



Cotswold Water Park

Biodiversity Action Plan

2007 – 2016

COTSWOLD WATER PARK BIODIVERSITY ACTION PLAN 2007 - 2016

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on behalf of the CWP Nature Conservation Forum.

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Foreword

A landscape rich in wildlife is important for the quality of life of residents, those who work in the area, the enjoyment of visitors and the local economy.

This local Biodiversity Action Plan translates national nature conservation goals to the local level. The introduction to this document provides a description of the area, the policy background and recent changes in legislation and the potential impacts of climate change. It briefly summarises the success and failures of the original CWP Biodiversity Action Plan 1996-2007 and sets out the approach taken in this revised plan.

The plans select those priority species and habitats typical of the area for which focused conservation effort can make a significant difference at local, regional and potentially national level. There are Habitat Action Plans (HAPs) for 10 different habitat types and Species Action Plans (SAPS) for 9 species. Each Habitat and Species Action Plan provides background information, the threats, a set of measurable conservation targets and details of actions required to achieve these targets including timescales, lead organisations and quantitative measures of success. In addition, several Species Statements have been included for those species considered sufficiently important (UK BAP species occurring in area or species for which the CWP is at least regionally important) to warrant inclusion within the CWPBAP 2007-2016, but where halting population decline and assisting recovery will be achieved by measures already outlined within a HAP.

The Generic Action Plan sets out a number of policy, funding and awareness raising objectives that will be crucial to the success of this plan.

While the local biodiversity action planning process may be led by nature conservation bodies it is abundantly clear that these ambitious targets can only be achieved by true partnership working between mineral companies, landowners, developers, businesses, consultants, local authorities, statutory bodies, local residents, volunteers and nature conservation organisations.

An increase in the biodiversity of an area is a crucial measure of sustainable development and a lasting legacy for future generations.

Introduction

This new Cotswold Water Park Biodiversity Action Plan 2007-2016 (CWP BAP 07-16) replaces the original Cotswold Water Park Biodiversity Action Plan (CWP BAP 97-07).

1 The Cotswold Water Park

The Cotswold Water Park covers more than 40 square miles or 10,000 hectares (ha) in the Upper Thames catchment which straddles the county boundary of Wiltshire, Gloucestershire and Oxfordshire. For over 50 years the area has been subjected to sand & gravel extraction. The high ground water levels mean that any holes dug greater than 1 metre in depth rapidly fill with water. It is a large, complex and rapidly changing area and to date (July 2007) 147 lakes (approximately 1,200 ha) have been formed through extraction.

The sand and gravel deposits range in depth from a few centimetres to 6 metres, and are generally within the gravel aquifer which can be found 1 to 1.5 metres below ground level. Currently, 7 mineral companies are extracting just less than 2 million tonnes per year from 400 ha of active quarries, and have permission to extract from a further 310 ha. The two county mineral plans propose allocating another 550 ha to extraction. Then, beyond this, there is estimated to be at least another 30 years supply of sand & gravel at current rates of extraction.

The first lakes were created in the early 20th century when small individual fields were sold for extraction. Early extraction was usually wet using drag lines. This created lakes with uneven bottoms, irregular shore lines and numerous islands. As a result of inefficient methods of extraction and minimal use of topsoil in restoration, some of these older lakes have become very important sites for wildlife, particularly aquatic macrophytes such as stoneworts. Improvements in pump technology in the 1970s meant that quarries could be de-watered during extraction, thus more gravel could be extracted creating deeper lakes with more uniform bottoms and shorelines and no islands. Inadequate restoration plans resulted in rectangular lakes with relatively steep sides of poor value to marginal plants, invertebrates and other wildlife.

The implementation of the Cotswold Water Park Biodiversity Action Plan 1997-2007 has encouraged a more considered approach to restoration through the creation of lakes with shallow sloping banks, indented shorelines, reed beds and shallow wetlands. This has demonstrated that significant biodiversity gains can be made through restoration of mineral sites.

Until recently little thought was given to the after-use of quarries until they had been flooded as lakes, due to a lack of planning and forethought prior to mineral extraction. This lack of planning has in some cases led to incompatible uses of neighbouring lakes with considerable conflicts and problems.

Ownership of land within the Cotswold Water Park is complex, with more than 40 lake owners. The lakes are used for fishing (64), holiday accommodation (23), nature reserves (18), inland beach (1), park (3), hotel (1), sailing / windsurfing (9), water skiing (10), water ski-tow (1), corporate hospitality (1) lakes with no after use (32).

There has been almost no strategic planning as regards lake usage and location over the last 35 years, and consequently many lakes are poorly suited to their present use by the nature of their restoration and location.

Nature Conservation importance of the Cotswold Water Park

Prior to the Second World War much of the area was dominated by flower rich grasslands but large scale conversion to arable farming and mineral extraction has dramatically changed the landscape.

The current nature conservation value of the area is a result of a combination of factors, particularly the underlying geology and hydrology. Low intensity farming on a few key sites has maintained flower rich meadows while mineral extraction has led to the formation of lime rich marl lakes important for aquatic plants. The large number of lakes and sheer size of the area of open water has attracted large number of wetland birds.

More recently pro-active restoration of quarries and management for nature conservation has enhanced the conservation value of a number of sites through the area.

The potential of the Cotswold Water Park as a site of national importance for wildlife was recognised by its inclusion in the Nature Conservation Review in 1977 (*Ratcliffe, 1997*). The area contains eight grassland Sites of Special Scientific Interest (SSSI) two of which are now an SAC (North Meadow and Clattinger Farm). Ten marl lakes have also received SSSI designation because of their blue-tinted lime-rich waters which support a wide diversity of aquatic plants. The area is also nationally important for wintering and breeding birds as well as regionally significant for many other species of birds, dragonflies, damselflies, bats and water voles.

1.1 Governance

1.1.1 The Cotswold Water Park Joint Committee

In recognition of the special nature of the area, the lakes and surrounding land were designated in 1967 by the Joint Committee of the Cotswold Water Park *“to serve the interests of aquatic sports, naturalists and others who wish to pursue informal recreational activities in a rural lakeside setting”*.

The Cotswold Water Park Joint Committee was originally created in 1967. It is currently formally established as a Joint Committee under Sections 101 and 102 of the Local Government Act 1972.

The Joint Committee, as presently constituted, consists of three elected members from four local authorities: Gloucestershire County Council, Cotswold District Council, Wiltshire County Council, North Wiltshire District Council, and one elected member from Swindon Borough Council, together with three representatives from Parish Councils, and with representatives from Natural England, the Environment Agency, and Sport England. The Forestry Commission and the Farming and Conservation Agency (now DEFRA) are also invited to attend together with any other relevant bodies that the Joint Committee wishes to co-opt as appropriate.

The Joint Committee was set up to provide strategic guidance for the management and development of the area. Planning and statutory duties however still remain with the individual authorities alongside separate mineral plans for Gloucestershire and Wiltshire County Councils and local plans for Cotswold District and North Wiltshire District.

1.1.2 The Cotswold Water Park Nature Conservation Forum (NCF)

The Cotswold Water Park Nature Conservation Forum (NCF) was formed in 1989 through an alliance of voluntary and statutory nature conservation organisations in response to the increasing development pressure on the lakes in the Cotswold Water Park. The initial members were the Wildfowl & Wetland Trust, RSPB, Gloucestershire Wildlife Trust, Wiltshire Wildlife Trust and English Nature. Initially the NCF provided an opportunity for conservation bodies to discuss

particular planning applications, lend more weight to the conservation arguments and provide clear consistent advice to the relevant local authorities. Over the last 18 years it has taken a more pro-active approach to nature conservation issues and in 1992 the Forum published 'A Nature Conservation Review of the Cotswold Water Park', commissioned the biodiversity audit in 1996 and supervised the production of the CWP Biodiversity Action Plan in 1997. Membership of the NCF has grown and now includes the Wiltshire Ornithological Society, the Environment Agency, and ecologists from various local authorities. The NCF is regarded by the CWP Joint Committee as a technical officer working group.

Current remit of Nature Conservation Forum

“Working in partnership to take a proactive approach to nature conservation in the Cotswold Water Park”.

This will be achieved by:

- Regular update meetings on conservation issues in the area.
- Working together, where appropriate, to respond to plans and strategies that may impact on the nature conservation value of the area.
- Working together, where appropriate, in responding to planning applications
- Acting as a steering group for the Cotswold Water Park Biodiversity Action Plan.
- Working together to support and work on nature conservation projects in the area.
- Working together to ensure ecological data is held by appropriate record offices.
- Where appropriate hosting nature conservation events in the area.
- Acting as a sounding board for new ideas and approaches to nature conservation in the area.
- Where appropriate working together to seek joint funding for projects.

1.1.3 The Cotswold Water Park Society

The Cotswold Water Park Society Ltd was formed in 1996 as a non local authority influenced body (by virtue of having less than 20% of controlling board / trustees being local authority members or officers). It is an Industrial & Provident Society (a not for profit company) with charitable status. The Society is also a registered Environmental Body.

The main roles of the Society are:

- To assist in the implementation of the Cotswold Water Park Joint Committee Strategy.
- Management of land owned by the four Local Authorities within the Cotswold Water Park.
- To promote public access, recreation and nature conservation.
- To assist with the promotion of the Cotswold Water Park for nature conservation, sport, tourism and sustainable economic development.
- To contribute to the securing of new resources in partnership with the Joint Committee and others in order to implement the Cotswold Water Park Joint Committee Strategy.
- To work with business & industry within the area to encourage them to contribute to the delivery of the Cotswold Water Park Joint Committee Strategy.
- To work closely with local communities and interest groups within the Cotswold Water Park to contribute to delivery of the Cotswold Water Park Strategy.
- To coordinate and implement the CWP Biodiversity Action Plan 1997-2007.

In order to provide greater clarity and focus the Society has formed a separate Cotswold Water Park Group to run and manage its commercial operations and a full charity the Cotswold Water Park Trust to deliver the nature conservation, public access, education and public art and other charitable objectives.

1.2 Development scenarios

Due to the combined effects of mineral extraction and new built development, the Cotswold Water Park is one of the most rapidly changing landscapes in the UK today. Previous lack of co-ordination and strategic planning has led to piecemeal and incompatible development. Differences in planning policies between Cotswold District Council and North Wiltshire District Council have resulted in significantly more new built development within Cotswold District. Factors such as suitability of the site, hydrology, biodiversity potential, access to services and likely future land-use changes in the surrounding area are secondary factors in influencing developments.

