and species shortlisted and notes on selected current actions for each one is included in Table 4.

TABLE 4. Habitats and Species shortlisted for the NPBAP

Habitats meeting sift criteria	Notes on origin	Main Location in NPBAP	Selected actions currently underway in National Park
Upland oakwood	UKBAP priority habitat	Woodlands and Forests work programme	East Loch Lomond project, The Great Trossachs Forest, FCS habitat network, Innishewan woods regeneration, new woodlands at Comer.
Upland mixed ash woods	UKBAP priority habitat	Woodlands and Forests work programme	East Loch Lomond project, The Great Trossachs Forest, FCS habitat network.
Upland birch woods	UKBAP priority habitat	Woodlands and Forests work programme	East Loch Lomond project, The Great Trossachs Forest, FCS habitat network, Innishewan woods regeneration, new woodlands at Comer and Auchtertyre.
Lowland mixed deciduous woodlands	UKBAP priority habitat	Woodlands and Forests work programme	
Wet woodlands	UKBAP priority habitat	Woodlands and Forests work programme	FCS habitat network, e.g. Duchray Corridor, Loch Lomond NNR management, golf course management plans on west Loch Lomond.
Wood pastures and parkland	UKBAP priority habitat	Woodlands and Forests and Built Environment work programmes	Restoration in Glen Finglas, management at west Loch Lomond golf courses.
Native pine woodlands	UKBAP priority habitat	Woodlands and Forests work programme	SSSI woodland regeneration at Cononish and Glenfalloch, new pine woods at Tyndrum Community Woodland, Auchessan, Kirkton and in restructured State forests.
Juniper woodlands	National Park Local Woodland & Forestry Framework	Woodlands and Forests work programme	Site safeguard in Loch Lubnaig Marshes SSSI.
Hedgerows	UKBAP priority habitat	Farmland work programme	Hedgerow restoration and planting in grant schemes and at development sites.
Field boundaries and treelines	Stirling LBAP Boundary features plan, Tayside LBAP hedgerows and tree lines plan	Farmland work programme	Dyke restoration work at several sites.
Lowland meadows	UKBAP priority habitat	Farmland work programme	
Lowland dry acid grassland	UKBAP priority habitat	Farmland work programme	
Upland hay meadows	UKBAP priority habitat	Farmland work programme	
Lowland & upland calcareous grasslands	UKBAP priority habitat	Farmland work programme	
Upland heathland	UKBAP priority habitat	Moorland and Mountains work programme	

Habitats meeting sift criteria	Notes on origin	Main Location in NPBAP	Selected actions currently underway in National Park
Blanket bog	UKBAP priority habitat	Moorland and Mountains work programme	Grip blocking at Ben Lomond.
Montane heaths and willow scrub	UKBAP priority habitat	Moorland and Mountains work programme	Restructuring of State forests to improve transitions on upper margins.
Upland flushes, fens and swamp	UKBAP priority habitat	Moorland and Mountains work programme	Grip blocking at Invertrossachs.
Inland rock outcrops and scree	UKBAP priority habitat	Moorland and Mountains work programme	
Farmland	Stirling LBAP Farmland Plan	Farmland work programme	Agri-environment support schemes from Loch Lomond ESA to the present day. Good farm management practice.
Wet grassland	Stirling LBAP and Tayside LBAP	Farmland work programme	
Rivers	UKBAP priority habitat	Lochs Rivers and Ponds work programme	Agri-environment measures on Dochart, Teith and Endrick systems. Control of invasive weeds on the Endrick catchment.
Oligotrophic and dystrophic lakes	UKBAP priority habitat	Lochs Rivers and Ponds work programme	Sewerage improvements, e.g. new mains connections near Arden.
Mesotrophic lakes	UK BAP priority habitat	Lochs Rivers and Ponds work programme	SSSI site safeguard at Lake of Menteith.
Standing open waters	Argyll & Bute, Stirling and Tayside LBAPs	Lochs Rivers and Ponds work programme	Sewerage improvements by Scottish Water, e.g. new mains connections near Arden, woodland pond creation by FCS.
Built and developed environment	Stirling LBAP and Tayside LBAP	Built Environment work programme	Development control management plans at Cameron House, the Carrick and Loch Lomond golf complexes, Ardgartan Hotel, Stronvar, etc.
Greenspace	Stirling LBAP and Tayside LBAP	Built Environment work programme	Community wildlife sites in some places.
Transport corridors	Stirling LBAP and Tayside LBAP	Built Environment work programme	Some control of Japanese knotweed along trunk roads and railway lines.

Species meeting sift criteria	Notes on origin	Main Location in NPBAP	Selected actions currently underway in National Park
Brown long-eared bat *Plecotus auritus*	UK BAP priority species	Farmland, Woodlands and Forests and Built Environment work programmes	Development control procedures, preserving roosts in building restoration projects.
Brown hare *Lepus europaeus*	UK BAP priority species	Farmland work programme	
Mountain hare *Lepus timidus*	UK BAP priority species	Moorland and Mountains work programme	
Otter *Lutra lutra*	UK BAP priority speciest	Lochs, Rivers and Ponds, Coastal and Marine and Built Environment work programmes	Development control procedures, surveys by Ranger Service and by SNH for SACs, Glasgow University research work.
Red squirrel *Sciurus vulgaris*	UK BAP priority species	Red squirrel work programme	NPA red squirrel project.
Soprano pipistrelle bat *Pipistrellus pygmaeus*	UK BAP priority species	Farmland, Woodlands and Forests and Built Environment work programmes	Development control procedures. Ranger Service bat box work.
Water vole *Arvicola terrestris*	UK BAP priority species	Water vole work programme	Surveys by NPA and FCS Ranger Services, survey under Tay Western Catchment Project, possible reintroduction project.
Wildcat *Felis silvestris*	UK BAP priority species	SNH national survey to confirm presence in the Park	SNH National survey.
Barn owl *Tyto alba*	Stirling LBAP	Woodlands and Forests Farmland and Built Environment work programmes	Nest box work by FCS and Mike Steward.
Black grouse *Tetrao tetrix*	UK BAP priority species	Black grouse work programme	NPA black grouse project and FCS management plans.
Bullfinch *Pyrrhula pyrrhula*	UKBAP priority species	Woodlands and Forests work programme	
Capercaillie *Tetrao urogallus*	UKBAP priority species	Capercaillie work programme	Capercaillie LIFE project and FCS management plans.
Curlew *Numenius arquata*	UK BAP priority species	Farmland work programme	
Golden eagle *Aquila chrysaetos*	Argyll & Bute LBAP, Stirling LBAP	Moorland and Mountains work programme	Eagle watch Balquhidder, forest design planning, raptor study group monitoring.
Grey partridge *Perdix perdix*	UKBAP priority species	Farmland work programme	
Lapwing *Vanellus vanellus*	UK BAP priority species	Farmland work programme	
Linnet *Carduelis cannabina*	UKBAP priority species	Farmland work programme	
Nightjar *Caprimulgus europaeus*	UKBAP priority species	Woodlands and Forests work programme	
Reed bunting *Emberiza schoeniclus*	UKBAP priority species	Farmland work programme	

Species meeting sift criteria	Notes on origin	Main Location in NPBAP	Selected actions currently underway in National Park
Skylark *Alauda arvensis*	UKBAP priority species	Farmland work programme	
Song thrush *Turdus philomelus*	UKBAP priority species	Woodlands and Forests and Built Environment work programmes	
Swift *Apus apus*	Stirling LBAP and Tayside LBAP	Built Environment work programme	
Tree sparrow *Passer montanus*	UK BAP priority species	Farmland work programme	
Yellowhammer *Emberiza citrinella*	UK BAP priority species	Farmland work programme	
Great crested newt *Triturus cristatus*	UK BAP priority species	Lochs, Rivers and Ponds work programme	
Atlantic salmon *Salmo salar*	UK BAP priority species	Lochs, Rivers and Ponds work programme	Existing survey programmes, fishery management plans in preparation by LLFT, AFT, TLC and FDSFB. Site safeguard in river SACs. Protection from adverse impacts in hydro scheme proposals.
Arctic charr *Salvelinus alpinus*	UK BAP priority species	Lochs, Rivers and Ponds work programme	Research by Glasgow University, survey in Loch Eck by SNH.
Brown/Sea trout *Salmo trutta*	UK BAP priority species	Lochs, Rivers and Ponds work programme	Existing survey programmes, fishery management plans in preparation by LLFT, AFT, TLC and FDSFB. Protection from adverse impacts in hydro scheme proposals.
Powan *Coregonus lavaretus*	UK BAP priority species, Park holds only Scottish populations	Powan and Lamprey work programme	SNH and University of Glasgow research projects.
River lamprey and Lomond sub-species of river lamprey *Lampetra fluviatilis*	UK BAP priority species, Park holds only population of a unique sub-species	Lochs, Rivers and Ponds and Powan and Lamprey and work programmes	Site condition monitoring, University of Glasgow research projects. Site safeguard in river SACs.
Sea lamprey *Petromyzon marinus*	UK BAP priority species	Lochs, Rivers and Ponds work programme	Site safeguard in river SACs.
Pearl-bordered fritillary *Boloria euphrosyne*	UK BAP priority species	Woodlands and Forests work programme	Ranger Service surveys.
Mountain ringlet butterfly *Erebia epiphron*	UK BAP priority species	Moorland and Mountains work programme	Ranger Service surveys.
Freshwater pearl mussel *Margaritifera margaritifera*	UK BAP priority species	Freshwater pearl mussel work programme	SNH survey project.
Juniper *Juniperus communis*	UK BAP priority species	Woodlands and Forests work programme	Site safeguard in Loch Lubnaig Marshes SSSI.
Lesser butterfly orchid *Platanthera bifolia*	UK BAP priority species	Biodiversity Audit work programme	Recent national survey work.
Scottish dock *Rumex aquaticus*	UK BAP priority species, Park holds only UK population	Biodiversity Audit work programme	Loch Lomond NNR management, site safeguard at SSSIs.
Marsh club moss *Lycopodiella inundata*	UK BAP priority species	Biodiversity Audit work programme	RBGE assessment of some colonies.

Habitat Work programmes are listed in Table 5. Species work programmes are listed in Table 6. The detailed habitat and species work programmes are set out in Sections 7 and 8 of the NPBAP.