In the last ten years demand for accommodation, mainly second homes, has been the driving force behind development. With approximately 450 second homes already built, planning permission for a further 750, plus two further applications for another 250 units the demand remains high. In addition a 240 bed hotel has recently opened and planning permission has been granted for one further hotel.

In spite of all this development, the Cotswold Water Park is still in the early stages of being recognised as a major tourist destination. However if climate change predictions are fulfilled, ie warmer drier summers, combined with increasing concerns of terrorist threats and carbon foot prints, a greater proportion of the 20 million people who live within a 2hr drive (1.5hr by train) may visit the area.

As the amount of accommodation increases and the area is promoted as a tourist destination the next ten years is likely to see more development proposals, new retail outlets and activities for families.

Continued sporadic development could lead to significant conflicts with the existing and planned nature conservation of the area, hence there is an urgent need for coordinated long term planning of the after-use of mineral sites right through from the planning stage, to extraction and restoration.

1.3 A 50 year vision for the future

The original Cotswold Water Park Biodiversity Action Plan 1997-2007 summarised its 50 year vision as follows:

“THE COTSWOLD WATER PARK SHOULD BE A PREMIER SITE FOR NATURE CONSERVATION WHERE THE REQUIREMENTS OF INDUSTRY, LEISURE, PEOPLE AND WILDLIFE ARE SUCCESSFULLY INTEGRATED”

This vision was subsequently adopted by the Cotswold Water Park Joint Committee and there is every reason to adopt this broad aspiration for the Cotswold Water Park Biodiversity Action Plan 2007-2016.

What could the Cotswold Water Park look like in 2070?

In 2070 the Cotswold Water Park will be one of the largest man-made freshwater wetland complexes in Europe. It has the potential to become a unique landscape between Cirencester and Swindon linking the Cotswolds AONB to the North Wessex Downs AONB. With appropriate restoration the landscape will have the potential to remain resilient to the extremes of weather produced through climate change, acting as a large sponge at the head of the Thames to reduce the severity and speed of flooding to Oxford and beyond, whilst acting as a refuge for wetland wildlife in times of drought.

There is potential to plant woodlands around the Western end to ameliorate the rapid run-off of rainfall to linking the old woodlands of Bathurst estate and the upper Chalford valley, to the Braydon Forest in North Wiltshire. This could link forest bat populations such as Bechstein's and Barbastelle. By 2070, this region could also be home to wild boar dispersing from the Forest of Dean and a viable pine marten population.

In the future the upper reaches of the Thames and its tributaries will meander through flower rich grasslands seasonally grazed by cattle and sheep being reared for the menus of the local hotels and retail complex at the Spine Road junction. In the winter or at any time of high rainfall these grasslands will become shallow temporary wetlands.

By 2070, along the course of the Thames from Clattinger Farm near Oaksey to St John's Lock at Lechlade, a continuous corridor of shallow wetland, reedbed linking the old lakes in the West and Eastern sections will provide homes for otters, water vole and beaver. Bittern will have finally returned to breed along with osprey, marsh harrier, little egret, great egret, garganey, spoonbill, bearded tit, penduline tit, black tern and common crane. Populations of little ringed plover and sand martin will remain even after cessation of mineral extraction on areas specifically managed for them. Within the flood plain, grasslands will support breeding wader such as snipe, redshank, common curlew in dry springs. Wet woodland and willow coppice will be managed to act as extra flood storage. Careful management of ancient trees and integration of roost sites for bats in new buildings and sculptures will ensure the maintenance and protection of one of the most diverse and high density populations of bats in England.

New water sports and leisure developments are likely to be concentrated in a triangular area between Ashton Keynes, South Cerney and Down Ampney. Footpaths and cycle routes will link villages and leisure developments following the route of the Cotswold, Wiltshire and Berkshire canals to Swindon and Cirencester, and bridle paths will weave through the area.

In 50 years time the Cotswold Water Park will not only be a vibrant place for wildlife but a desirable place to live and work. Designs of new developments will be compatible with wildlife and will provide a key part of a local economy based upon tourism, water sports, angling, art and farming. Residents and visitors alike will see the maintenance of a successful balance between the needs of wildlife and the local economy as important to their quality of life. Ways to sustain this achievement will be a constant theme of research for the Cotswold Water Park's Biodiversity and Natural Art Institute and Research centre, whose presence will enrich the cultural life of the villages of the Cotswold Water Park.

2 National and regional context

2.1 What is Biodiversity and why does it matter?

Biodiversity is the variety of life. The word is a short hand way of referring to all the creatures and plants which live on the Earth. But why does the conservation of biodiversity matter? The most fundamental reason is that human beings are reliant upon all the other species on the planet to keep the life support systems of the Earth going - for example to trap energy from the sun, produce oxygen and recycle nutrients.

The rate of species extinction at present is greater than at any other period in the Earth's history, perhaps 1,000 to 10,000 times the normal 'background level'.* To turn this tide of extinction, which may threaten the ability of this planet to support the human population, we must take action, both globally and locally to look after the remaining biodiversity.

* 'The Diversity of Life', E.O Wilson

Biodiversity is also important for a number of other reasons:

- People empathise with wildlife and very often individual experiences with wildlife can enrich their quality of life.
- Experiencing wildlife can be an important factor in the prevention of mild mental illness and in the recovery of various forms of mental and physical illness.
- Wildlife has long been a source of inspiration for art and literature.
- The recent growth of wildlife conservation organisations and media interest demonstrates the continued importance of wildlife to people.
- The BBC Spring Watch survey 2006 estimates over half of UK population is concerned about wildlife conservation.
- High quality, biodiversity rich landscapes are also important economic drivers for tourism, leisure and rural crafts.
- Businesses, which can trade anywhere in the UK, select or remain in an area because of the high quality of the local environment.

2.2 The Rio Convention and Global Biodiversity Targets

In June 1992, the Convention of Biological Diversity (www.biodiv.org) was signed by 159 governments at the Earth Summit, which took place in Rio de Janeiro (also referred to as the Rio Convention.). As the first treaty to provide a legal framework for biodiversity conservation, it called for the creation and enforcement of national strategies and action plans to conserve, protect and enhance biological diversity.

UK Biodiversity Action Plan (UK BAP)

In 1994, the UK government launched Biodiversity: the UK Action Plan (www.ukbap.org.uk) which outlined the UK Biodiversity Action Plan for dealing with biodiversity conservation in response to the Rio Convention.

UK Biodiversity Steering Group

The UK Biodiversity Steering Group was created in 1994 and published Biodiversity: the UK Steering Group Report – meeting the Rio challenge (www.ukbap.org.uk).

This established the framework and criteria for identifying species (1250 in number) and habitat types of conservation concern. From this list, action plans for 391 species and 45 habitats (116 species and 14 habitats in Tranche 1 and the balance in the six volumes of Tranche 2) were published. As well as having national priorities and targets, action was also taken at a local level. The Steering Group drew

up a set of guidelines for the development of Local Biodiversity Action Plans of which there are now 162 LBAPs in England, Scotland and Wales.

In May 1996, the government endorsed the Steering Group's recommendations and established the UK Biodiversity Group in place of the UK Biodiversity Steering Group to advise the Government on the process. [The Government Response to the UK Steering Group Report on Biodiversity](#) (www.ukbap.org.uk). To measure progress on the 436 Action Plans a three to five yearly reporting cycle was established, details of which can be found on the UK Biodiversity Website www.ukbap.org.uk along with details of the management of the process at national level. In 2007 the review of the national species and habitat targets was published, and some of these may be included in future versions of the CWP BAP.

2.3 Why a Local Biodiversity Action Plan?

The implementation of a Local Biodiversity Action Plan provides a means of focusing conservation effort and money of all stakeholders on those species and habitats which are declining in number, area or quality and where it is still possible to take action to halt and reverse this decline. In summary:

- Biodiversity Action Plans set out a clear framework for nature conservation with measurable objectives and targets.
- Biodiversity Action Plans can only be delivered through a wide partnership of organisations including local authorities, farmers, landowners, developers, statutory bodies as well as nature conservation organisations.
- It is Government policy to protect *and* enhance biodiversity. Biodiversity is one of the Government's key tests for Sustainable Development.
- New developments provide an opportunity to make a positive contribution to delivering the targets in the Cotswold Water Park and UK Biodiversity Action Plans. Local planning authorities have both a duty and an opportunity to enhance the environment.
- Appropriate policies can be adopted and implemented to protect and enhance key species and habitats.
- The integration of benefits to biodiversity through planning should become a routine consideration, and flagged up at the earliest stage.

The protection and enhancement of natural features should be promoted through business plans, strategic and local development control plans, planning consent, mineral extraction permissions, farm management plans, sports development plans, village appraisals, local transport plans.

2.4 Local and Regional Biodiversity Action Plans

South West Biodiversity Action Plan

www.swbiodiversity.org.uk

The South West Biodiversity Partnership published a Biodiversity Audit in 1996, a South West Action Plan in 1997 and an implementation plan in 2005.

Gloucestershire Biodiversity Action Plan

Launched in 2000 and various plans are being reviewed.

www.gloucestershirebap.org.uk

Swindon Biodiversity Action Plan

www.biodiversityswindon.co.uk

Launched in March 2005 and overlaps with the CWPBAP along the River Thames downstream of the confluence of the River Ray.

Wiltshire Biodiversity Action Plan

www.biodiversitywiltshire.org.uk

Revised Wiltshire BAP, to be launched June 2008

Oxfordshire Biodiversity Action Plan

www.oncf.org.uk/biodiversity/

Published in 2005 this plan aims to focus conservation activity on a number of biodiversity hotspots identified by the Oxfordshire Nature Conservation Forum.

Staff from the Cotswold Water Park Society and other members of the CWP Nature Conservation Forum sit on the steering groups which guide the neighbouring LBAPs to ensure there is a co-ordinated approach to implementation and reporting.

The Cotswold Water Park Biodiversity Action Plan 1997-2007

The Cotswold Water Park Biodiversity Action Plan 1997-2007 was developed prior to other local biodiversity action plans. It set out local actions and targets to contribute to the delivery of UK targets in the Cotswold Water Park. This revised Cotswold Water Park Biodiversity Action Plan 2007-2016 replaces the 1997-2007 plan

2.5 Policy Changes since 1996

The implementation of a local Biodiversity Action Plan is supported and influenced by both national and local policy.