TABLE 5. Habitat Work Programmes 2008–2011

Habitat Work Programme
Lochs, Rivers and Ponds
Coastal and Marine
Farmland
Woodlands and Forests
Moorland and Mountains
Built Environment

TABLE 6. Species Work Programmes 2008–2011

Note: P = on UK BAP Priority List

Red squirrel *Sciurus vulgaris*	P
Water vole *Arvicola terrestris*	P
Black grouse *Tetrao tetrix*	P
Capercaillie *Tetrao urogallus*	P
Powan *Coregonus lavaretus* and the Loch Lomond sub-species of river lamprey *Lampetra fluviatilis*	P
Freshwater pearl mussel *Margaritifera margaritifera*	P

7. HABITAT PROGRAMMES

Lochs, Rivers and Ponds Programme

Factors limiting biodiversity of lochs, rivers and ponds

- Nutrient enrichment attributed to various sources including wastewater effluent, agricultural run-off, forestry, urban drainage and atmospheric deposition
- Spread of invasive species
- Climate change
- Limited information on species distribution and abundance

This work programme will benefit the following shortlisted habitats and species:

Habitats	Species	
Rivers	Otter	River lamprey
Oligotrophic and dystrophic lakes	Water vole	Sea lamprey
Mesotrophic lakes	Atlantic salmon	Great-crested newt
Standing open waters	Brown/sea trout	Freshwater pearl mussel
	Arctic charr	Scottish dock
	Powan	

TABLE 7. Lochs, Rivers and Ponds Work Programme

# denotes a project whose timescales extend beyond this initial three-year plan.

Project Ref. No.	Project Title	Key outputs and outcomes	Start & End Dates in three-year plan		Resources in place? Who?
LRP 1#	Ecological monitoring and research of aquatic taxa	Monitoring of phosphorus, nitrogen, macrophytes, macroinvertebrates, zooplankton, phytoplankton, diatoms, chlorophyll.	2008	2011	Yes. SEPA, University of Glasgow.
LRP 2 #	Control of point-source pollution and input of nutrients to Loch Lomond	Phosphate-free 'Do a Little, Save the Loch' campaign. Boat users' best practice campaign. Loch boating surveys and boat registration scheme. Surveys of nutrient inputs at informal sites. Evaluation of water quality at current and future recreational levels.	2008	2011	Yes. SEPA, NPA.
LRP 3	River Basin Management Planning	Produce four River Catchment Management Plans by 2009. Convene two meetings a year of the Loch Lomond Catchment Management Plan Working Group.	2008	2011	Yes in part. SEPA, NPA, SNH, Scottish Water.
LRP 4	Sympathetic recreation on Loch Lomond	Develop and implement research programme to gather information for the 2010 Byelaws Review.	2008	2010	Yes in part. NPA, SEPA.

Project Ref. No.	Project Title	Key outputs and outcomes	Start & End Dates in three-year plan		Resources in place? Who?
LRP 5 #	Control acidification of surface waters	Complete conversion of plantations along the Duchray corridor to native broadleaved woodland.	2008	2011	Yes. FCS.
LRP 6	Fishery management plans	Production of fishery management plans for all four river catchments in the National Park.	2008	2010	Yes. Fishery Trusts, Fishery Boards, Association of Fishery Trusts.
LRP 7	Fish and habitat surveys	Baseline survey for all fish species and for 17 rivers (13 within the National Park) in south Argyll and Management recommendations for restoring fish populations. Fish and habitat surveys round the Lomond Catchment.	2008	2010	Yes. SNH, Argyll Fisheries Trust, Scottish & Southern Energy Loch Lomond Fishery Trust, NPA.
LRP 8	Conservation of native species	Loch Lomond submerged plant community mapping survey undertaken. Great crested newt survey completed.	2008	2011	Yes in part. NPA.
LRP 9	Monitor climate change in freshwater	Loch Lomond macroinvertebrates and macrophytes study completed. Environment Change Network (ECN) monitoring buoy operated.	2008	2011	Yes. University of Glasgow.

Project Summaries

LRP 1 Ecological monitoring and research

Lead Partner: SEPA, University of Glasgow
Other Stakeholders: University of Glasgow, Loch Lomond and Trossachs Research Group, NPA, Landowners

This project comprises monitoring Loch Lomond, its main inflows and the River Leven. These are regularly monitored by SEPA and the results are summarised by classification. For example, in 2005 both the north and south basins of Loch Lomond were assessed as class 1 ('excellent/good') based on a comparison of measured and reference phosphorus concentrations. New Water Framework Directive monitoring and classification schemes have recently been introduced. The first classification results will be published in 2009.

Rivers and lochs are classified annually using a combination of chemical, physical and ecological elements. Ecological monitoring may include surveys of macroinvertebrates, macrophytes, diatoms and fish. In Loch Lomond, phytoplankton, zooplankton and chlorophyll are also measured. An Environmental Change Network monitoring buoy operated by SCENE is also in place.

Key chemical determinants measured include nitrogen and phosphorus. The physical characteristics of the loch shore and river channels are also surveyed.

LRP 2 Control of point-source input of nutrients to Loch Lomond

Lead Partner: SEPA, NPA
Other Stakeholders: SNH, Scottish Water

Control of nutrient input is necessary to prevent the development of algal blooms and the associated damage to water quality, ecology and the value of the resource. Point sources, such as those from sewage treatment works, contribute a significant proportion of nutrient inputs into many water bodies, eg estimated at slightly over 40% of the total phosphorus loading to Loch Lomond. Phosphorus is the major problematic nutrient. Detergents account for a large percentage of the phosphorus found in discharges from sewage treatment works but is expensive and energyintensive to treat. Its removal at source by minimising phosphate inputs into the sewerage system is considered the best environmental and economical option.

This project will address the problem of phosphorous input and other nutrients to Loch Lomond by:

- **Encouraging residents, visitors and holiday accommodation developments to use phosphorus-free detergents.**
- **Raising awareness of key issues amongst boat users and relevant authorities, e.g. alternative sewage disposal, fuel spillage.**
- **Monitoring water-based recreation on the loch.**
- **Undertaking one-off surveys of water quality at intensively used informal recreational sites such as popular moorings at the Loch Lomond islands, if resources can be identified.**
- **Evaluating the water quality issues associated with current and predicted future levels of use.**

LRP 3 River Basin Management Plan (Scotland)

Lead Partner: SEPA,
Other Stakeholders: NPA, SNH, Scottish Water

This project will take forward the development and implementation of catchment management plans covering the National Park.

Area management plans will be produced for the Clyde, Forth, Tay and Argyll catchments that between them cover the whole of the National Park. These plans will identify specific actions required to ensure all water bodies meet good ecological status. The plans will be produced by 2009 and implementation of actions in them will follow thereafter.

The Loch Lomond Catchment Management Plan will continue to operate in the meantime, taking forward a range of actions on ecological, quality and recreation management.

LRP 4 Sympathetic recreation on Loch Lomond

Lead Partner: NPA
Other stakeholders: SNH, SEPA

The number of craft using Loch Lomond has increased in recent years, giving rise to concerns about possible effects on water quality. Particular areas of concern include fuel and exhaust emissions from powered craft, disposal of chemical toilet contents and effects on the loch bed and plant communities from intensive use of particular areas of shallow water such as bays used regularly as informal anchorages. Bacteriological quality is monitored by SEPA at Luss (a designated Bathing Water) and at Milarrochy Bay and other points along the loch shore, and both bathing waters have so far complied with the Bathing Water Directive's mandatory standards but less accessible areas such as bays used for mooring and camping on the islands have not been surveyed.

This project will develop and implement additional surveys and monitoring protocols to investigate if these issues are generating any genuine impacts on the quality of Loch Lomond. This information will be used to inform the next scheduled review of the Registration and Navigation Byelaws.

LRP 5 Control acidification of surface waters

Lead Partner: FCS
Other stakeholders: SNH, SEPA

For approximately 10% of the area of Scotland the deposition of acids is believed to exceed the threshold at which damage occurs to the freshwater biota (SEPA, 1996). Acidification is exacerbated by mature coniferous forest, which is a more efficient collector of acid deposition than open moorland. It is a problem in some watercourses draining in to the upper catchment of the River Forth on the eastern flanks of Ben Lomond where salmonid populations have been locally extinguished. The Duchray Water and the Water of Chon are two locations that have suffered particularly.

This project comprises the completion of a programme of work to convert the original conifer plantations along the Duchray into native broadleaved woodland amounting to some 800 ha in size.

LRP 6 Fishery management plans

Lead Partner: Fishery Trusts and Fishery Boards
Other stakeholders: Angling clubs, SNH, SEPA

This project covers the production of fishery management plans for all the river catchments in the National Park. The Argyll Fishery Trust, Loch Lomond Fishery Trust, Tay Liaison Committee and the Forth District Salmon Fishery Board will each produce fishery management plans for all their river systems covering all the main rivers and lochs in the National Park. This is being funded by Scottish Government through the Association of Fishery Trusts.

LRP 7 Fish and habitat surveys

Lead Partners: Argyll Fisheries Trust, Loch Lomond Fishery Trust
Other stakeholders: SNH, Goil Angling Club, Eachaig DSFB, LLAIA, VOLDAC, NPA

This project will establish baseline information on the distribution and abundance of freshwater fish.

- In South Argyll, 17 river systems (13 within the Park) will be surveyed. In addition there will be baseline surveys of freshwater habitats where none currently exist. The information will be used to inform management of freshwater resources in the region.
- The Loch Lomond Fishery Trust will complete the development and then implement a programme of fish and habitat surveys and monitoring round the Lomond catchment, with equipment including a smolt trap part funded by the Park Authority.

LRP 8 Conservation of native species

Lead Partner: NPA
Other stakeholders: SNH, SEPA, BSBI

This project gathers together items of work to improve conservation management of groups of native species.

- Undertake a survey to map the locations of macrophyte vegetation in Loch Lomond, if funds can be obtained. Many of these plant species are rare or scarce nationally. This work will be of use for development control and the review of the loch's Registration and Navigation Byelaws.
- The Park Authority will check for recent records of great-crested newts in the National Park and survey historically recorded sites if required.

LRP 9 Monitor climate change in freshwater

Lead Partner: University of Glasgow (SCENE)
Other stakeholders: SEPA

Loch Lomond is an Environmental Change Network (ECN) site monitored to track large-scale environmental changes across Europe. This project comprises work undertaken in the loch for ECN purposes.

- ECN and University of Glasgow 'Review of Change' of macroinvertebrates and macrophytes of Loch Lomond
- Operation of ECN monitoring buoy by University of Glasgow.

Coastal and Marine Programme

Factors limiting the biodiversity of the coastal and marine environment

- Poor sewerage infrastructure at some coastal settlements
- Pollution from oil spills
- High levels of fishing
- Marine litter, especially plastic fragments

This work programme will benefit the following shortlisted habitats and species:

Habitats	Species
	Otter

TABLE 8. Coastal and Marine Work Programme

# denotes a project whose timescales extend beyond this initial three-year plan.

Project Ref. No.	Project Title	Key outputs and outcomes	Start & End Dates in three-year plan		Resources in place? Who?
CE 1 #	Coastal litter management	Adopt-a-Beach scheme expanded to cover four schools and four beaches. Bag it and Bin it Campaign promoted.	2008	2011	Yes in part. NPA, MCS, GRAB Trust, Scottish Water.
CE 2	Sea search survey	Review existing survey coverage and plan a programme of further surveys.	2009	2010	To be confirmed. NPA, MCS.
CE 3	Marine biodiversity leaflet	Produce and publish leaflet.	2009	2009	To be confirmed. SNH, NPA.
CE 4	Marine awareness event	Biannual marine conservation awareness events and annual coastal rock pool programme.	2009	2009	Yes. NPA, GRAB Trust.
Unfunded Proposals (see Achieving the vision, page 6)					
CE 5	Whale, dolphin and porpoise recording	Whale, dolphin and porpoise recording scheme established to properly document the regular sightings of these animals in the sea lochs and upper Clyde.			
CE 6	Cool Seas education programme	Marine Conservation Society "Cool Seas" education programme expanded to cover all schools in the National Park.			
CE 7	WeBs surveys	Develop programme of WeBs counts to survey wading birds on mudflats at the Holy Loch and Arrochar.			

Project Summaries

CE 1 Coastal litter management

Lead Partner: NPA
Other stakeholders: GRAB Trust, Schools

Expand the Adopt-a-Beach scheme in conjunction with the GRAB Trust and local schools, to undertake beach litter picks and raise awareness of the impacts of plastic litter on marine wildlife. This currently operates at Ardentinny and the aim is to expand it to cover Strachur, Arrochar and Lochgoilhead if staff resources can be identified.

The 'Bag it And Bin It' campaign promoted by Scottish Water is aimed at reducing the amount of domestic rubbish flushed down toilets, which often escapes through sewage treatment systems to become marine litter.

CE 2 Sea search survey

Lead Partner: NPA, MCS
Other stakeholders: SNH

Review existing JNCC sea lochs survey reports for the National Park sea lochs and evaluate the need for any new or repeat sea search surveys in the Park by volunteers from local sub-aqua clubs.

CE 3 Marine biodiversity leaflet

Lead Partner: NPA, SNH
Other stakeholders:

Produce a leaflet on the biodiversity of the National Park's coastline and the adjacent sea lochs which form the marine gateway into the Park.

CE 4 Marine awareness programme

Lead Partner: NPA, GRAB Trust
Other stakeholders:

The Park Authority and GRAB Trust previously held a marine conservation awareness event. A further event will be held in 2009.

A programme of school educational visits to coastal rock pools will also be held annually, with five to 10 events a year, making use of existing materials including the Argyll & Bute 'Sea and Learn Education Pack'.

Farmland Programme

Factors limiting the biodiversity of lowland and in-bye farmland

Intensification of grassland management through ploughing, spreading lime and fertiliser
Drainage
Incorrect grazing regimes – over and under grazing
Earlier cutting of grass for silage rather than hay, partly due to wetter summers
Increased predation on improved farmland
Lack of rush management
Inappropriate shelter belt planting
Lack of hedgerow management or frequent and intensive hedgerow cutting
Winter cropping reducing stubble cover over winter and giving increased sward height by early summer

This work programme will benefit the following shortlisted habitats and species:

Habitats	Species
Wet grassland	Brown hare
Lowland meadows	Brown long-eared bat
Lowland dry acid grassland	Soprano pipistrelle bat
Upland hay meadows	Barn owl
Lowland calcareous grassland	Curlew
Hedgerows	Grey partridge
Field boundaries and treelines	Lapwing
Farmland	Linnet
	Redshank
	Reed bunting
	Skylark
	Snipe
	Tree sparrow
	Yellowhammer
	Lesser butterfly orchid

TABLE 9. Farmland Work Programme

# denotes a project whose timescales extend beyond this initial three-year plan.

Project Ref. No.	Project Title	Key outputs and outcomes	Start & End Dates in three-year plan		Resources in place? Who?
F 1	Glen Dochart wet grassland project	Breeding waders surveys carried out on all participating land holdings, management plans written for each and funding for implementation pursued. Surveys will be repeated in 2011.	2009	2011	Yes in part. RSPB, NPA, SGRPID.
F 2	Hedgerows and boundary features mapping and evaluation	Map extent of hedgerows, dykes and other boundary features in the National Park. Evaluate condition and distribution; identify opportunities and priority locations to promote for improved management and restoration.	2008	2011	Yes in part. NPA, SNH.
F 3 #	Priority grassland habitats mapping and evaluation	Undertake survey and assessment of priority grasslands to determine condition and potential areas for restoration. Identify interested land owners and provide management and funding advice for the highest priority sites.	2009	2011	Yes in part. NPA, SNH.
Unfunded Proposals (see Achieving the vision, page 6)					
F 4	Park-wide wet grasslands project	• Build on F 1 to have wet grassland projects in place on the floors of all the major straths to benefit farmland waders and riparian habitats and act as flood storage areas. • Removal of strath floor plantation blocks that disrupt key wader sites.			

Project Summaries

F 1 Glen Dochart wet grassland project

Lead Partner: RSPB
Other Partners: NPA, SGRPID, Land Managers, FWAG, SAC

The vision for this project is to create a landscape-scale wet grassland system in the floodplain of Glen Dochart. Historically this was one of the main areas in the National Park to hold high densities of breeding waders such as lapwing, redshank, curlew and snipe. However, for many reasons, as listed above, their numbers have declined dramatically. This project depends on finding support amongst land managers and working with them to improve the glen for waders by making changes to current land management techniques, for example putting in water control measures, removal of scrub and inappropriate woodland planting. These suggestions would form part of a costed farm plan of works and assistance would be offered with seeking funding to do the recommended work.

F 2 Hedgerows and boundary features mapping and evaluation

Lead Partner: NPA
Other Partners: Land Managers, SNH

This project will map and evaluate all of the hedgerows, dykes and other boundary features in the National Park using aerial photography and existing habitat surveys. It will identify where hedgerows could be planted and better managed for biodiversity and where other boundary features need to be restored. It will make use of survey information collated for the National Park Biodiversity Audit and will form one strand of the habitat connectivity work needed for the National Park Integrated Habitat Network model.

Further work may follow on from this project, including field surveys where data are limited and advice or events for land managers to promote greater interest in management of these features.

F 3 Priority grassland habitats mapping and evaluation

Lead Partner: NPA
Other Partners: Land Managers, SNH

The priority grassland habitats are wet grassland, lowland and upland meadows, lowland dry acid grassland and lowland calcareous grassland. Their location in the park will be identified and mapped as a part of the NP Biodiversity Audit. Funds will be sought for further work to assess the quality of the mapped areas and prioritise them for conservation action. Potential restoration areas for each habitat will be identified where appropriate and the highest priority sites will have management recommendations sent to the land managers.

Woodland and Forest Programme

Factors limiting the biodiversity of forest and woodland habitats

- Limited extent and fragmented nature of native woodland habitat
- Lack of structural diversity and deadwood
- Limited natural regeneration of some woodlands
- Poor management of woodland grazing
- Climate change
- Spread of invasive species

This work programme will benefit the following shortlisted habitats and species:

Habitats	Species
Native pine woodlands	Brown long-eared bat
Upland oak wood	Soprano pipistrelle bat
Upland mixed ash woods	Red squirrel
Upland birch woods	Scottish wildcat
Lowland mixed deciduous woodlands	Barn owl
Wood pastures	Black grouse
Juniper woodlands	Bullfinch
Wet woodland	Capercaillie
	Nightjar
	Song thrush
	Pearl-bordered fritillary
	Juniper

TABLE 10. Woodland and Forest Work Programme

# denotes a project whose timescales extend beyond this initial three-year plan.

Project Ref. No.	Project Title	Key outputs and outcomes	Start & End Dates in three-year plan		Resources in place? Who?
WF 1#	The Great Trossachs Forest	Create approx 4,400 ha of new native woodland over three land holdings through a combination of planting and natural regeneration. Halt the spread of Rhododendron in Loch Katrine catchment and Glen Finglas. Increase numbers of black grouse by 10%.	2008	2011	Yes. FCS, RSPB, WTS.
WF 2	National Park PAWS survey	Assessment of the ecological potential for restoration of all 4,367 ha of PAWS sites in the national forest estate in the Park.	2007	2011	Yes. FCS.
WF 3 #	PAWS restoration project	Develop programme and implement targets for restoration of national forest estate ancient woodland in the Park.	2007	2011	Yes. FCS.
WF 4 #	East Loch Lomond native woodland conversion	Continue to expand area of native woodland on East Loch Lomond, by 30 ha in this plan period.	2008	2011	Yes. FCS.
WF 5	Forest Habitat Network model	Produce Forest Habitat Network model for the National Park.	2008	2009	Yes. NPA, FCS, SNH.
WF 6	National Park Local Woodland and Forestry Framework	Produce a revised, agreed National Park Local Woodland and Forestry Framework.	2009	2011	Yes. NPA, FCS, SNH.
WF 7 #	Pearl-bordered fritillary survey	Undertake butterfly survey and mapping programme at 12 sites for this woodland edge species.	2008	2011	Yes. Butterfly Conservation, NPA, RSPB, volunteers.
WF 8 #	Owl nest box monitoring	Undertake annual nest box monitoring of approx 150 barn owl boxes and 300 tawny owl boxes in FCS woodlands in the Park.	2008	2011	FCS, volunteers.
Unfunded Proposals (see Achieving the vision, page 6)					
WF 8	Old fence removal	Develop a programme to remove redundant deer fences where they prevent graded transitions between habitat types or there is a risk of bird strikes.			
WF 9	Woodland grazing	New cattle or pig grazing schemes in pilot woodlands to improve the ecological quality and diversity of established native woodlands, to add to existing projects at The Great Trossachs Forest and the Hill Sheep and Native Woodland project at SAC Kirkton and Auchtertyre Farms.			

Project Summaries

WF 1 The Great Trossachs Forest

Lead Partner: FCS, WTS, RSPB
Other stakeholders: SNH, Scottish Water, NPA

This project will achieve landscape-scale creation of new native woodlands and improved woodland to moorland transitions in the Loch Katrine, Loch Arklet and Glen Finglas catchments. This will be achieved through sustainable deer management, careful use of livestock grazing, new planting and conversion of existing conifer plantations. Improvements in the FCS-managed Loch Katrine catchment will be secured in collaboration with the Woodland Trust Scotland property at Glen Finglas and the RSPB reserve at Garrison Farm and Inversnaid by Loch Arklet. Over 25 years this initiative will connect existing woodlands from East Loch Lomond to Strathyre, resulting in "The Great Trossachs Forest", the largest continuous area of native woodland in Scotland and significant benefits to a range of species and habitats.

WF 2 National Park PAWS survey

Lead Partner: FCS
Other stakeholders: NPA

There are approximately 4,637 ha of forestry plantations on ancient woodland sites (PAWS) on land owned by the Forestry Commission in the National Park. This project consists of assessment of all these PAWS sites for their ecological potential for restoration in line with current good practice. Along with a consideration of practical and economic factors, this will be the basis for drawing up a detailed programme for their restoration to native woodland.

WF 3 PAWS restoration project

Lead Partner: FCS
Other stakeholders: Landowners, NPA, SNH

A costed, prioritised Park-wide programme of PAWS restoration based on an assessment of ecological, practical and economic factors for each PAWS stand and a prioritisation of all stands across the Park on FCS land. In developing the programme, use will also be made of complementary studies such as forest habitat network modelling (see WF5 on page 36). FCS will undertake this work systematically on Forest District land. Private landowners will also be encouraged to include PAWS conversion in their forest plans when plantations are due for restructuring.

WF 4 East Loch Lomond native woodland conversion

Lead Partner: FCS
Other stakeholders: SNH, NTS, Royal Scottish Forestry Society

This project will continue the systematic restructuring of all the FCS plantations on east Loch Lomond to native woodland. FCS land totals approx 1,899 ha of which about half is tree covered. Much of that is plantation woodland which has been systematically felled since the 1990s and allowed to revert to native woodland with a more natural treeline. A further 30 ha are due to be felled in this plan period.

The native woodlands in this project are physically linked to The Great Trossachs Forest project area by native woodland management on the intervening private estate.

WF 5 National Park Forest Habitat Network model

Lead Partner: FCS, SNH, NPA
Other stakeholders: Landowners

This project involves the production of an Integrated Habitat Network (IHN) model for the National Park, incorporating a model for a woodland habitat network and other key habitats such as open ground and riparian zones. It will add to similar work recently undertaken for the Glasgow & Clyde Valley Structure Plan area which encompasses the southern end of the Park. It will be produced using the BEETLE methodology using selected species to model the functional connectivity of habitats. This will then be used to guide land-use planning including the Local Woodland and Forestry Framework (see WF6 below).