2.5.1 National policy changes

Since 1996 the environment has moved up the political agenda with increasing concern about species loss and most importantly the impact of climate change on both the natural environment and human societies. Over the last ten years there have been a number of significant policy changes

Countryside and Rights of Way Act 2000

This act provides the statutory basis for Biodiversity Action Plans. Part III of the Act amends the law relating to nature conservation and the protection of wildlife, and includes provision on the conservation of biodiversity and the protection of Sites of Special Scientific Interest (SSSI). In particular, Section 74 of the Act places new duties on Government ministers and departments in respect of the conservation of biodiversity. Local authorities are not covered by these duties. In practice the Government expects the lists of habitat types and species of principal importance to be consistent with those which are already the subject of Action Plans under the UK Biodiversity Action Plan.

Details of Act and guidance

Countryside and Rights of Way Act 2000

DEFRA DETR circular 04/2001

Countryside and Rights of Way Act Factsheets

www.opsi.gov.uk

www.defra.gov.uk

www.defra.gov.uk

Natural Environment and Rural Communities Act 2006

From 1 October 2006, all local authorities and other public bodies in England and Wales have a duty towards the conservation of biodiversity in exercising their functions. The duty aims to raise the profile of biodiversity across the public sector and ensure that biodiversity becomes a natural consideration in policy and decision-making.

The Duty is set out in Section 40 of the Natural Environment and Rural Communities Act 2006, and states that:

“Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity”

The Duty affects all public authorities which include public bodies, government and statutory undertakers in England and Wales. The latter includes bodies carrying out functions of a public character under a statutory power, such as NHS Trusts, Emergency services etc. The Duty applies to all local authorities, including the 410 unitary, county and district councils in England and Wales, and approximately 10,000 community, parish and town councils.

New List of Priority Species and Habitats for England; Section 41 NERC Act

Under Section 41 of the Natural Environment and Rural Communities Act, the Secretary of State must publish, review and revise a list of the living organisms and types of habitat which in the Secretary of State’s opinion are of principal importance for the purpose of conserving biodiversity. The new list contains 1149 species and 65 habitats. The original UK BAP list contained only 577 species and 49 habitats. The CWP BAP 2007-2016 has been developed using the original list but new species and habitat action plans will be introduced over the coming years.

Details of new priority Species and Habitat
Details of NERC ACT

www.ukbap.org.uk
www.defra.gov.uk

National Policy guidance statements, circulars and guidance

Local Plans and the emerging local development frameworks need to take account of national guidance, circulars and planning statement (PPS). The national guidance also needs to be taken into account when planning applications are determined at a local level. Current national planning guidance relevant to biodiversity is listed below:

Planning Policy Statement 9: Biodiversity and Geological Conservation

Planning Policy Statement 9 (PPS 9) sets out planning policies on protection of biodiversity and geological conservation through the planning system. www.communities.gov.uk

Circular 06/05: Biodiversity and Geological Conservation - Statutory obligations and their impact within the Planning System

This Circular provides administrative guidance on the application of the law relating to planning and nature conservation as it applies in England. It outlines how statutory obligations impact within the planning system, in some cases the legislation will have an equal bearing on other regimes eg Transport and Works Act 1992. This Circular should be read in conjunction with PPS9, available on www.communities.gov.uk, which sets out the Government's planning policies for England on protection of biodiversity and geological conservation through the planning system and the accompanying www.communities.gov.uk

Planning for Biodiversity and Geological Conservation: A Guide to Good Practice

This Guide complements PPS9 and circular 06/05 and provides good practice guidance on ways regional planning bodies and local planning authorities can help deliver the national policies in [PPS9](#) and comply with legal requirements set out in the Circular 06/05. www.communities.gov.uk

Local sustainable Community Strategies, Local Area Agreements and national indicator for local government

To increase the efficiency of delivery of local services that reflect local priorities, local authorities are required to form local strategic partnerships made up of a range of statutory and non-statutory organisations. Many partners involved in the CWP Biodiversity Action Plan are involved in these local strategic partnerships and are working to ensure that the delivery of local biodiversity action plan targets become integrated into the work plans of all government department and agencies.

www.communities.gov.uk

Local area agreements

As part of this greater partnership-working, County Councils are entering into agreement with regional government offices to deliver certain targets. These local area agreements (LAAs) for both Gloucestershire and Wiltshire currently include biodiversity objectives.

www.communities.gov.uk

National performance indicators for local partnerships

In order to reinforce the importance of improving biodiversity, the new national list of performance indicators for local authorities and local authority partnerships includes a specific target (NI 197) to improve local biodiversity through active management of local sites.

www.communities.gov.uk

Spatial Planning

Spatial planning at a regional, county and local level can have significant positive and negative impacts on the delivery of local biodiversity action plans. The spatial planning system is currently in a state of change with planning decisions being made in the Cotswold Water Park in 2007 using local plans and mineral plans developed under the old system, while the new spatial plans are being developed and are likely to be operational in the next few years.

Old system (2007)

Regional Policy Guidance (RPG10)

Regional Planning Guidance Note 10 “Regional Planning Guidance for the South West” provides strategic guidance to which County Structure Plans, Local Mineral Plans and Local plans must comply including major infrastructure projects, regional transport routes, housing allocation and mineral allocations. The South West Regional Aggregates Working Party (SWRAWP) is responsible for sub-dividing the central government’s national and regional aggregates demand forecasts down to a county level.

Structure Plans

County Structure plans translate regional guidance in RPG10 to county level and provide the policy basis for Mineral Plans and District Local Plans

Local Minerals plans

Currently planning applications for mineral extraction and restoration in the CWP are determined by the relevant County Council in accordance with either the Gloucestershire Local Mineral Plan 1997-2006 or the Wiltshire & Swindon Mineral Local Plan 2001 depending on the location of the particular site.

District Local Plans: Built development or change of use

Planning applications for change of use of land or water and for built developments are determined by either Cotswold District Council (Cotswold District Local Plan 2001-2011, North Wiltshire District Council (North Wiltshire district plan 2001-2011) or Swindon Borough Council.

2.5.2 Local Policy Changes

The Planning and Compulsory Purchase Act 2004 came into effect in May 2004. The Act amends existing legislation (The Town and Country Planning Act 1990), and has changed the planning system in several important ways:

Forward planning

- Regional planning guidance is replaced with regional spatial strategy
- County structure plans are abolished
- Local plans are replaced with local development frameworks
- County Mineral and Waste Plans replaced with Mineral and Waste Development Frameworks

The first round of local development frameworks are emerging at different timescales and are by their very nature evolving documents. Details of the status and policies in the South West Region Spatial Strategy and each Local Development Framework can be found at the relevant websites.

South West Regional Spatial Strategy

www.gos.gov.uk

www.southwest-ra.gov.uk

Gloucestershire Mineral Plan

www.gloucestershire.gov.uk

Wiltshire Mineral and Waste Plan

www.wiltshire.gov.uk

Cotswold District Local Plan and emerging Local Development Framework

www.cotswold.gov.uk

North Wiltshire District Local Plan and emerging Local Development Framework

www.northwilts.gov.uk

It should be noted that by Autumn 2008 Wiltshire will become a Unitary authority and the forward planning function of North Wiltshire will be a county council role.

CWP Master Planning Process

In 2007 the Cotswold Water Park Joint Committee (along with financial assistance from the South West Regional Development Agency) commissioned consultants Scott Wilson to develop a Strategic Plan for the future development of the whole of the Cotswold Water Park. This is due for adoption in 2008 as a precursor for a local area action plan for the whole of the Water Park. Biodiversity has been identified as a key driver for the future development of the Cotswold Water Park in particular the development of a biodiversity corridor linking the western and eastern sections.

See website www.waterpark.org for further details

2.6 Climate change

The climate is changing in the Cotswold Water Park and it is predicted that these changes will continue for the next 20 years even if global emissions of carbon dioxide are reduced by 60% this year. Average temperatures are predicted to rise in the region of 0.3 - 0.6 C, summers will become drier and hotter while winters will become wetter and milder, along with an increase in the frequency and severity of storms.

If no action is taken on reduction of carbon dioxide emissions, the **UK Climate Change Panel*** predicted changes from now to 2050 - 2080 for the South West region will be as follows:

Temperature

- Annual warming of 1.0 to 2.5°C (Annual warming of 1.5 to 4.5°C in the 2080s)
- Greater warming in summer and autumn than in winter and spring
- Greater night-time than day-time warming in winter
- Greater day-time than night-time warming in summer

Precipitation

- Winters 5 to 15% wetter (Winters 10 to 30% wetter by the 2080s)
- Summers 15 to 30% drier (Summers 25 to 55% drier by the 2080s)
- Heavy rainfall becomes more common
- Dry summers as in 1995 (37% drier than average) become more common
- Winter and spring precipitation becomes more variable
- Snowfall to decrease significantly

Cloud cover

- Reduction in summer and autumn cloud and increase in radiation
- Small increase in winter cloud cover

Humidity

- Specific humidity increases throughout the year, relative humidity decreases in summer

Soil moisture

- Decreases in summer soil moisture
- Increase in winter soil moisture

Storm tracks

- Depressions, particularly in autumn and winter become more frequent including deepest ones

South West Climate Change Impact Scoping Study

For full study and further information

www.oursouthwest.com

Impact of climate change in Cotswold Water Park

Climate change is likely to have significant impact on biodiversity in the Water Park resulting in changes in abundance, presence and distribution of species and in the longer term, habitats. Warmer temperatures will mean that mobile species are likely to colonise as they gradually move north; for example, migrant hawk dragonflies have colonised in the last 20 years and more recently species such as the lesser emperor bred in 2007, plus red-veined darter dragonflies and small red-eyed damselfly have been recorded in the area. Little egret numbers are gradually increasing and it is likely they will begin to breed in the next few years. Warmer temperatures are likely to see an increase in certain bat species particularly lesser and greater horseshoe bats. The number of wintering waterfowl, particularly migrants from northern Europe is likely to decline as milder conditions mean that they over winter further north.

Climate change will have a complex impact upon water regimes and will lead to much greater fluctuation in water levels within and between years. Species such as water vole may suffer from rapid fluctuations in river levels meaning that over time large reed bed and shallow wetland

complexes may become a much more important habitat for this species. Lower summer river levels are likely to have a negative impact on a number of species in the upper reaches of the catchment although on lakes more exposed mud may benefit a range of species.

One of the key opportunities within the CWP is creation of a significant variety of wetland habitats over a large area to allow species movement between different areas.