WF 6 National Park Local Woodland and Forestry Framework

Lead Partner: FCS, SNH, NPA
Other stakeholders: Landowners

The National Park Local Woodland and Forestry Framework is a strategic document that guides the management of woodland and forestry work across the Park. This project consists of a review of the existing framework document to take account of the new Scottish Forestry Strategy, climate change, the National Park Plan and other key national policy considerations.

WF 7 Pearl-bordered fritillary survey

Lead Partner: Butterfly Conservation
Other stakeholders: NPA, landowners, RSPB Volunteers

The pearl-bordered fritillary is a butterfly that lives on the margins of established broadleaved woodlands. It is a UKBAP priority species due to significant declines in its known populations. This project consists of a programme of surveys by volunteers, Park Authority staff, the RSPB at Inversnaid and other landowners to survey and map colonies at 12 sites with historical records of this species and identify colonies in likely locations. Knowledge of the presence of the butterflies will be used to inform future woodland management such as design of woodland edge and internal open space.

WF 8 Owl nest box survey

Lead Partner: FCS
Other stakeholders: Volunteers

FCS have approximately 150 barn owl nest boxes and 300 tawny owl boxes in woodlands across the Park. This project will continue the annual monitoring of these boxes.

Moorland and Mountains Programme

Factors limiting the biodiversity of moorland and mountains

- Historic losses to forestry plantations
- Abrupt transitions from forest zones
- Widespread and long-term grazing by sheep, especially winter grazing, and more recently in some places by deer at levels that promote loss of heather and herbs and expansion of rough grassland and bracken
- Abandonment of livestock gazing
- Bracken encroachment without management
- Nitrogen enrichment from atmospheric pollution
- Climate change

This work programme will benefit the following shortlisted habitats and species:

Habitats	Species
Upland heathland	Mountain hare
Blanket bog	Black grouse
Montane heaths and willow scrub	Golden eagle
Upland calcareous grassland	Mountain ringlet butterfly
Upland flushes, fens and swamp	Juniper
Inland rock outcrops and scree	Marsh clubmoss

TABLE II. Moorland and Mountains Work Programme

# denotes a project whose timescales extend beyond this initial three-year plan.

Project Ref. No.	Project Title	Key outputs and outcomes	Start & End Dates in three-year plan		Resources in place? Who?
MM 1 #	Sub-montane scrub restoration	Review six to eight FCS forest design plans a year and conservation body management plans to identify suitable locations for scrub restoration. Obtain best-practice advice from national group. Undertake planting on identified locations as a part of restocking programmes.	2008	2011	Yes in part. FCS, NPA, SAC.
MM 2 #	Effects of livestock grazing abandonment on breeding birds	Identify three suitable sites. Obtain resources for project. Undertake study on sites in the National Park as part of a national research project.	2009	2011	To be confirmed RSPB, SAC, SNH, NPA.
MM 3 #	Golden eagle viewing project	Establish a golden eagle viewing opportunity using a TV camera link to a nest site at Ardgartan, operate with partners and review annually.	2008	2011	Yes. FCS, NPA, Volunteers.
MM 4 #	Mountain ringlet butterfly survey	Undertake mountain ringlet survey programme over three years for eight sites.	2008	2011	Yes. Butterfly conservation, NPA, volunteers.
Unfunded Proposals (see Achieving the vision, page 6)					
MM 5	Blanket bog restoration	Assess the condition of all non-designated blanket bogs and evaluate their carbon storage capabilities. Promote management such as drain blocking and modification of grazing regimes where these are having an adverse effect on the peat.			

Project Summaries

MM 1 Sub-montane scrub restoration

Lead Partner: FCS
Other stakeholders: NPA, SAC

Sub-montane scrub plant communities with dwarf willows and juniper are largely absent in the National Park. This project will seek to restore areas of this habitat type by planting these species in locations where grazing and browsing pressure is low enough to let them re-establish. Suitable locations at the upper margins of fenced forestry plantations or on other land-holdings with low livestock and deer numbers will be identified and planted through FCS forest design planning and restructuring, the Natural Heritage Grant Scheme or volunteer projects as appropriate. Advice on best practice will be obtained from the national montane scrub action group, National Trust for Scotland Ben Lawers and Scottish Agricultural College Kirkton where pilot projects are already underway.

Future tasks could include automatic inclusion of a scrub element in new plantings and restock through a future revision of the RDC scheme and re-establishment of natural scrub treeline in an entire upland area, such as the Great Trossachs Forest Project area.

MM 2 Effects of livestock grazing abandonment on wading birds

Lead Partner: RSPB
Other stakeholders: SAC, NPA, SNH

Some species of birds particularly waders that nest on high moors and hill tops are believed to decline when dramatic reductions in grazing pressure produce more tussocky vegetation. Conversely, other bird species may benefit from the same changes. Sheep numbers in particular have undergone marked declines in many upland areas over the past 10 years or so, and there seems a real likelihood that large tracts of moorland and possibly in-bye may become devoid of sheep and cattle within the foreseeable future. Gaining an insight into the habitat changes resulting from the removal of livestock from moorlands is a priority for research, given the importance of the bird community that depends upon this habitat, along with the potentially rapid nature of livestock abandonment in the uplands. If suitable study sites and funding can be arranged, this project will include some sites in the National Park to see what effects such changes in land use are having here on the upland bird population.

MM 3 Golden eagle viewing project

Lead Partner: FCS
Other stakeholders: SNH, NPA, Volunteers

This project based at the FCS Visitor Centre at Ardgartan will promote the National Park as a place to visit and see golden eagles. Awareness of the needs of the species will be raised through face to face interpretation and displays, together with CCTV footage of golden eagles at the nest from a nearby location in the Arrochar Alps.

MM 4 Mountain ringlet butterfly surveys

Lead Partner: NPA
Other stakeholders: Butterfly Conservation

The mountain ringlet butterfly lives on high altitude plant communities but its distribution in the National Park is poorly known. It is also thought to be at risk from the effects of climate change on upland plant communities and the restricted breeding opportunities in increasingly wet and windy summer weather. This project will improve information about the location of the species by undertaking surveys at eight potential sites where the species has been previously recorded. The survey depends on careful planning and good luck to have skilled surveyors in likely locations when weather conditions are favourable for the adult butterflies to fly. The improved information may provide a basis for monitoring climate change impacts and assist with land management decision-making.

Built Environment Programme

Factors limiting the biodiversity of the built environment

- Unsympathetic management of green spaces such as uniform mowing regimes
- Use of invasive plants and wildlife-unfriendly planting schemes on new developments
- Accidental spread of invasive plants in construction projects
- Unsympathetic development design with little space for wildlife
- Fragmentation of habitat by roads
- Road kill mortality
- Competition with and predation by domestic pets

This work programme will benefit the following shortlisted habitats and species:

Habitats	Species
Built and developed environment	Brown long-eared bat
Greenspace	Soprano pipistrelle bat
Transport corridors	Otter
Wood pastures and parkland	Barn owl
	Swift
	Song thrush

TABLE 12. Built Environment Work Programme

Project Ref. No.	Project Title	Key outputs and outcomes	Start & End Dates in three-year plan		Resources in place? Who?
BE 1	Otter survey	Sightings and road kill records Investigation of road bridges and culverts at otter hotspots.	2008	2011	Yes. NPA, University of Glasgow.
BE 2	Barn owl nest boxes	20 barn owl boxes, 10 on buildings.	2008	2010	Yes. Mike Steward, NPA.
BE 3	Bat boxes	Develop bat box project.	2008	2011	To be confirmed. NPA.
BE 4	Open space audit	Final audit complete.	2008	2008	Yes. NPA.
BE 5	Design guidance	Suite of design guidance produced.	2008	2009	Yes. NPA.
BE 6	Development contributions	Establish a system for seeking biodiversity contributions from developers of relevant significant developments.	2008	2009	Yes. NPA.
Unfunded Proposals (see Achieving the vision, page 6)					
BE 7	Community wildlife sites	Use open space audit to identify and assess potential new community wildlife sites and possible Local Nature Reserves.			
BE 8	School grounds	Develop a comprehensive school grounds programme using the Natural Heritage Grant Scheme.			
BE 9	Homes for wildlife	Building design- green roofs and homes for wildlife as standard elements.			
BE 10	Marina reed beds	Establish 'buffer' reed bed areas round marinas to trap and absorb minor accidental fuel spills.			

Project Summaries

BE 1 Otter survey

Lead Partner: NPA, University of Glasgow
Other stakeholders: Transport Scotland, Scotland Transerv

Otters are widespread in the National Park and the aquatic and riparian habitats present seem largely suitable for them. The main human factor affecting their population is mortality from collisions by cars, particularly on wider, faster roads. This project will gather information about the presence of otters in the Park, keep records of otter road kills and investigate the design of road structures such as bridges and culverts in locations where otter sightings and road mortalities are recorded. This information will be used when road maintenance and improvement projects are being considered.

BE 2 Barn owl nest boxes

Lead Partner: Mike Steward
Other stakeholders: NPA, Property owners

Most modern buildings and many renovation projects leave no space for barn owls to find suitable nest sites. This project involves the construction, erection and monitoring of 20 barn owl nest boxes in areas of suitable habitat in the southern parts of the National Park. Ten of these boxes will be installed on buildings and the others on large trees.

BE 3 Bat boxes

Lead Partner: NPA
Other stakeholders: Bat Groups, Community Groups, Volunteers

The National Park Ranger Service, volunteers and community groups have built and installed bat boxes at a number of locations on buildings and trees in greenspaces over the years. This project will develop and implement a programme of bat box work targeting the built environment and greenspace as a way of engaging local people in nature conservation work. Typical bat boxes are only useful to the relatively common pipistrelle bats. The project will also look for opportunities for bat boxes to benefit less common species.

BE 4 Open space audit

Lead Partner: NPA
Other stakeholders: Communities

An initial audit of open spaces round communities was undertaken in 2006/07. This included assessment of the presence of green corridors and natural or semi natural habitats amongst other attributes. This project will revisit that audit to incorporate additional sites identified as being of high value by communities in the Park. The final audit will meet Scottish Planning Policy 11 standards and will be used to inform the development of the open space strategy for the Local Plan.

BE 5 Design guidance

Lead Partner: NPA

To complement the National Park Local Plan, a suite of supplementary planning guidance, design guidance and sustainability checklists is being developed. These will include measures to promote the better incorporation of biodiversity benefits into new developments.

BE 6 Development contributions

Lead Partner: NPA
Other stakeholders: Developers, businesses

This project arises from a policy proposed for inclusion in the draft Local Plan. It will involve developing a system for seeking biodiversity contributions from developers of relevant significant developments. This is based on the principle that the natural environment of the National Park is a very significant asset on the balance sheet of all businesses operating here and that there is a case for investing accordingly.

8. SPECIES PROGRAMMES 2008-2011

Red Squirrel Programme

Factors limiting the numbers and distribution of red squirrel

Habitat extent, quality and connectivity

Spread of grey squirrels displacing reds, particularly from broadleaved woodlands where they have a competitive advantage

Spread of squirrel pox virus, spread by grey squirrels and so far invariably fatal to reds

TABLE 13. Red Squirrel Work Programme

# denotes a project whose timescales extend beyond this initial three-year plan.

Project Ref. No.	Project Title	Key outputs and outcomes	Start & End Dates in three-year plan		Resources in place? Who?
RS 1 #	Red squirrel awareness raising	One new website, one upgraded website, one CCTV viewing facility, three major events a year, 12 community or school group talks a year, six media articles a year.	2008	2011	Yes. NPA, FCS & Cowal Red Squirrel Group time.
RS 2 #	Red squirrel surveys of Scottish Priority Woodlands	Surveys in two Priority Woodlands to confirm red squirrel presence and estimate abundance.	2008	2011	Yes. NPA, FCS & Cowal Red squirrel Group time. Further woodlands dependent on more resources.
RS 3 #	Red and grey squirrel distribution surveys	Fourteen walking transects and 12 feeder box transects in red/grey interface areas. Compile records of public sightings and produce annual map of results.	2008	2011	Yes. NPA, FCS & Cowal Red squirrel Group time.
RS 4	Survey method comparison	Comparison of 12 cone feeding and two walking transect surveys in Strathyre.	2008	2011	Yes. NPA staff time and volunteers.
RS 5	Pine marten predation survey	Collection of pine marten scats and analysis of red and grey squirrels in pine marten diet.	2008	2009	Yes. FCS staff time for collection. Analysis dependent on student availability.
RS 6 #	Cowal buffer zone management	Two walking transects, feeder box survey and trapping and killing programme to limit spread of greys west of Arrochar.	2008	2011	Yes. NPA, FCS & Cowal Red squirrel Group time.
RS 7	Rope bridge usage study	MSc thesis on the use and efficacy of squirrel rope bridges over main roads.	2008	2009	Yes, Student, Leeds University, Cowal Red squirrel Group, NPA.
RS 8 #	Squirrel diseases survey	Collect and supply dead squirrels to national analysis programme for squirrel pox and other pathogens.	2008	2011	Yes. NPA & FCS staff time.
RS 9 #	Habitat management programme	Update eight FCS Forest Design Plans a year to incorporate red squirrel habitat improvements.	2008	2011	Yes. FCS staff time.

Project Summaries

RS 1 Red Squirrel awareness-raising

Lead Partner: NPA & FCS
Other stakeholders: SNH, Cowal Red Squirrel Group

This project will deliver a number of actions to raise public awareness of the threats facing the red squirrel population and generate support for red squirrel conservation work including surveys, habitat management and control of greys in key locations. Specific outputs are:

- Cowal group website to be established.
- Update squirrel material on new National Park website.
- Upgrade of National Park interpretation materials.
- Three major events annually by FCS, Park Authority and Cowal Red Squirrel Group (National Red Squirrel Week plus biodiversity days).
- Ten Park Authority talks or presentations to the public or school groups each year.
- Six Park Authority media articles each year.
- CCTV viewing at David Marshall Lodge of reds at feeding site.
- Two talks a year to schools by Forestry Commission Rangers.

RS 2 Red squirrel surveys of Scottish Priority Woodlands

Lead Partner: NPA, FCS, Cowal Red Squirrel Group
Other stakeholders: SNH

This project will establish and monitor cone feeding transects in two dense plantation woodlands in Scottish priority woodland areas at Cowal (30 transects at Ben Laggan in 2008) and Loch Voil (20 transects in Muirlaggan woods), to determine squirrel presence and provide an estimate of population density from the abundance of chewed cones.

Three further Scottish priority woodlands occur in the Park at Glen Loin, Ardkinglas, Ardgartan. Transects at these sites would require additional resources to operate. This task may fall to a squirrel project officer if one is appointed by FCS.

RS 3 Red and grey squirrel distribution surveys

Lead Partner: NPA, FCS, Cowal Red Squirrel Group
Other stakeholders: SNH

This project will monitor the distribution of red and grey squirrels. Fourteen walking transects will be undertaken in March/April and October/November each year from 2008 onwards to check for the presence of each species in known and potential red and grey interface areas:

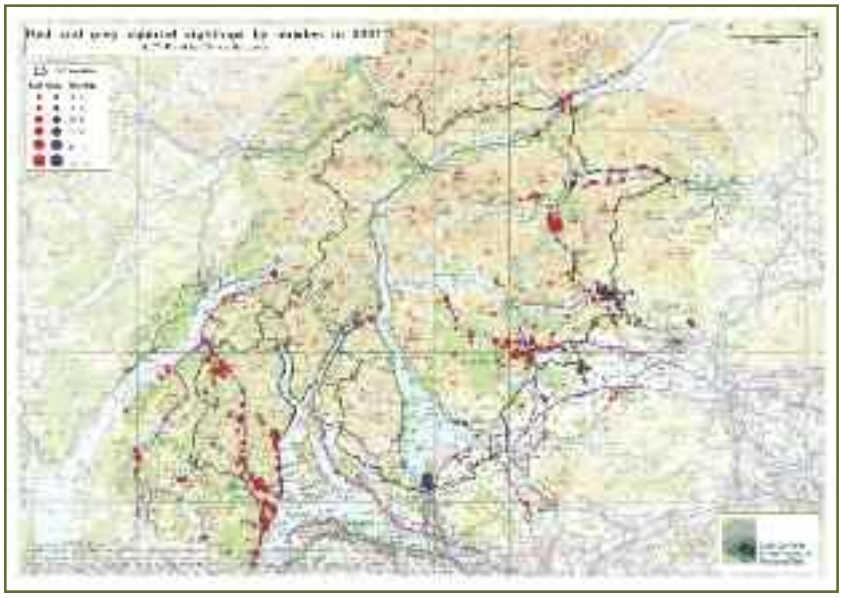
- Balloch Castle Country Park
- Balmaha
- Sallochy
- Lochan Maoil Dhuinne
- Aberfoyle North East - Dounans
- Aberfoyle - Fairy Knowe/ Cobeland
- Aberfoyle - Doune Hill
- Callander South East - Cambusmore
- Callander North - Lower Wood Walk
- Callander North East – Bracklinn /Golf Course
- Strathyre - East
- Strathyre - West
- St Fillans - North Loch Earn
- St Fillans - South Loch Earn

FCS will undertake feeder box surveys using 10 sets of four feeder boxes covering Callander, Aberfoyle, Loch Ard and Strathyre. The boxes are checked fortnightly and sticky tabs removed for hair analysis to identify the squirrel species visiting them.

The Park Authority will set up another two sets of four feeding boxes in Garadhban Forest close to Drymen.

This monitoring will take place from November through to May each year.

Records of public sightings will also be compiled and all records passed on to the national database of squirrel sightings. Maps of the records will be published annually to show the distribution in the Park.



RS 4 Survey method comparison

Lead Partner: NPA
Other stakeholders: SNH, FCS

The Strathyre area appears to have very few grey squirrels and abundant reds. This project will monitor the area for abundance of reds and possible spread of greys while also comparing results from two population estimation techniques using 12 cone feeding and two walking transect surveys.

RS 5 Pine marten predation survey

Lead Partner: FCS
Other stakeholders: Universities

Anecdotally, grey squirrels seem to have declined and reds to have expanded in some areas such as the Loch Ard Forest. This may be linked to an expansion of pine martens which are thought to be very efficient at hunting grey squirrels. This project will gather information on the presence and relative importance of both squirrel species in pine marten diet. The National Park is one of only two areas in the UK where all three species occur in any numbers and provides a rare opportunity to investigate the interactions between them. FCS will collect pine marten scats from bird nest boxes used by them, with the view of having the scats analysed in a student project.

RS 6 Cowal buffer zone management

Lead Partner: NPA, FCS, Cowal Red Squirrel Group
Other stakeholders: SNH

The Cowal peninsula is an important area for red squirrel conservation holding a large population of red squirrels and accessible by grey squirrels only at a narrow strip of forested land from the head of Loch Long to Glen Croe. This project will use squirrel feeder boxes with sticky pads to monitor for grey squirrels moving into the narrow strip. Live traps for greys will be deployed to catch for humane killing any that are detected in this buffer zone. The extent of trapping will depend on the appointment of national grey squirrel control officers.

Training in hair identification was undertaken in April 2008.

Walking surveys will be undertaken twice a year at Arrochar/Succoth and Tarbet Station/Tarbet Isle from 2008 onwards.

RS 7 Rope bridge usage study

Lead Partner: Cowal Red Squirrel Group
Other stakeholders: NPA, FCS, SNH

Red squirrels are frequently run over when crossing roads. Ropes suspended at tree-top height have been installed at Lochgoilhead and Strachur to give the squirrels a safer alternative way of crossing. This project will be undertaken for an MSc thesis to investigate how well used these bridges are to see if the technique is worth using more widely.

RS 8 Squirrel diseases survey

Lead Partner: NPA, FCS
Other stakeholders: SNH, Royal (Dick) School of Veterinary Studies, Edinburgh

A national monitoring programme exists to check for the spread of squirrel pox virus. This project is to collect dead red and grey squirrels and send them for analysis to look for any signs of the virus spreading into the National Park. These squirrels will also used for vet school studies for other viruses, parasite burdens and other diseases.

RS 9 Habitat management programme

Lead Partner: FCS
Other stakeholders: NPA

Under this project, eight FCS Forest Design Plans will be updated each year to incorporate red squirrel habitat improvements, including the planting of more minor conifer species, which are known to be favoured by reds. This includes Forest Design Plans for Glenbranter, Benmore, Lochgoilhead, Glen Croe, South Loch Ard, Drumore, Corriegrennan & Strathyre east in 2008-09. Consideration will be given to using a modelling approach for coning years establish a species mix that maintains adequate food supplies for reds.

Water Vole Work Programme

Factors limiting the numbers and distribution of water vole

Predation by North American mink
Habitat extent, quality and connectivity

TABLE 14. Water Vole Work Programme

# denotes a project whose timescales extend beyond this initial three-year plan.

Project Ref. No.	Project Title	Key outputs and outcomes	Start & End Dates in three-year plan		Resources in place? Who?
WV 1	Water vole survey	Complete survey programme. Encourage casual records. Compile database of records.	2008	2010	Yes. NPA, FCS, TWCP.
WV 2 #	Water vole habitat management	Review six to eight Forest Design Plans each year for scope to restructure riparian zones and undertake Wetland habitat creation.	1991	Ongoing	Yes. FCS.
WV 3 #	Water vole reintroduction	Water vole release programme in one location. Monitoring of habitat quality and management. Targeted mink control.	2008	2011	Yes. FCS, NPA, SNH, RZSS, Derek Gow Associates, Kilgarth Development Company Ltd.

Project Summaries

WV 1 Water vole survey

Lead Partner: NPA
Other stakeholders: FCS, Tay Western Catchments Project Team, Landowners

Water voles are believed to absent across most of the Park, though new records of populations have been obtained recently in several locations in Glen Dochart. This project will continue and consolidate existing survey work by the Ranger Service, FCS Conservation Team and the Tay Western Catchments Project (TWCP) Team, encourage the reporting of sightings by land managers and collate records into a single data set.

WV 2 Water vole habitat management

Lead Partner: FCS
Other stakeholders: NPA, Landowners

This programme will develop actions to protect and expand existing water vole populations. Initially in most locations, it will consist simply of targeted improvements to the design of riparian zones in forestry plantations as they are re-structured to enhance the habitat value for water voles. Depending on the results of further survey work for water voles, a wider programme of habitat management and targeted mink trapping could be considered in future.

WV 3 Water vole reintroduction

Lead Partner: FCS
Other stakeholders: NPA, SNH, Royal Scottish Zoological Society, Derek Gow Associates Ltd., Kilgarth Development Company Ltd.