3 Summary of progress on delivery of the CWP BAP 1997 – 2007

Funding for the implementation of the CWP BAP has come from a variety of sources including Landfill Tax, Statutory Agencies, Aggregates Levy Sustainability Fund (ALSF), various grant-giving Trusts, the CWP Joint Committee and commercial sponsorship.

Habitat Action Plans

Progress in the delivery of specific targets in the Habitat Action Plans has been variable.

- Good progress has been made on the **Standing Open Water HAP** with the creation of shallow wetlands and mineral companies taking a positive approach to restoration for conservation.
- Targets in the **Rivers & streams HAP** have largely been achieved through the work of the Environment Agency and agri-environment schemes.
- Progress on the **Marsh & swamp HAP** has been slower than hoped in terms of creation of large new areas of habitat although a number of restoration plans for quarries now include restoration to large areas of these habitats in the future. Small reedbeds have already been created, and conservation input to mineral restoration plans should result in approximately 115ha new reedbeds in 15 years.
- Creation of new areas of **Lowland neutral grasslands** has been limited to a number of small areas through the restoration of quarries largely because quarries restored to terrestrial habitats are commercially very valuable to development. The purchase of Blakehill Farm, Clattinger Farm and Lower Moor Farm by the Wiltshire Wildlife Trust has ensured the protection and suitable management of existing lowland grassland in the areas. Also a number of large areas of farmland adjacent to the Thames are in the process of arable reversion to grassland through Countryside Stewardship schemes.
- While there have been some notable losses of important hedgerows, progress on the **Boundary Features HAP** can be seen through increased recognition of this habitat in the CWP for bats, nightingale and invertebrates.
- Agri-environment schemes particularly Countryside Stewardship have contributed to the delivery of the **Cereal field margin HAP** but only limited progress has been made on the **Woodland and Canal HAPs**.

Species Action Plans

There has been even greater variation in the overall progress of the **Species Action Plans**.

- **Otter** have increased significantly in number and range since 1996.
- The near eradication of American mink from the Western sections by 2006 and very significant reduction in number from the Central and Eastern area has resulted in the dramatic return of **water vole** to good habitat but their recovery is now probably limited by suitable habitat.
- The known distribution of **lesser bearded stonewort** has increased over the period due partially to increased knowledge but probably also through the creation of new lakes with suitable conditions.
- The **reed bunting** population has fluctuated dramatically between seasons but overall has shown an increase in number. The number of wintering **bittern** has remained roughly similar although not yet a breeding species due to the slow progress in creation of large reedbeds. **Tufted duck**

wintering numbers have increased in line with the increase in the national population. In areas where they have been monitored, the breeding population has remained stable although the amount of suitable breeding habitats through the Cotswold Water Park has increased. The number of wintering **pochard** has decreased more steeply than the national decrease, whilst **gadwall** numbers have increased at a greater rate than national numbers. The distribution of freshwater **white-clawed crayfish** has contracted during the periods whilst the alien signal crayfish has increased. Further details of progress are included in each Habitat Action Plan (HAP) or Species Action Plan (SAP).

Survey and monitoring

There has been a very significant increase in the level of research and monitoring in the area during the plan period on both priority and non priority species which has confirmed and enhanced the recognition of the area as a biodiversity hot-spot. However further survey work, particularly a Phase 1 habitat survey, is still desperately required.

Planning policy

Overall good progress has been made in the integration of biodiversity into the planning process, both in terms of mineral planning and development control, although there is scope for further improvements. For example, Gloucestershire Mineral Policy E10 provides policy support for restoration to enhance biodiversity and the Wiltshire Mineral plan favours restoration for nature conservation on four out of the six sites in the Cotswold Water Park. The CWPBAP 97-07 was adopted as supplementary planning guidance to the Cotswold Local Plan and Policy RC17 in the North Wiltshire local plan provided policy support for both protection and enhancement of biodiversity in the Cotswold Water Park.

South West Nature Map

The Cotswold Water Park has been included in the South West Nature Map (now included in the Region Spatial Strategy) as a target area for new habitat creation.

A feasibility study by the RSPB has set out a long term plan for restoration of a large part of the central section of the Cotswold Water Park. In partnership with Natural England, the CWP Society is developing an overall vision for a 14 mile corridor of linked high quality habitat. This is referred to as the Head of the Thames Wetland Corridor, and will incorporate high quality habitats from the source of the river Thames and its tributaries through to the head of the navigation at Lechlade.

Bird Strike Working Group

Concerns by the Ministry of Defence over bird strike at RAF Fairford has led to the creation of a Bird Strike working group and a recognition that restoration of new mineral sites in the central section do not lead to a significant increase in the bird strike risk. This will mean restoration to farmland and in the wetter area, enclosed wetland habitats.

Mineral companies, landowners and developers

Biodiversity is now recognised as an important issue for mineral companies in the planning, extraction and restoration of quarries. Many farmers and landowners are now changing the management of their land through adoption of agri-environmental schemes which will result in biodiversity improvements. Some of the commercial developers in the Cotswold Water Park have also recognised the importance of a biodiversity rich environment and are delivering biodiversity gain over and above planning requirements, even to the extent of using wildlife as part of their marketing programme for second homes or apartments.

The Cotswold Water Park Society has become the main point of contact with regard to biodiversity issues in the area for developers, mineral companies, lake owners and local communities. Working with all the members of the Nature Conservation Forum, the Society provides ongoing advice and training to a wide range of people.

Education

Education programmes, both formal and informal have been developed and delivered by the Society and other partners (RSPB, Wildlife Trusts and second home developments) and the Wiltshire Wildlife Trust has constructed a purpose built education facility at Lower Moor Farm, near Oaksey. Talks, guided walks and events are offered throughout the year to the general public and interested parties. The CWP website, www.waterpark.org offers an up to date source of information and reference for students and the public.

Volunteers

A very significant part of the success of the implementation of the CWPBAP to date has been the role of volunteers. This volunteer work includes bird, mammal, plant and invertebrate surveys, monitoring, American mink trapping, leading guided walks, giving talks/running workshops, representing BAP partners at key meetings, assisting with data entry, computing and practical habitat improvements. Approximately 150 volunteers are involved in the implementation of the CWPBAP each year. To give an indication of the value of this work the Natural England recommended day rates for in-kind contribution were used to calculate the financial value. The monetary value of this voluntary effort is in the region of £300,000 to £480,000 per annum.

Land acquisition

During the plan period a number of sites in the CWP have been acquired by conservation bodies including Clattinger Farm, Lower Moor Farm and Blakehill Farm by the Wiltshire Wildlife Trust and Cleveland Lakes by the Cotswold Water Park Society.

3.1 Working at a landscape scale

Experience of implementing the CWP Biodiversity Action Plan 1997-2007 over the last ten years has shown there is a significant opportunity to deliver real change at a landscape scale working with landowners throughout the area.

The NCF is working towards the vision of creating and restoring a broad corridor of riparian habitats between the source of the Thames and Lechlade in order to maintain and restore the biodiversity value of this land. Many areas are already in favourable management for nature conservation; for example, Clattinger Farm, Blakehill Farm, Lower Moor Farm and Swillbrook Lakes (Wiltshire Wildlife Trust reserves), North Meadow NNR (Natural England) as well as at least 8 large farms and landholdings in agri-environment schemes along the River Thames at Ashton Keynes, Cricklade, Castle Eaton, Kempford and beyond. The creation of this riparian corridor is aimed at certain species and their habitats, such as otter, water vole, breeding waders and farmland birds all benefitting within a matrix of lowland meadows, wet woodland, rivers and streams.

Furthermore, this landscape will provide additional benefits; this area is still a natural floodplain, although flooding patterns have changed in recent years, rendering agriculture increasingly difficult and unprofitable. Management of parts of this area for wildlife as well as for water control will promote water storage in this area of the Upper Thames, helping to protect settlements downstream and protect this area from future developments. The value of this vision has been recognised by its inclusion in the South West Regional Spatial Strategy within the Nature Map South West.

One of the key strands to this vision is that built development should not, and cannot be undertaken on the floodplain; this will protect settlements elsewhere in the Upper Thames, will prevent inappropriate developments and will also safeguard these areas for wildlife.

The CWPBAP 07-16 recognises another key facet of the area that key partner organisations are committed to creating large reserves along this corridor e.g the RSPB is committed, in future decades, to creating a landscape-level wetland reserve in the Central CWP, the latest area of gravel extraction. This work will attempt to link together several mineral companies and their quarries, restoring the area as one ecological unit. The Wiltshire Wildlife Trust is committed to linking reserves together at the Western end around Clattinger Farm. The Society has long term aspirations for linking Cleveland Lakes to North Meadow, Cricklade and Pike Corner, near Ashton Keynes. There may also be potential for the Gloucestershire Wildlife Trust to extend its reserves in the Eastern section.

Habitat creation and restoration targets within the CWPBAP 07-16 recognise the huge but long term contribution these projects will make, and the reality that some of these works will not be completed within the lifespan of this BAP but in decades to come.

3.2 Bird Strike

The Cotswold Water Park is within the statutory bird strike safeguarding zones surrounding RAF Brize Norton and RAF Fairford. The principle concern of the MOD in this area is creation and management of habitat, particularly wetland habitat that would significantly increase the population of large and, or flocking bird species that are hazardous to air traffic. In recognition of these concerns the Cotswold Water Park Bird Strike Technical Working party was set up in 2001. This working group involves representation from MOD defence estates, RAF Fairford, Mineral Planning authorities, Natural England, Environment Agency, RSPB, and the Cotswold Water Park Society with representatives from particular mineral companies when appropriate. The aim of the technical working party is to ensure that future phases of mineral restoration and other forms of habitat development in CWP do not significantly increase bird strike risk.

3.3 Rationale behind the revised CWP BAP 2007 – 2016 and the way forward

In 2006, the CWP NCF began a review of the original Cotswold Water Park Biodiversity Action Plan 1997-2007, recognising that it required updating since many targets and actions had been successfully completed, whilst some other areas required new impetus. Following wider consultation with key stakeholders in the Cotswold Water Park the resulting document will be launched in 2008.

The new Cotswold Water Park Biodiversity Action Plan 2007-2016 (CWP BAP 07-16) recognises the unique and rapidly changing nature of the CWP and that mineral extraction has a great potential to create a positive impact for biodiversity.

The CWP BAP 2007-2016 now includes Habitat Action Plans (HAPs) for:

1 Habitats found before, during and after mineral extraction:

- Boundary features
- Built structures
- Canals
- Rivers & streams
- Lowland Neutral grassland
- Farmed land
- Woodland

2 Habitats created as a result of the mineral extraction process

- Sand and gravel quarries

3 Habitats created during the mineral restoration process

- Fen, marsh and reedswamp
- Standing open water

The last category also includes those habitats found in the CWP prior to the mineral extraction, since restoration will also aim to replace and increase the areas of these habitats.

The key point of the above categories is to emphasise that habitat conservation and enhancement should be seen as an integral part of the whole mineral extraction process, before, during and following extraction. For example, farmland left uncultivated prior to extraction and temporary habitats found within active quarries can play a valuable role, as well as the more permanent habitats that may be created afterwards.

It is worth highlighting that the new CWP BAP 07-16 includes a HAP for Built Development. Whilst many BAPs cover large areas of built development, the CWP is perhaps unusual in the way that the majority of built development in the area is so closely linked to the tourism and leisure industry, including hotels, second home developments and leisure complexes. Many such developments rely on a high quality environment to attract custom, and even small-scale developments can make significant contributions to nature conservation

With this in mind, the **Built Structures HAP** has been included to recognise and capitalise upon the contribution that built development can make, including bridges and second homes as well as tourism and leisure development.

Detailed rationales for including many of the habitats, with an explanation of the scope of each HAP, can be found at the start of each HAP.

An array of species has been selected to complement these HAPs:

- Barberry carpet moth [§]
- Bats (Group) [§]
- Black poplar [§]
- Breeding waterbirds (Group)
- Dragonfly (Group) [§]
- Great crested newt [§]
- Stoneworts (Group) ^{*}
- Water vole ^{*}
- Wintering waterbirds (Group)

Many of these species were included in the previous CWP BAP 1997-2007 and are currently the focus of considerable projects (marked ^{*}). Others have been added because of recent recognition of the importance of the CWP for these species at a regional level (marked [§]). In some cases (bats, dragonflies, black poplar) their inclusion has only been possible through recent advances in our knowledge of their populations and distribution within the CWP.

It should also be noted that some of the targets extend beyond the life of this BAP, and the reason for this is that there are some actions which take a long time to establish, such as a newly planted reedbed can take many years before it provides a suitable habitat for breeding bitterns.

The new CWPBAP 07-16 reflects the rapidly changing nature of the CWP, the extensive mineral extraction, the potential for creation and restoration of habitats, and the richness of the wildlife already found here. It also reflects the huge nature conservation efforts undertaken within this area by a vast range of partners including members of the NCF, landowners, lake owners, developers, mineral companies and local nature conservation groups.

Unlike many local Biodiversity Action Plans which take a fairly broad approach, the new CWP BAP 07-16 is more akin to a detailed work programme for the next 10 years, specifying where and how efforts are required for a range of partner organisations.

3.4 How the CWP BAP Process works and how it will be developed

This CWP BAP 07-16 is a working document setting out targets for species and habitats. Each Action Plan (Species, Habitat or Generic) is set out in a similar manner

- A brief introduction
- Conservation priority at a local, regional and country level in a table format
- National & Local Status: A description of national and local status in terms of changes in population and distribution
- Habitat and Ecology: A brief description of the habitat (or habitat requirements) and ecology
- Current Factors affecting the habitat/species in the UK and Cotswold Water Park
- Conservation objectives for that species or habitat action plan. These objectives will be delivered by the series of actions set out in the **Action Table**
- Links to other Action Plans
- Links for further information

Action Plan tables

Each Species and Habitat Action Plan has a **Table of Actions** which set out the actions required to achieve each of the objectives for that particular species or habitat. **These are the most important part of the document** and are set out in the same way.

- **Action Plan** – which is the name of the action to which the target applies
- **Target code** – this is an alpha-numeric code which will be cross referenced to the national Biodiversity Action Reporting System (**BARS**) to record progress on the delivery of this LBAP
- **Target Text** – this describes the measurable target
- **Target Year** – is the year by which the target is to be completed
- **Action Code** – this is the code number for this particular target
- **Action Text** – this describes the action required to complete target
- **Action Lead** – this is the organisation or individual(s) who will be responsible for ensuring this action is carried out. The lead organisation may not necessarily be undertaking the task but will be responsible for making it happen.
- **Action Partners** – these are the organisations who will be involved in carrying out the actions. These organisation will be required to report to the lead organisation on progress
- **Measure (units)** – the measurement used to assess whether the target has been achieved

The CWP BAP07–16 will be a largely web based document which can be downloaded as a whole document or by individual section. Only a small number of hard copies will be made available, although the entire document can be sent on CD if required. This means that the CWP BAP07-16 can be updated regularly and new Action Plans added when required.

Criteria for Species Statements

Species Statements have been written for those species considered sufficiently important (UK BAP species occurring in area or species for which the CWP is at least regionally important) to warrant

inclusion within the CWPBAP 2007-2016, but where halting population decline and assisting recovery will be achieved by measures already outlined within a HAP.

For example, **reed bunting** will benefit from a range of habitat creation and management practices that will benefit other species; none of these practices is necessarily specific only to **reed bunting**. It is therefore included as a Species Statement.

Where actions are required for a species that are over and above general positive habitat creation and management works, that species should be considered for inclusion as a SAP.

There is a temporal element to whether there is a need for a specific Species Action Plan or Species Statements. Bittern, for example will benefit the most in the CWP from the creation of reedbeds, marsh and fen; such habitat creation/restoration and management is detailed within the relevant HAP. If additional works are required to support this species (such as monitoring and stocking with prey species such as eel, rudd & roach), it may be considered for inclusion as a SAP in the future. In the case of **bittern**, by the end of the lifespan of this BAP (2016) it is planned that significant areas of reedbed will have been established. It is at this point that further consideration of fish prey species is most pertinent.

In taking this approach the attention of the CWP BAP document has been further focussed upon implementation of the Habitat Action plans and the key species groups of the CWP: **Bats, breeding and wintering waterbirds, dragonflies, stoneworts and also water vole, great crested newt, black poplar and barberry carpet moth.**

These species and species groups accurately represent the species focused nature conservation interest of the CWP and the direction of current biodiversity work. It is anticipated that during the lifespan of the new BAP (2007-2016) there will be increasing work on species not yet focussed upon, for example, **invertebrates.**

Biodiversity Action Reporting System (BARS)

The Biodiversity Action Reporting System (BARS) is a web-based information system that supports the planning, monitoring and reporting requirements of national and local Biodiversity Action Plans (BAPs).

BARS will enable everyone involved in BAP implementation, including LBAP partnerships and Lead Partner organisations, to enter action plans and record progress towards targets and actions. BARS uses drop-down lists and quantitative fields to provide a standardised structure so that BAP information can be integrated across users. This information can be searched by members of the public to learn about BAP activities underway. A range of sophisticated reports is available to BAP users enabling them to generate summaries from their data and to set their work in the wider context. The CWP BAP 07-16 will be entered onto the BARS system and this will be the mechanism by which progress on the implementation of the CWP BAP 07-16 will be monitored.

4 Non-native invasive species

Local biodiversity action plans generally target native species however it needs to be recognised that non-native species can have significant impact on both habitat and species targeted in local biodiversity action plans. While these issues are dealt with in individual action plans it is important to put the issue of non-native and invasive species in context, hence the development of this non-native species action plan.

Introduction

A wide variety of non-native species may be found throughout the UK in nearly all habitats of the UK. This includes terrestrial and aquatic plants; cultivars from parks and gardens that have naturalised in the wild (eg rhododendron, Himalayan balsam, Australian swamp stonecrop etc) ; vertebrates such as Canada geese, ruddy duck, red crested pochard, little owl, various species of parrot and parakeet, Sika deer, fallow deer, American mink, red eared terrapin and Alpine newt. Numerous invertebrates have also been introduced and include the New Zealand flatworm and American signal crayfish as well as a host of other species.

The UK BAP website presents an extensive list of non-native and invasive species in the UK at present (Understanding the impacts of introduced species: highlighting the status and threats posed by non-native species; see weblink www.ukbap.org.uk/library/brag/InvasiveSpeciesEConference.doc)

Non-native invasive species should not be confused with:

- Species colonising the UK naturally, possibly in response to climate change; for example the little egret, red veined darter, small red eyed damselfly. These are species naturally expanding their range in response to improving environmental conditions.
- Native species reintroduced to the UK or parts thereof, under IUCN guidelines, for example pool frog, European beaver, great crested newt, red kite, and white tailed sea eagle.

The impact of non-native invasive species upon UK BAP species and habitats

Many non-native invasive species are presumed to have a benign impact upon UK BAP species and habitats, for example, little owl *Athene noctua* and sycamore *Acer pseudoplatanus*.

Many invasive and non-native species however are clearly of conservation and economic concern, for example, American mink *Mustela vison* (due to its impact on the water vole and native breeding waterbirds), Canada geese *Branta canadensis* (due to their impact on arable crops, birdstrike risk, public health and hygiene) and Australian swamp stonecrop *Crassula helmsii* (due to its ability to rapidly choke waterbodies and to colonise new sites).

Action against non-native invasive species should be focussed upon species which are clearly of acute conservation and economic concern, and for the purposes of a Biodiversity Action Plan any action should be further focussed upon supporting UK SAPs and HAPs.

Non-native invasive species	Impacts	Impacting UK BAP and CWP BAP HAPs and SAPs
American Mink <i>Mustela vison</i>	Predation of the Water Vole and native waterbirds	Water Vole SAP Rivers & Streams HAP Standing Open Water HAP
Signal Crayfish <i>Pacifastcus leniusculus</i>	Carrier of "crayfish plague",	White Clawed Crayfish SAP Rivers & Streams HAP Standing Open Water HAP
Canada Geese <i>Branta canadensis</i>	Crop damage, birdstrike, public health & hygiene, enrichment of waterbodies through excreta	Standing Open Water HAP
Australian Swamp Stonecrop <i>Crassula helmsii</i>	Choking of waterbodies, suffocating other aquatic life. Rapidly spreads.	Standing Open Water HAP

Of clear concern is the potential for colonisation of aquatic plants being dumped in lakes and ponds by gardeners and pond-owners. There have already been several instances of non-native plants being found in some of the lakes, for example water hyacinth *Eichhornia crassipes* in Cokes Pit LNR (Lake 34) in 2004, *Crassula helmsii* in Jubilee Pond, Ashton Keynes in 2005. In both cases, it is likely that colonisation was as a consequence of deliberate introduction.