The Duchray and Keltie river systems in the Queen Elizabeth Forest Park have been assessed as having good areas of suitable habitat, enhanced by recent forestry restructuring and extensive wetland habitat management to produce greatly improved riparian zones. Surveys identified areas where water voles had recently disappeared. As no known water vole colonies were sufficiently close to recolonise this area, a re-introduction programme is proposed.

The reintroduction entails:

- Water vole release and monitoring programme.
- Monitoring of habitat quality and management.
- Targeted mink control by deployment of monitoring rafts and mink traps in the Duchray and Keltie and the adjacent Water of Chon and Loch Ard catchments to prevent mink from moving into the project area.

Black Grouse Programme

Factors limiting black grouse

- Fragmentation of habitat
- Loss of habitat
- Sub-optimal quality of remaining habitat
- Collision risk from deer fences
- Predation in some circumstances

TABLE 15. Black Grouse Work Programme

# denotes a project whose timescales extend beyond this initial three-year plan.

Project Ref. No.	Project Title	Key outputs and outcomes	Start & End Dates in three-year plan		Resources in place? Who?
BG 1 #	Co-ordinated annual lek counts	Hold annual meetings to coordinate survey areas in the Park. Devise a two or three year rolling programme to cover entire Park with available surveyors. Undertake annual surveys of 15 sites a year. Collate results and produce summary report.	2008	2011	Yes. RSPB, NPA, FCS, WTS staff, landowner & volunteer time.
BG 2 #	Habitat enhancement	Implement the high priority actions from the nine key lek management appraisals produced by FWAG for SNH, NPA and RSPB. Develop management recommendations for other key lek sites that are identified. Progress recommendations in the six FCS black grouse reports through Forest Design Plans.	2008	2011	Yes in part. RSPB, NPA, FCS, SNH.
BG 3	Advisory work	Hold two workshops in 2008 for land owners and managers. Provide advice on potential RDC applications.	2008	2009	Yes. NPA, RSPB.
BG 4	Range expansion assessment	Map the locations of all known leks inside and within ten km of the National Park boundary. Undertake a desk analysis of the suitability of habitat in the intervening areas and identify potential areas for range expansion work.	2009	2010	Yes to be confirmed. RSPB, NPA, FCS, SNH, Scottish Native Woodlands (SNW).
Unfunded Actions (see Achieving the vision, page 6)					
BG 5		Implement habitat management recommendations in additional lek sites.			

Project Summaries

BG 1 Co-ordinated annual lek counts

Lead Partner: RSPB Other Partners: NPA, Landowners, FCS, CSBG&CSG

This project consists of the continuation of the annual programme of black grouse lek surveys undertaken in previous years. Some of the available resources will be directed into checking and searching for known and suspected lek sites that have not previously been surveyed. Updated information on distribution is used to inform assessment of development and forestry proposals or RDC applications that could affect black grouse.

- **Fifteen sites a year will be covered by National Park and Forestry Commission Rangers, WTS, Central Scotland Black Grouse and Capercaillie Study Group and other volunteers.**

BG 2 Habitat enhancement project

Lead Partner: RSPB Other Partners: NPA, Landowners, FCS

Management appraisals have been produced for nine key areas of largely private land and six management programmes for areas of FCS land with active black grouse leks. This project will promote the implementation of the management recommendations in these plans, including:

- **Planting new small woodlands.**
- **Restructuring plantation edges and graded density of re-stock.**
- **Grazing management.**
- **Bracken control.**
- **Detailed assessment of the deer fence marking requirements identified in the nine management appraisals.**
- **Fence marking with grant aid, RDC funding and volunteer squads.**
- **Predator control.**

BG 3 Advisory work

Lead Partner: RSPB
Other Partners: NPA, Landowners, FCS, FWAG, SAC

Many of the known leks occur on privately-owned land where the owners don't have easy access to detailed advice or funding sources to undertake additional management for black grouse. This project provided two workshops for land managers in May and June 2008 to provide advice on practical measures. Further detailed advice will also be provided in individual surgeries to look at particular land-holdings and the eligible options for RDC applications.

BG 4 Range expansion assessment

Lead Partner: RSPB
Other Partners: NPA, FCS, SNH, SNW

The range occupied by black grouse has contracted in some areas, such as Cowal, and some remaining populations may be isolated from others. This project will assess the available lek distribution information and look for areas where management could be targeted to promote the establishment of new leks and encourage range expansion. Encouraging management in the identified locations would be done separately through promotion of suitable Rural Development Contracts.

Capercaillie Programme

Factors limiting capercaillie

- Climate change
- Poor habitat quality
- Collisions with deer fences
- Levels of predation
- Fragmentation of habitat including exclusion from some locations by recreational disturbance

TABLE 15. Capercaillie Work Programme

# denotes a project whose timescales extend beyond this initial three-year plan.

Project Ref. No.	Project Title	Key outputs and outcomes	Start & End Dates in three-year plan		Resources in place? Who?
CP 1	National Park Capercaillie Working Group	• Agree need for group. • Agree group membership. • Meet on an annual basis.	2008	2011	To be confirmed. NPA, Luss Estates, SNH, RSPB, FCS, CSBG & CSG, SNW.
CP 2 #	Capercaillie monitoring and survey	• Annual counts on all Loch Lomond SPA islands. • Survey annually for leks on the mainland where there are regular sightings and follow up on sightings in other areas. • Establish capercaillie sightings records database. • Promote submission of records of casual sightings.	2008	2011	Yes. Luss Estates, SNH, RSPB, FCS, CSBG & CSG.
CP 3 #	Promoting responsible access on the SPA islands	• Provide annual briefings to staff in key organisations on disturbance to capercaillie and the law. • Undertake appropriate enforcement. • Provide information on responsible access to people who may land on the islands about the risk of disturbance to capercaillie.	2008	2011	Yes. NPA, SNH, Police, FCS, RSPB.
CP 4	Impacts of visitor recreation on capercaillie on the Loch Lomond islands.	Undertake research project.	2008	2009	Yes. NPA, SNH, Luss Estates.
CP 5 #	Habitat management	Insert capercaillie habitat management into four to six Forest Design Plans each year as they come up for review. Undertake clearance of bracken, *Rhododendron ponticum*, scrub and drain blocking at one capercaillie SPA.	2008	2011	
Unfunded Proposals (see Achieving the vision, page 6)					
CP 6	Predator survey and control	Undertake detailed study into crows as likely predators of capercaillie eggs on the Loch Lomond islands and implement suitable control work e.g. Larson traps and humane killing.			
CP 7	Range expansion project	Creation of suitable accessible habitat from Strathyre to Loch Tay and Strathearn to allow the capercaillie population to move through the whole area.			

Project Summaries

CP 1 National Park Capercaillie Working Group

Lead Partner: NPA
Other Partners: Luss Estates, SNH, RSPB, FCS, SNW, CSBG & CSG

Previous actions to benefit capercaillie in this area were co-ordinated under a LIFE project. A new structure is now required to ensure that efforts are promoted and co-ordinated into the future. This project consists of the establishment and operation of a National Park Capercaillie Working Group to undertake this role.

CP 2 Capercaillie monitoring and survey

Lead Partner: SNH
Other Partners: Luss Estates, RSPB, FCS, CSBG & CSG

Information on the capercaillie population in the National Park requires continued and increased effort to obtain it. This project includes surveying the known breeding area in the Loch Lomond SPA using the agreed national methodology of brood and lek counts as well as surveys for possible new leks in other areas and collation of records of casual sightings.

CP 3 Promoting responsible access on the Loch Lomond islands

Lead Partner: SNH
Other Partners: NPA, Luss Estates, Police, FCS

Capercaillie leks are vulnerable to disturbance by human activity and nesting capercaillie are vulnerable to disturbance by dogs. The birds are also subject to strict legal protection when lekking, nesting or rearing their young. This project will provide relevant information about these issues to relevant agency staff and the visiting public using staff briefings, the National Park website, Mainsheet – the newsletter for boat users on Loch Lomond, other public relations, information boards on islands and information at launch sites. The aim is to reduce the disturbance which is likely to occur on the Loch Lomond islands.

CP 4 Impacts of visitor recreation on capercaillie on the Loch Lomond islands

Lead Partner: NPA
Other Partners: SNH, Luss Estates

Capercaillie leks are vulnerable to disturbance by human activity and nesting capercaillie are vulnerable to disturbance by dogs. This project will investigate these factors on the Loch Lomond islands as a part of a larger research project into the effects of recreational activities on ecologically sensitive sites round Loch Lomond being carried out by the Park Authority and SNH. This will involve a structured programme of moored boat counts, campsite and tent counts, people counts and dog counts with observations on activities.

CP 5 Habitat management

Lead Partners: Luss Estates, FCS
Other Partners: Landowners, RSPB, SNH, NPA

A programme of habitat management at the Loch Lomond SPA for capercaillie will continue involving control of bracken, Rhododendron ponticum and scrub along with drain blocking to improve the habitat for breeding capercaillie.

The small isolated population of capercaillie in the National Park will not survive much longer unless it expands in size and distribution and becomes reconnected to the rest of the Scottish population. Its nearest neighbours are to the north east in Perthshire. Areas of good and potentially good habitat for caper to breed in have been identified in the Queen Elizabeth Forest Park and other land-holdings from east Loch Lomond to Strathyre. This project will undertake appropriate management of these locations to improve and expand these areas of habitat to create linked stepping stones within the range of caper dispersal.

Powan and Dwarf River Lamprey Programme

Factors limiting the numbers and distribution of powan and river lamprey

- Predation by invasive ruffe on powan eggs in Loch Lomond
- Poor water quality
- Availability of spawning habitat
- Barriers to migration
- Availability of host species for lamprey, particularly the availability of powan in Loch Lomond

TABLE 17. Powan and Dwarf River Lamprey Work Programme

Project Ref. No.	Project Title	Key outputs and outcomes	Start & End Dates in three-year plan		Resources in place? Who?
PRL 1	The effective population size of the Loch Lomond powan population	Estimates of the population size of powan in Loch Lomond.	2008	2009	Yes. SCENE, SNH, NPA.
PRL 2	The effective population size of the Loch Lomond dwarf river lamprey population	Estimates of the population size of dwarf lamprey.	2008	2009	Yes. SNH.

Project Summaries

PRL 1 The effective population size of the Loch Lomond powan population

Lead Partner: SCENE
Other stakeholders: NPA, SNH

Recent work has demonstrated that the Loch Lomond powan population appears to be in serious decline, probably due to continued predation of its eggs by ruffe. This work will estimate the population size of powan based on assessments of genetic diversity.

PRL 2 The effective population size of the Loch Lomond dwarf river lamprey population

Lead Partner: SNH
Other stakeholders: NPA

Recent work has demonstrated that this unique form of river lamprey found only in Loch Lomond may be in decline. This work will estimate the population size of dwarf river lamprey based on assessments of genetic diversity.

Freshwater Pearl Mussel Programme

Factors limiting the numbers and distribution of freshwater pearl mussel

- Habitat removal and alteration through development, drainage schemes, flow regulation and fisheries management
- Declines in populations of salmon and trout, which act as the larval hosts
- Destructive pearl fishing and illegal pearl trade, aided by improved accessibility
- Poor water quality, including nutrient enrichment (which also affects the numbers of host fish)
- Conifer planting, exacerbating the effects of river acidification
- Sedimentation from soil erosion, affecting the suitability of gravel and sand beds for juvenile mussels

TABLE 18. Freshwater Pearl Mussel Work Programme

Project Ref. No.	Project Title	Key outputs and outcomes	Start & End Dates in three-year plan		Resources in place? Who?
FPM 1	Survey of deep waters in the Teith and Forth catchments	Report on existing populations in the Teith and Forth catchments.	2009	2011	Yes. SNH.
FPM 2	Survey of potential reintroduction sites	Report on the potential suitability of three rivers in the Park.	2008	2009	Yes. SNH.