In a similar fashion, red eared terrapins *Trachemys scripta elegans* have been seen in at least 2 lakes. The numbers of individuals involved and the overall distribution in the CWP is unknown. At one location the species was eradicated when the lake was drained; clearly such drastic measures are not always desirable or possible. A means of removing this species from lakes should be explored. Its ecological impact can be notable.

Himalayan balsam *Impatiens glandulifera* colonised the River Churn in Cirencester several years ago and has colonised its banks in many areas, notably at Cerney Wick, including the canal. At present little or no coordinated control is undertaken here other than ad hoc attempts by local home owners. Concern has been expressed of the potential threat of this species to the floral composition of North Meadow NNR. Furthermore, concerns have also been raised over the suboptimal habitat for water voles that Himalayan balsam creates in terms of the reduced complexity and variety of vegetation.

Actions

Monitoring

- 1 Monitoring of priority non-native species of conservation and economic concern: Canada goose, signal crayfish, American mink, *Crassula helmsii*, Japanese knotweed, parrots feather *Myriophyllum aquaticum* and others as and where appropriate.

Research

- 2 Develop research programme looking at potential impacts of non-native invasive species such as zebra mussels *Dreissena polymorpha* upon native invertebrate communities.
- 3 Develop research programme assessing signal crayfish distribution and the potential to create signal crayfish-free areas where native crayfish can be reintroduced.
- 4 Assess potential risk of Himalayan balsam *Impatiens glandulifera* to North Meadow NNR and the potential to impede the water vole recovery project in the CWP and beyond.

Advisory

- 5 Promote and disseminate existing advisory material produced by Environment Agency and other relevant organisations with regard to non-native invasive plant species, non-native crayfish species and others where appropriate.
- 6 Promote and encourage the use of native plant species and strains in the Cotswold Water Park, notably on large developments but also amongst small-scale gardeners and landscapers.
- 7 Promote the identification, control and disposal of non-native invasive plant species amongst local developments, lake owners and householders to generate increased awareness and action.
- 8 Develop action plans and contingency plans for the discovery of certain invasive plants in the CWP, as highlighted by the recent discovery of *Crassula helmsii* in Jubilee Pond, Ashton Keynes. Such plans should also clearly indicate responsibility by partner organisations as well as funding sources.

Pro-active control

- 9 Control of priority species:
 - American mink
 - Canada goose

- Other species where deemed appropriate by research and monitoring process: for example, Japanese knotweed, giant hogweed *Heracleum mantegazzianum*, and red eared terrapin *Trachemys scripta elegans*.

Generic Action Plan

During the preparation of the first CWP BAP in 1996 a number of themes, issues and constraints were observed that span many, if not all of the HAPs and SAPs. These points have been revised with the rest of the CWP BAP, prior to the re-launch of the second edition. Although some may have no specific relevance to individual habitats or species, their completion will, by their nature, make significant contributions to nature conservation and to the CWP BAP.

1. Landscape-scale approach; The Head of the Thames Wetland Corridor

In the Cotswold Water Park, nature conservation efforts have been focussed at a landscape level since 2000, with the recognition that mineral restoration could potentially make vast contributions to the creation and restoration of UK BAP habitats.

The long-term objective, within which the CWP BAP lies, is the creation and maintenance of a wetland corridor of diverse and high quality habitats from the source of the River Thames and its tributaries to the head of the River Thames navigation at Lechlade-upon-Thames. This comprises 15 miles of the main Thames, whilst the tributaries include an additional 32 miles.

This is the last relatively 'wild' stretch of the River Thames. The area will change dramatically over the next 40 years as a result of ongoing mineral extraction, restoration of quarries, changes in land use, built development, changes in farming and flood management.

The Head of the Thames Wetland Corridor will be created by linking together the existing areas of high nature conservation value using mineral restoration (to create new UK BAP habitats), agri-environment schemes (using new schemes to bring land into favourable condition and management) and land acquisition (to create new reserves).

Areas of high nature conservation value include the 10 SSSI lakes, 6 SSSI grasslands, various Wildlife Trust and Cotswold Water Park Society nature reserves, the private nature reserves (e.g. Lower Mill Estate), quarries already restored for nature conservation and farms already in agri-environment schemes.

The main opportunities for nature conservation are in the flood plain where future built development will be limited, recognising the high development pressure outside of the floodplain. Significant opportunities exist, however, to integrate high quality nature conservation into new recreation and leisure developments in the area.

The complexity and rapidly changing nature of the area dictates that the project must work at a number of levels to maximize the level of success, for example, regional and local strategies and development frameworks, the planning system, minerals planning, agri-environment schemes, flood risk management, habitat and species ecology and land acquisition.

The project will target the restoration and creation of 9 UK BAP habitats and will also make significant contribution to 15 UK BAP Species Action Plans.

2. Planning: Minerals Planning and development control

In any landscape, habitats and their species can be affected by built developments of varying sizes and types. This is particularly true in the CWP, where sand and gravel extraction results in restoration of the land and a change of land use to, for example, nature conservation (reed bed, wet

grassland, standing open water, shallow water wetland and wet woodland), sports & recreation and perhaps built development such as leisure complexes, hotels and second home developments. In planning terms, the CWP is therefore extremely complex with ongoing new and revised mineral applications and planning applications being submitted.

The Local Development Frameworks (LDFs) produced by Local Planning Authorities (LPAs), provide many opportunities to protect and enhance biodiversity, together with policy and legislation such as the biodiversity duty set out under the Natural Environment and Rural Communities (NERC) Act, 2006.

Built development can, with thought and careful planning, make significant contributions to local Biodiversity Action Plan targets, beyond the usual mitigation and compensation required by the planning process. In the CWP, many developers and mineral companies are putting this into practice, yielding significant biodiversity gain above and beyond their planning conditions, making significant contributions to the CWP BAP. Opportunities continue to arise where conservation action and BAP targets may be achieved implementing developer contributions and section 106 agreements.

Planning & Policy Statement 9 (PPS9) sets out national planning policies on protection of biodiversity and geological conservation through the planning system, outlining that is expected of local planning authorities. PPS9 states that, *“Plan policies and planning decisions should aim to maintain, and enhance, restore or add to biodiversity and geological conservation interests. In taking decisions, local planning authorities should ensure that appropriate weight is attached to designated sites of international, national and local importance; protected species; and to biodiversity and geological interests within the wider environment”*.

3. Promote and facilitate collection and availability of biological information in the CWP

Good quality biological information is needed in order that informed and well-reasoned decisions can be made regarding the species and habitats of the CWP, that the impact of development can be predicted and understood, and that the progress of the CWP BAP can be monitored. The monitoring of species and habitats is urgently required in the CWP to improve the prioritization and quality of conservation efforts.

Biological recording in the CWP is coordinated by the Cotswold Water Park Society, promoting the collection and collation of data and its dissemination to the local biological records centre. Supporting the Cotswold Water Park Society are a large number of local recording groups, including Gloucestershire Naturalist's Society, Wiltshire Ornithological Society, Gloucestershire Bat Group, Wiltshire Bat Group, Cotswold Water Park Ringing Group and many others.

In addition, increasing quantities of data are supplied by local ecological consultancies and their clients in the CWP, recognizing the contribution that such groups are making toward the CWP BAP. With this in mind, the Cotswold Water Park Society and local biological records centres must be adequately resourced and supported in order to manage these vast quantities of data.

4. Promote ecological and environmental research of priority habitats and species in the CWP.

The CWP is a rapidly changing, dynamic landscape which, in ecological terms, is very young in age, often supporting transient or temporary habitats and their characteristic species. The many lakes created thus far (147 plus) are also ecologically immature and rapidly changing; when created through the mineral restoration process, they are blank sheets whose ecological development and vegetation succession can vary considerably between lakes. The ecological development of a lake may

vary according to a number of biological or chemical characteristics, water quality, colonisation of vegetation and waterbirds and use by people for recreation. It is therefore of little surprise that the CWP has become a large outdoor laboratory which is perfect for promoting the study of shallow freshwater habitats and species.

Consequently, considerable research has been undertaken to date, by the Wildfowl & Wetlands Trust Slimbridge and Bristol University (as well as several other universities), regarding the freshwater habitats of the CWP, their aquatic plants, water quality, use by wintering waterbirds and human recreation.

Promoting and increasing our understanding of shallow water wetlands, a relatively poorly known habitat, will significantly enhance our efforts to promote their conservation, creation and management.

5. Promote the balance of sports and recreation with nature conservation. **[Sports and recreation is a key part of the CWP]**

There is potential for conflict between sports and recreation and nature conservation, depending upon the type of activity, the species and habitats involved and the time of year. Efforts should be made to understand and resolve such conflicts, promoting best practice in the design and management of recreational facilities and integrating these with the objectives of the CWP BAP.

6. Promote and enable land acquisition to safeguard sites of current and potential nature conservation importance.

Land acquisition is expensive but facilitates the delivery of nature conservation objectives in the long term, through the safeguarding of key sites and creation of new reserves. Such acquisition should fulfill the criteria of the landscape-level approach, facilitating the movement of wildlife across the landscape, enabling it to cope with the effects of climate change and changes in land usage.

Land acquisition should be undertaken in partnership with other members of the CWP Nature Conservation Forum.

7. Grants & Funding.

Funding is the key to all projects and improved funding strategies and partnership working can benefit all involved.

8. Education, Advice & Training.

Education and training of all partners and land owners can ensure a greater delivery of BAP targets by ensuring a greater understanding of what is to be achieved and how this should be done. This will range from the education of school groups, promoting their understanding of their place in the natural environment, to the education of local landowners and mineral companies, promoting high standards of land management and habitat creation.

9. Publicity, Interpretation and raising of awareness.

Education of the wider community is key to BAP delivery since targets can be delivered by the sum of many small actions. Awareness and understanding of the CWP BAP and its habitats and species by the wider community is key to this.

10. Policy.

The inclusion of the CWP BAP in local, regional and national policy and framework helps to strengthen the value of the BAP and raise its profile, yielding further funding and stronger, greater conservation action.

Generic Action Plan for the CWP BAP 2007/2016

Introduction

In addition to the specific targets and actions outlined within each Habitat Action Plan (HAP) and Species Action Plan (SAP), a series of broader targets and actions are outlined within the Generic Action Plan. Some relate to a number (if not all) of the CWP BAP habitats and species. Although some may have no specific relevance to individual habitats or species, by their nature, their completion will make significant contributions to nature conservation and to the CWP BAP, for example through fund raising, biological recording, policy adoption etc.

Generic Action Plan incorporates ten themes:

- 1. Landscape-scale approach; The Head of the Thames Wetland Corridor**
- 2. Planning: Minerals Planning and development control**
- 3. Promote and facilitate collection and availability of biological information in the CWP** *[Research and monitoring of species and habitats is needed to improve the prioritization and quality of conservation efforts].*
- 1. Promote ecological and environmental research of priority habitats and species in the CWP** *[Research and monitoring of species and habitats is needed to improve the prioritization and quality of conservation efforts].*
- 2. Promote the balance of sports and recreation with nature conservation.** *[Sports and recreation is a key part of the CWP. There is potential for conflict between sports and recreation and nature conservation. Efforts should be made to resolve such conflicts, promoting best practise in the design and management of recreational facilities and integrating these with the objectives of the CWP BAP].*
- 3. Promote and enable land acquisition to safeguard sites of current and potential nature conservation importance.** *[Land acquisition is expensive but facilitates the delivery of nature conservation objectives in the long term, through the safeguarding of key sites].*
- 4. Grants & Funding.** *[Funding is key to all works and improved funding strategies and partnership working can benefit all involved].*
- 5. Education, Advice & Training.** *[Education and training of all partners and land owners can ensure a greater delivery of BAP targets by ensuring a greater understanding of what is to be achieved and how this should be done].*
- 6. Publicity, Interpretation and awareness raising.** *[Education of the wider community is key to BAP delivery since targets can be delivered by the sum of many small actions. Awareness and understanding of the CWP BAP and its habitats and species by the wider community is key to this].*
- 7. Policy.** *[The inclusion of the CWP BAP in local, regional and national policy and framework helps to strengthen the value of the BAP and raise its profile, yielding further funding and stronger, greater conservation action].*

These are considered over-arching themes which compliment the more specific targets and actions elsewhere in the CWP BAP.

See table for Generic Action Plan targets and actions.

**CWP GENERIC ACTION PLAN
2007- 2016**

1. **Landscape-scale approach; The Head of the Thames Wetland Corridor**
2. **Planning: Minerals Planning and development control**
3. **Promote and facilitate collection and availability of biological information in the CWP**
4. **Promote ecological and environmental research of priority habitats and species in the CWP.**
5. **Promote the balance of sports and recreation with nature conservation. [Sports and recreation is a key part of the CWP.**
6. **Promote and enable land acquisition to safeguard sites of current and potential nature conservation importance.**
7. **Grants & Funding.**
8. **Education, Advice & Training.**
9. **Publicity, Interpretation and awareness raising.**
10. **Policy.**

Action Plan	Target Code	Target Text	Target Year	Action Code	Action Text	Action Lead	Action Partners	Measure (units)
Theme 1: Landscape-scale approach; The Head of the Thames Wetland Corridor								
GAP	GAP-T1	The Head of the Thames Wetland Corridor Project is adopted as the landscape-scale project in the Cotswold Water Park by all partners	2010	GAP-A1	Project is promoted to all partners, including nature conservation organisations, landowners, mineral companies, local developers and NCF partners and adopted as the local project delivering landscape-level biodiversity enhancements, integrating nature	CWP BAP Team	NCF	All partners have adopted The Project by 2010.

					conservation, built development, mineral restoration and agriculture.			
GAP	GAP-T2	Establish series of SNAs in the CWP	2010	GAP-A2	Based upon the South West Nature Map, establish a series of Strategic Nature Areas in the CWP, coordinated across the county and administrative boundaries, to and between which, conservation action can be targeted.	CWP BAP Team	NCF	SNAs agreed and published
GAP	GAP-T3	Agreed framework in place for the creation and restoration of new BAP priority habitats within SNAs throughout the corridor	1016	GAP-A3	Draft and establish an agreed programme and series of priorities for habitat creation and enhancement in the CWP, linking up and enhancing identified SNAs in the CWP. [it is recognised that the completion of the habitat creation and enhancement may be beyond the lifespan of this BAP, but that the principles should be agreed]	CWP BAP Team	NCF	Programme and priorities agreed and reported
Theme 2: Planning - Minerals Planning and development control								
GAP	GAP-T4	All major developments to achieve an overall biodiversity gain.	2016	GAP-A4	Major developments should achieve an overall biodiversity gain, either through planning conditions or above and beyond these, for a number	CWP BAP Team	NCF	All major developments to make a significant and measurable contribution to 1 or more CWP BAP

					of UK and CWP BAP habitats and species.			targets and actions.
GAP	GAP-T5	All major developments to contribute to biodiversity enhancement throughout the CWP	2016	GAP-A5	Whether through planning gain or through section 106 agreements, all major developments should make a significant contribution to nature conservation in the wider CWP.	CWP BAP Team	NCF	All major developments to make a significant and measurable contribution to 1 or more CWP BAP targets and actions
Theme 3: Promote and facilitate collection and availability of biological information in the CWP								
GAP	GAP-T6	To ensure all ecological records for CWP are held at county record offices	2007 ongoing	GAP-A6	Collation of existing survey data and submit to county record office. Encourage consultants and developer to submit records to record offices. Encourage all record groups and volunteers to submit record	NCF	NCF	Annual input to county record centres
GAP	GAP-T7	To ensure record offices and CWP BAP team have up-to-date ecological data from partner organisations and consultancies.	2010	GAP-A7	All data held by LA's and NCF partners, regarding protected species, CWP BAP species and species of conservation concern to be made available to the CWP BAP Team and local record centres. To include ES and EIAs as supporting documents on planning applications	LA	NCF	Data exchange once a year
Theme 4. Promote ecological and environmental research in the CWP of priority habitats and species								

GAP	GAP-T8	3 doctoral or post-doctoral studies completed upon studies into CWP BAP species and habitats	2016	GAP-A8	To develop relationship with local academic institutions and develop project briefs that can contribute to the delivery of the targets in the CWP BAP	CWP BAP team	NCF	3 studies completed and published
GAP	GAP-T9	4 BSc or MSc Studentships completed upon studies into CWP BAP species and habitats	2016	GAP-A9	To develop relationship with local academic institutions and develop project briefs that can contribute to the delivery of the targets in the CWP BAP	CWP BAP team	NCF	4 studentships completed
GAP	GAP-T10	Create a field study centre in the CWP, working in partnership with at least one university or organisation	2016	GAP-A10	FSC to be integrated into Cleveland Lakes complex, promoting biological and ecological research.	CWP Society	CWP Society	1 Field Study Centre established
Theme 5. Promote the balance of sports and recreation with nature conservation.								
GAP	GAP-T11	Ensure where practical new lakes are created for water sports appropriate features are integrated to contribute to delivery of the to objectives of the CWP BAP without compromising the proposed use of lakes for waterspouts.	2016	GAP-A11	Early discussion with landowners, mineral companies and mineral planners on restoration plans for quarries	CWP BAP team	NCF	Number of new water sport sites which contribute to delivery of BAP targets

GAP	GAP-T11		2016	GAP-A12	Provide appropriate advice to developers, consultants and planning authorities when schemes are brought forward for re-design of existing lakes	CWP BAP team	NCF	Number of new water sport sites which contribute to delivery of BAP targets
GAP	GAP-T12	Optimized temporal and spatial use of lakes to balance nature conservation, sport and recreation.	2016	GAP-A13	Provide appropriate advice and support to water sport venues in CWP particularly through leaflets and training sessions	CWP BAP team	NCF	Numbers of leaflets produced, and number of training events
GAP	GAP-T13	Develop a conservation management plan on recreational lakes to integrate recreation and nature conservation, contributing to the CWP BAP targets where possible.		GAP-A14	Develop standard template and guidelines for conservation management plan for water sports lakes. NCF partners to work with water sport venues to develop plans	CWP BAP team	Water Sport Clubs , NCF	Production of template
Theme 6. Promote and enable land acquisition to safeguard sites of current and potential nature conservation importance								
GAP	GAP-T14	As opportunities arise, seek to safeguard and favourably manage sites through land acquisition.	2010	GAP-A15	Develop common land acquisition policy for NCF members	CWP BAP Team	NCF	Policy agreed and published.
GAP	GAP-T14		2007 ongoing	GAP-A16	NCF members to facilitate and support land	NCF		As opportunities arise, acquire sites

					acquisition, as agreed in the land acquisition policy, for nature conservation in the CWP through the identification of sites, identification of funding streams and support of acquisition.			for nature conservation.
Theme 7. Resources and Funds Objective: To develop ongoing funding streams to implement BAP targets								
GAP	GAP-T15	To ensure partner organisations maximise funding streams to deliver CWP BAP targets	2010	GAP-A17	Form funding sub-group of NCF to develop joint project funding bids and support partner organisation bids	NCF	Fund raising teams of NCF members	Number of successful bids making a significant contribution to delivery of CWP BAP targets
GAP	GAP-T16	Ensure that Section 106 monies from developments in the CWP make significant contributions to the CWP BAP and its component projects.	2010	GAP-A18	Develop robust criteria for Section 106 funds to enable funding of CWP BAP projects. Enable s106 monies to make significant contribution to nature conservation in the CWP.	LA's (Planning & Development)	NCF	Number (amount) of section 106 funding supporting BAP projects
GAP	GAP-T17	Develop clear linkage of delivery of CWP BAP targets with LAA funding stream	2010	GAP-A19	Work in partnership with LAA block leads and emerging Environmental partnerships	CWP BAP Team	NCF	Level of funding for CWP BAP targets via LAA process
GAP	GAP-T18	Develop clear linkage of delivery of CWP BAP targets with local ALSF	2010	GAP-A20	Develop criteria and project suitable for local ALSF support	CWP BAP Team	NCF	Number of targets delivered via local ALSF