Project Summaries

FPM 1 Survey of deep waters in the Teith and Forth catchments

Lead Partner: SNH
Other stakeholders: Scottish Water, Forth District Salmon Fishery Board, Landowners, NPA

A recent research project (2007-08) using video cameras operated from the surface to survey deepwater areas of part of the River Teith SAC identified an extant population of freshwater pearl mussel. This is the only known record of a live population in the National Park. This new project in 2009 to 2011 will use this technology to survey all possible deepwater habitat in the River Teith and the River Forth catchments. The potential for this project to inspire and enthuse visitors about the natural heritage is recognised. Depending on survey results, the project could be expanded to explore the genetics of separate metapopulations of freshwater pearl mussels which would inform the development of a possible restocking or reintroduction strategy.

FPM 2 Survey of potential reintroduction sites

Lead Partner: SNH
Other stakeholders: Argyll Fisheries Trust, Loch Lomond Fishery Trust. Landowners, NPA

Recent survey work in 2007 identified some potential reintroduction sites for pearl mussels in Scotland. This project will undertake further surveys for any existing pearl mussels, suitable habitat and juvenile salmonids to confirm the suitability of some previously surveyed sites and identify further potential locations for possible reintroduction and restocking. Three rivers in the National Park will be included in this survey.

9. INVASIVE SPECIES PROGRAMME

Audit Invasive Species Programme

A number of invasive non-native species of plants and animals are present in the National Park and some surveys of their distribution already exist, including:

- Strategic audit of the distribution of Rhododendron ponticum and Japanese knotweed in the National Park, 2007
- Survey of Invasive plants along the Endrick and Blane river corridors, 2000
- Invasive plant surveys in the Endrick Marshes NNR, ongoing
- National Park grey squirrel survey programme, ongoing
- Loch Lomond islands predator survey for mink, 2004

A more comprehensive audit of the invasive species in or near the Park is required to:

- Identify priority species for prevention and early intervention
- Collate all existing information sources for other invasive species as a basis for the further detailed survey work required in order to plan and cost any required management programmes

TABLE 19. Invasive Species Audit Work Programme

Project Ref. No.	Project Title	Key outputs and outcomes	Start & End Dates in three-year plan		Resources in place? Who?
ISA 1	Invasive Animals Audit	Commission Invasive Animals Audit, covering Sika deer, American mink, Canada goose, ruffe, New Zealand flatworm and others. It will include the following steps: • Collate existing survey information on invasive animals for the National Park. • Assess risks of likely adverse impacts including responses to climate change, scope for and constraints to effective management and priorities for management.	2008	2009	Yes. NPA.
ISA 2	Invasive Plants Audit Part 2	Commission the Invasive Plants Audit part 2. This will build on the existing audit to cover Himalayan balsam, North American skunk cabbage, piri piri, few-flowered leek, giant hogweed, white butterburr, pampas grass and others reported in the Park. It will include the following steps: • Collate existing survey information on invasive plants for the National Park. • Assess risks of likely adverse impacts including responses to climate change, scope for and constraints to effective management and priorities for management.	2009	2010	To be confirmed. NPA and SNH.
ISA 3	Wireweed survey	Undertake a survey of coastline sites for the invasive sea weed wireweed *Sargassum muticum* and disseminate identification cards for the species.	2009	2009	Yes. SNH and NPA.

Invasive Species Management Programme

The need for management of the better known invasive species already present is widely recognised but is expensive and may be difficult to carry out thoroughly. The most effective control is to prevent invasive species from establishing themselves, either by preventing their spread or by dealing with them when they are first detected. The work carried out by deer managers in the National Park to shoot any Sika deer or Sika/red deer hybrids they encounter is a good illustration of this approach.

An invasive species action programme will be produced, covering:

- The prevention and early intervention of new invasive species
- The control of *Rhododendron ponticum* in the National Park, in conjunction with a Forestry Commission Scotland programme covering Argyll
- The control of aquatic and riparian invasive plants along the rivers Endrick and Blane and the Endrick Marshes, in partnership with Scottish Natural Heritage, Stirling Council and Clackmannanshire and Stirling Environment Trust

TABLE 20. Invasive Species Management Work Programme

# denotes a project whose timescales extend beyond this initial three-year plan.

Project Ref. No.	Project Title	Key outputs and outcomes	Start & End Dates in three-year plan		Resources in place? Who?
ISP 1 #	*Rhododendron ponticum* control programme	Appoint project officer. Promote control work at priority locations with funding through Rural Development Contract applications, and grant schemes. Investigate further funding options including LIFE+.	2008	2011	Yes. FCS and NPA.
ISP 2	Endrick catchment invasive plants project	Arrange grant contract with CASET for upper Endrick and Blane, to complement SNH control work in Loch Lomond National Nature Reserve.	2008	2011	Yes. CASET, NPA.
ISP 3	Flora guardian project	Benmore site management. Investigate scope for expansion of programme.	2008	2009	Yes. Plantlife, NPA, Community volunteers.
ISP 4 #	Invasive fish monitoring	Invasive fish survey programme developed for Water Framework Directive assessment.	2010	2011	Yes. SEPA.
ISP 5	Invasive species practitioners network	Establish a network of interested agencies to exchange information, problems and solutions and to coordinate control work.	2008	2011	Yes. NPA, SNH, ABC, CASET, WDC, FWAG, CSFT, SEPA.
ISP 6 #	Japanese knotweed control programme	Develop and implement programmes to survey and eradicate Japanese knotweed from known locations in the National Park.	2008	2011	Yes. In part. Community groups, NPA.
Unfunded Proposals (see Achieving the vision, page 6)					
ISP 7 #	Early intervention protocol	Develop policies and procedures for prevention and treatment of new invasives.			
ISP 8	Mink control	A mink control programme in place in selected river catchments.			
ISP 9 See also red squirrel plan	Grey squirrel control	Grey squirrel control programme in place and dedicated control officers in all locations identified in the Scottish Red Squirrel Conservation Project.			
ISP 10	Prevention of *Gyrodactylus salaris*	*Gyrodactylus salaris* awareness programme developed for anglers, canoeists and other water users.			

10. BIODIVERSITY INDICATORS

A suite of indicators for Scotland's biodiversity was produced by the Scottish Government in 2007. In order to demonstrate how the NPBAP contributes to these indicators, a small number of related indicators for the NPBAP have been developed. These are intended to show the overall ecological effect of actions. As such they are additional to the task of monitoring and reporting on the actions in work programmes.

At the scale of the National Park and over the three years of the NPBAP, the NPBAP indicators are unlikely to give statistically robust measures of trends. Hard data such as survey and monitoring results will be fed into national monitoring schemes where the larger data sets will allow firmer analysis of trends. Trends in relation to these indicators will be considered as a part of the five-yearly review of the National Park Plan and State of the Park Report.

TABLE 21. NPBAP Biodiversity Indicators

Scottish Biodiversity Indicator	NPBAP Indicator	Information Source
Status of BAP priority species	Status of BAP species for which we have work programmes	Periodic reviews of the National Park Biodiversity Audit
Status of BAP priority habitats	Status of BAP habitats for which we have work programmes	Periodic reviews of the National Park Biodiversity Audit
Abundance of terrestrial breeding birds	Status of birds for which we have work programmes	BBS Survey reports, BTO bird atlas
Trends in butterfly populations	Status of butterflies for which we have survey programmes	Survey reports
Trends in moth populations	Changes in recorded moth species in national monitoring programme	Rothamstead light trap programme at SCENE, Rowardennan
Woodland biodiversity indicator for numbers of tree and shrub species per 0.25 ha	Information on restructuring and species composition from Forest Plans	Forestry Commission Scotland data sets
Non-native species range	Information from surveys of invasive plants and control programmes	Control programme reports

II. MANAGEMENT OF THE NPBAP PROCESS

Implementation and Oversight

Implementation of the NPBAP will be taken forward in a partnership approach building on the work of the working group that helped to produce this document. A revised working group of the partners who produced the NPBAP will be established and chaired by the National Park Authority with a remit for delivery to push forward the implementation of actions. The NPBAP Working Group will be responsible for:

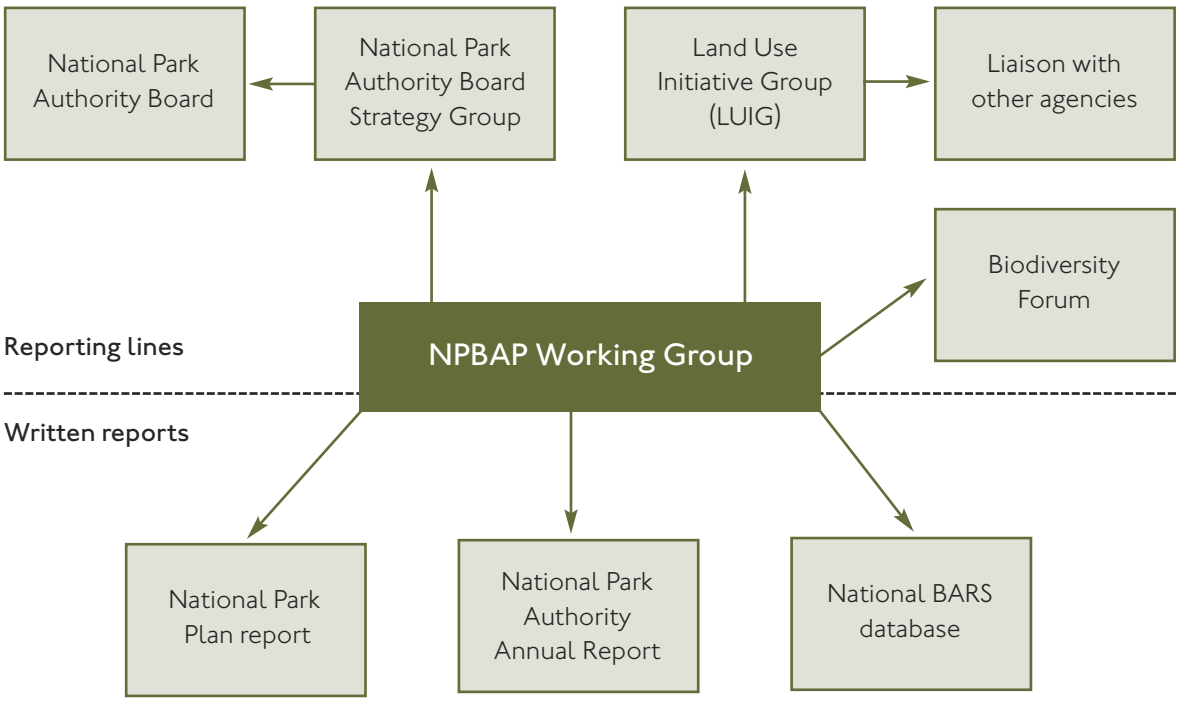
- Undertaking further development of work programmes
- Ensuring progress with the three-year costed work programmes
- Reporting on progress with biodiversity actions annually using the BARS system
- Revising and rolling forward the three-year work programmes

The NPBAP Working Group Chair will report to the existing Land Use Initiative Group (LUIG) which oversees the co-ordination of the work of the relevant Government departments and agencies in the National Park. LUIG will be responsible for routine oversight of the Working Group through reports to its quarterly meetings.

Reports of progress will also be provided by the NPBAP Working Group Chair to the National Park Board Strategy Group as a part of the corporate governance and business plan reporting arrangements for the Park Authority. This mechanism combined with reports to LUIG will enable issues to be raised as necessary at the national level with the overseeing group of senior staff from government departments and agencies responsible for implementing the National Park Plan as a whole.

A wider group of stakeholders will be engaged by establishing a Biodiversity Forum with an open membership to ensure an ongoing flow of information and co-ordination of work between the Working Group, LUIG, landowner representative groups, community bodies and nature conservation NGOs. Meetings of the Biodiversity Forum will be convened annually for formal reports on progress, with more frequent dialogue in relation to specific projects and issues as required.

The Overall Reporting Structure



Project planning, monitoring and reporting

Work programme projects will be planned in more detail with simple and appropriate project plans using the PRINCElite project management tool. Firm, quantified targets will be confirmed or established as a part of this process, to build on those outlined in this document.

As highlighted in the SEA Environmental Report, there is a need to ensure that management in favour of a particular habitat or species does not have undue adverse effects on key landscape and historic environment receptors or on other habitats or species. The need to avoid adverse effects on the designated features of SSSIs and Natura 2000 sites as well as scheduled ancient monuments and designated landscapes will require particular attention. The project planning process will include consideration of environmental baseline information to identify potential conflicts, evaluate priorities and identify relevant mitigation. In some circumstances this will entail a formal environmental impact assessment or Natura "Appropriate Assessment" in accordance with statutory requirements. In other cases, officers implementing the NPBAP will need to follow a similar though less formal approach in consultation with relevant agencies, NGOs and other stakeholders. This will be done as a part of the project management system for the NPBAP and will be the responsibility of the NPBAP Working Group, answerable to LUIG.

Progress for each project will be monitored by the Working Group using the PRINCElite project management tool. A progress report of work done on each project will be produced annually, presented to LUIG and the Biodiversity Forum and posted on the National Park Authority's website. Biodiversity outcomes will also be reported on the national BARS database by the lead partner for each project. This will allow easy incorporation of progress into the national BAP reporting round. Progress with implementation of the NPBAP will be reported each year as a part of the National Park Authority's corporate planning system.

Information at an appropriate level will also feed into the monitoring and reporting systems for the National Park Plan 2007-2012. This will include a review of the Biodiversity Indicators detailed in Section 10 of the NPBAP.

Review of the NPBAP

The NPBAP has been produced as a three-year business plan to fit in with the three-year corporate planning cycle of public sector agencies in Scotland. The NPBAP will be updated and rolled forward annually as a part of the corporate planning cycle. As a part of this process, we will also keep the unfunded actions under annual review, to ensure updates are made where funding becomes available, new funding options continue to be investigated, sound new proposals are added and any obsolete proposals removed.

APPENDIX 1

List of Unfunded Proposals in Work Programmes

This list is a compilation of the unfunded proposals identified in each section of the NPBAP.

Climate Change Work Programme		
CC 6	Flood plain management	Habitat restoration projects on flood plains to maximise their potential to slow down storm flood flows.
CC 7	Visitor footprint	Better public transport provision combined with a robust footpath and cycle network to reducing the total carbon footprint of visitors to the National Park.
CC 8	Awareness	Raise awareness of residents and visitors of the local impacts of climate change on biodiversity as a part of the NPA's Climate Change Awareness Raising Strategy.
CC 9	Forestry and carbon management	Further develop existing forestry trends for enhancement of existing native woodlands, expansion and greater connectivity of woodlands and more use of broadleaves to create ecosystems that are more robust in the face of change and that give carbon sequestration benefits. Further promote local markets for native timbers and appropriate wood-fuels to create economic incentives for woodland management and to reduce carbon emissions from transportation.
CC 10	Climate change monitoring	Develop and record simple ecological markers – eg appearance of new southern species or reduction in arctic alpine plants that can be detected in other work and noted as local indicators of climate change.
Scottish Biodiversity Duty Work Programme		
SBD 17	Biodiversity 'constraints' checking system	Comprehensive IT-based biodiversity constraints mapping available to Planning Officers, developers and the public, through the E-planning initiative.
SBD 18	Expanded Natural Heritage Grant Scheme	Enlarge and extend the scope of the Natural Heritage Grant Scheme to complement the Scottish Rural Development Plan.
SBD 19	National Park wildlife diary	Develop a web-based diary linked to ranger events and tourism businesses, to highlight an opportunity to view 'seasonal' wildlife for every week of the year. It will identify the best places and best wildlife to see in different seasons.
Biodiversity Audit Work Programme		
BA 5	Species survey and monitoring network	Develop a forum of local ecologists including BSBI, SWT, BTCV and other local expert groups to help identify gaps in species survey coverage, ensure all local records are available and to promote co-ordinated recording work.
BA 6	Biodiversity data management	Fully resourced biodiversity information management systems in place covering the National Park and adjacent local authorities, providing biodiversity data management, record verification, and analysis and information, and promoting active survey and recording work programmes.
Coastal and Marine Work Programme		
CE 5	Whale, dolphin and porpoise recording	Whale, dolphin and porpoise recording scheme established to properly document the regular sightings of these animals in the sea lochs and upper Clyde.
CE 6	Cool Seas education programme	Marine Conservation Society "Cool Seas" education programme expanded to cover all schools in the National Park.
CE 7	WeBs surveys	Develop programme of WeBs counts to survey wading birds on mudflats at the Holy Loch and Arrochar.

Farmland Work Programme		
F 4	Park-wide wet grasslands project	Build on F1 to have wet grassland projects in place on the floors of all the major straths to benefit farmland waders and riparian habitats and act as flood storage areas. Removal of strath floor plantation blocks that disrupt key wader sites.
Woodland and Forest Work Programme		
WF 8	Old fence removal	Develop a programme to remove redundant deer fences where they prevent graded transitions between habitat types or there is a risk of bird strikes.
WF 9	Woodland grazing	New cattle or wild boar grazing schemes in pilot woodlands to improve the ecological quality and diversity of established native woodlands, to add to existing projects at The Great Trossachs Forest and the Hill Sheep and Native Woodland project at SAC Kirkton and Auchtertyre Farms.
Moorland and Mountains Work Programme		
MM 5	Blanket bog restoration	Assess the condition of all non-designated blanket bogs and evaluate their carbon storage capabilities. Promote management such as drain blocking and modification of grazing regimes where these are having an adverse effect on the peat.
Built Environment Work Programme		
BE 7	Community wildlife sites	Use open space audit to identify and assess potential new community wildlife sites and possible Local Nature Reserves.
BE 8	School grounds	Develop a comprehensive school grounds programme using the Natural Heritage Grants Scheme.
BE 9	Homes for wildlife	Building design-green roofs and homes for wildlife as standard elements.
BE 10	Marina reed beds	Establish 'buffer' reed bed areas round marinas to trap and absorb minor accidental fuel spills.
Black Grouse Work Programme		
BG 5	Additional habitat enhancement	Implement habitat management recommendations in additional lek sites.
Capercaillie Work Programme		
CP 6	Predator survey	Undertake detailed study into crows as likely predators of capercaillie eggs on the Loch Lomond islands.
CP 7	Range expansion project	Creation of suitable accessible habitat from Strathyre to Loch Tay and Strathearn to allow the capercaillie population to move through the whole area.
Invasive Species Work Programme		
ISP 7 #	Early intervention protocol	Develop policies and procedures for prevention and treatment of new invasives.
ISP 8	Mink control	A mink control programme in place in selected river catchments.
ISP 9 See also red squirrel plan	Grey squirrel control	Grey squirrel control programme in place and dedicated control officers in all locations identified in the Scottish Red Squirrel Conservation Project.
ISP 10	Prevention of *Gyrodactylus salaris*	*Gyrodactylus salaris* awareness programme developed for anglers, canoeists and other water users.

APPENDIX 2 – LIST OF ABBREVIATIONS

AFT	Argyll Fishery Trust
BARS	Biodiversity Actions Reporting System
BBS	Breeding Bird Survey
BEETLE	Biological and Environmental Evaluation Tools for Landscape Ecology
BSBI	Botanical Society of the British Isles
BTO	British Trust for Ornithology
CASET	Clackmannanshire and Stirling Environment Trust
CSBG & CSG	Central Scotland Black Grouse and Capercaillie Study Group
ECN	Environmental Change Network
FCS	Forestry Commission Scotland
FDSFB	Forth District Salmon Fishery Board
FRS	Fisheries Research Service
FWAG	Farming and Wildlife Advisory Group
GRAB Trust	Group for Recycling Argyll & Bute Trust
HSEP	Habitats and Species Enhancement Programme
JNCC	Joint Nature Conservation Committee
LEAFPACS	Aquatic plants survey method
LUIG	Land Use Initiatives Group
LLFT	Loch Lomond Fisheries Trust
LNR	Local Nature Reserve
NGO	Non-Governmental Organisation
NP	National Park
NPA	National Park Authority
NNR	National Nature Reserve
MCS	Marine Conservation Society
NFUS	National Farmers Union Scotland
NTS	National Trust for Scotland
PAWS	Plantation on Ancient Woodland Site
PLANT	Plant Local Area NeTwork
RBGE	Royal Botanic Gardens Edinburgh
RSPB	Scotland Scotland Royal Society for The Protection of Birds Scotland
RZSS	Royal Zoological Society of Scotland
SAC	Scottish Agricultural College
SAC	Special Area of Conservation
SCENE	Scottish Centre for Ecology and the Natural Environment
SEPA	Scottish Environment Protection Agency
SGRPID	Scottish Government Rural Payments and Inspections Directorate
SMART	Specific, Measurable, Achievable, Realistic, Time-bounded
SNH	Scottish Natural Heritage
SNW	Scottish Native Woodlands
SPA	Special Protection Area for wild birds
SRPBA	Scottish Rural Property and Business Association
SSSI	Site of Special Scientific Interest
TLC	Tay Liaison Committee
TWCP	Tay Western Catchments Project
WeBs	Wetland Bird Survey
WTS	Woodland Trust Scotland
ABC	Argyll & Bute Council
BTCV	British Trust for Conservation Volunteers
CSFT	Central Scotland Forest Trust
DSFB	District Salmon Fishery Board
IHN	Integrated Habitat Network
LBAP	Local Biodiversity Action Plan
LLAIA	Loch Lomond Angling Improvement Association
RSFS	Royal Scottish Forestry Society
SWT	Scottish Wildlife Trust
UKBAP	UK Biodiversity Action Plan
VOLDAC	Vale of Leven District Angling Club
WDC	West Dunbartonshire Council

NATIONAL PARK

biodiversity

ACTION PLAN

Loch Lomond & The Trossachs National Park

Pàirc Nàiseanta Loch Laomainn is nan Tròisichean

Designed and produced by Loch Lomond & The Trossachs National Park Communications Unit. Printed on recycled paper.

Published by Loch Lomond & The Trossachs National Park Authority, Carrochan, Carrochan Road, Balloch G83 8EG

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LLTNPA/03/09CCB800