Theme 8 Education, Advice & Training								
GAP	GAP-T20	2 training events for CWP-related professional groups by 2010, 5 by 2016.	2 by 2010, 5 by 2016	GAP-A21	Training events to be undertaken for professionals working in the CWP, supporting the CWP BAP, for example, mineral companies, second home developers, lake owners etc. Subjects to include lake restoration and design, habitat management for wildlife, retrofitting buildings for wildlife, lake restoration for stoneworts etc	CWP BAP Team	NCF	2 by 2010, 5 by 2016
GAP	GAP-T21	Organise and undertake 2 specialist events for landowners/lake owners promoting species and habitats of the CWP.	2016	GAP-A22	Provide specialist ecological advice to targeted audiences to support and promote habitats and species of the CWP BAP. Such a conference may include habitat creation for stoneworts, land management for bats, riparian management for water voles.	CWP BAP Team	NCF	2 specialist events
GAP	GAP-T22	To ensure all Public bodies are aware of their obligations under the NERC Act and make	2010	GAP-A23	Use existing publications on NERC duty to raise awareness and request reporting upon annual delivery of NERC duty at	CWP BAP Team	NCF	Reporting upon delivery of NERC Duty at local level, outlining contributions

		significant contributions to nature conservation in the CWP and to the CWP BAP.			local level.			made.
GAP	GAP-T23	Provide advice to land owners and managers in the CWP with regard to habitat creation and management. Establish 4 new demonstration projects by 2010, 6 by 2016.	2007 ongoing	GAP-A24	Such targets will be difficult to measure since large amounts of advice is provided continually on an ad hoc basis; therefore, measure is described in terms of demonstration projects promoting good practice habitat creation and management. Organise demonstration projects such as reedbed and hedgerow creation, islands, riverbank, mink control, Canadian geese control	CWP BAP Team	NCF	4 new demonstration projects by 2010, 6 by 2016.
GAP	GAP-T24	Increase understanding of biodiversity of the CWP through formal education to school children and youth groups	2007 ongoing	GAP-A25	Develop, promote and deliver formal education sessions relating to richness of biodiversity of CWP, and deliver on site in CWP or at schools	CWP BAP Team	NCF	Deliver education sessions to 500 children per annum

Theme 9. Publicity, Interpretation and awareness raising: Objective: to raise awareness of the conservation value of the Water Park and the Biodiversity Action Plan								
GAP	GAP-T25	Promote CWP BAP to the wider public	2007 ongoing	GAP-A26	Organise a programme of guided walks and talks, promoting nature conservation in the CWP and the CWP BAP; at least 5 events annually.	CWP BAP Team	NCF	At least 5 events annually.
GAP	GAP-T25	Promote CWP BAP to the wider public	2016	GAP-A27	Organise and undertake 2 events promoting species and habitats of the CWP and the CWP BAP to the wider communities	CWP BAP Team	NCF	2 specialist events
GAP	GAP-T25	Promote CWP BAP to the wider public	2016	GAP-A28	Publication of popular leaflets and information promoting Habitats and Species of the CWP BAP.	CWP BAP Team	NCF	1 specialist leaflet per annum
GAP	GAP-T26	Maximise use of website to promote the BAP and the nature conservation value of the CWP	2008 ongoing	GAP-A29	Develop wildlife website for CWP to promote the BAP and nature conservation projects of all partners in the CWP, linking to related projects in neighbouring counties.	CWP BAP Team	NCF	Launch and maintenance of website. number of hits
Theme 10. Policy: Objective Ensure policy support at local, county and regional level for delivery of targets in CWP BAP								
GAP	GAP-T27	CWP BAP is incorporated into relevant local policies: Glos Mineral Plan, Wilts Mineral Plan, SPD where appropriate.	2016	GAP-A30	NCF partners to provide coordinated responses to all consultation of Glos & Wilts mineral plans and appropriate local LDFs	LA's	CWP BAP Team	The relevant policies make appropriate contributions to the CWP BAP. CWP BAP is featured in all appropriate

								plans and frameworks.
GAP	GAP-T28	CWP BAP is incorporated into relevant national policies, including: Natural England South -West, EA Upper Thames, Thameswater etc, RSPB South-West,	2016	GAP-A31	NCF partners to provide coordinated inputs to relevant policy documents	LAs	CWP BAP Team	The relevant policies make appropriate contributions to the CWP BAP. CWP BAP is featured in all appropriate plans and frameworks.
GAP	GAP-T29	CWP BAP is adopted as SPD by all local authorities.	2016	GAP-A32	Provide coordinated Input to local planning processes and where appropriate targeted lobbying	NCF	LAs	CWP BAP adopted as SPD by all LA's.
GAP	GAP-T30	Develop a common set of planning conditions to contribute delivery of CWP BAP	2016	GAP-A33	Such common planning conditions will enable LA's covering the CWP to produce a united response to planning applications either side of the county boundary. This will strengthen planning responses and ensure consistency in the planning conditions. Common conditions to include landscaping schemes using only native plants of known, local provenance, hedgerow and tree planting, promoting habitat corridors through landscaping	LA's	CWP BAP Team	Common set of planning conditions agreed and adopted by all LA's.

					schemes, pond creation, ecological monitoring etc. CWP BAP Team to work with LA reps on NCF and relevant planning officers to develop common set of planning condition and guidance for their use			
GAP	GAP-T31	Ensure delivery of UK and Local BAP targets are a key component of Master Plan for CWP	2008	GAP-A34	Provide on-going input to master planning process through officer group and consultation process	CWP BAP Team	NCF	Delivery of BAP targets is a key policy objective of Master Plan
GAP	GAP-T32	All protected species are adequately surveyed for prior to all new developments and mineral applications.	Target: 2007 ongoing	GAP-A35	Ensure that appropriate surveys are undertaken on sites showing potential for protected species. Include protected species and their habitat requirements in the development of mineral restoration plans for the CWP. (Protected species include water vole, otter, great crested newt, barberry carpet moth, bats, white clawed crayfish and others)	LAs (Planning & Development)	Natural England, NCF, CWP BAP Team, landowners	Number of applications where protected species are considered should be 100% of mineral applications, and large developments.
GAP	GAP-T33	All protected species impacted by all developments and mineral applications to be mitigated for and	Target 2007 ongoing	GAP-A36	Ensure that appropriate surveys are undertaken on sites showing potential for protected species. Include protected species and their habitat requirements in the	LAs (Planning & Development)	Natural England, NCF, CWP BAP Team, landowners	100% of mineral applications and large developments where there is likely negative impact on

		enhanced			development of mineral restoration plans for the CWP. (Protected species include water vole, otter, great crested newt, barberry carpet moth, bats, white clawed crayfish and others)			protected species
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Habitat Action Plan for Boundary Features

There are four main types of boundary features - ancient and species-rich hedgerows, highway verges, embankments and ditches. Dry-stone walls are not a typical feature of the Cotswold Water Park landscape, but may also occur on boundaries. Canals, large ditches, rivers, streams and standing open water are covered elsewhere in the CWP BAP.

Boundary features are extremely important habitats providing linkages across the landscape and between other habitats; such features facilitate the movement and dispersal of species across the landscape, promoting more sustainable populations by linking populations as well as habitats.

1 Conservation Priority

Status	Priority
National	<ul style="list-style-type: none"> • Hedgerows are a UK BAP Priority Habitat • Boundary & Linear Features are defined as a 'Broad Habitat' in the UK BAP • Regulation 37 of the Habitats Regulations 1994 requires land use plans to include policies to encourage management of boundary features. • UK BAP review progress in 2007 refers to "Hedgerows", now omitting the "Species-rich" suffix. • 'Important' hedgerows are protected by the Hedgerow Regulations 1997. • Tree Preservation Orders can protect important hedgerow, boundary trees, and trees which are important landscape features.
Regional	<ul style="list-style-type: none"> • Hedgerows are the subject of a HAP in the SW BAP
County	<ul style="list-style-type: none"> • Ancient and/or species-rich hedgerows HAPs in the Gloucestershire and Wiltshire BAPs. • Grassland on verges and embankments can be related to HAPs – Unimproved Limestone Grassland and Unimproved Neutral Grassland (Glos BAP) plus Calcareous Grassland and Neutral Grassland (Wilts BAP).

2 National and Local Status

There are approximately 450,000 km of hedgerow in the UK, of which approximately 190,000 km may be species rich. There are hundreds of kilometres of hedgerow in the Cotswold Water Park (Smith *et al* 1997). As gravel extraction licences have tended to be granted on a field by field basis, many lakes are surrounded by old hedgerows which, due to lack of management, have sometimes become valuable linear scrub features, eg for nightingale and bats. Historically many hedgerows and ditches have been lost in the Cotswold Water Park through mineral extraction activities, but now permissions will usually seek to avoid and mitigate such impacts.

Several hundred kilometres of ditches and drains exist in the CWP today (*pers.comm. G Harris 2007*) along roads, fields and hedgerows, many of which comprise field boundaries. Many wide grassy road verges with at least 1 km of verge/embankment in the CWP have been included on the Gloucestershire Roadside Verges Register as important grasslands. Also another 1 km of species rich verge/embankment has been identified in Wiltshire by Chalkhill Environmental Consultants (1995).

3 Habitat and Ecology

Hedges of good quality in the CWP contain a wide range of tree and scrub species, notably field maple, ash, hawthorn, blackthorn, purging buckthorn, elder, wild privet and grey willow, suckering elm and black poplars (Bell, D. 1992). Wide grassy highway verges exist in places and a few support the nationally scarce downy-fruited sedge (*Carex filiformis*). Ditches may contain running or standing water and can support various wetland plants and animals, including several species of dragonfly and damselfly. Ditches may also provide important wildlife corridors between lakes, rivers, streams and canals. Several roadside ditches in the CWP support water vole. Willow pollards associated with some boundary features contain significant dead wood habitat which is important for some nationally scarce invertebrates. Re-pollarding of willow should be carried out sensitively to prolong the life of the tree. Furthermore, a large number of hedgerow standards, veteran trees and in-field trees are known across the CWP, many of which may not be in favourable condition or management. Such mature trees are likely to support key lichen and invertebrate species and are likely to comprise a key corridor for movement across the upper Thames landscape.

Boundaries are primary habitats for a number of species of conservation concern included in the UK BAP and the CWP BAP including water vole, reed bunting, nightingale, several species of bat, black poplar, barberry carpet moth and great crested newt. Other relevant species include the brown hairstreak butterfly and the glow worm.

Species Statement: Roman snail, (*Helix pomatia*)

The Roman snail, (*Helix pomatia*) the UK's largest snail, favours rough grassland, woodland, scrub and hedgerows on chalk and limestone; several populations are known within the CWP (near Somerford Keynes, near Marston Meysey, near Ashton Keynes). The Roman snail is considered a gastronomic delicacy but over-collection and over-exploitation of wild populations means it is now endangered throughout its European range (it is listed in Appendix III of the Bern convention and on the IUCN Red List). At present, protection of this species applies only to collection and sale. Care should be taken in the CWP to preserve and support Roman snail populations. Boundary habitats such as verges, hedgerows and scrub are particularly important in this respect.

Habitat Statement: Mature & Veteran Trees

The CWP and wider Upper Thames landscape includes a large number of mature (and often veteran) trees, including riparian willow pollards, hedgerow standards, veteran trees and in-field trees, many of which may not be in favourable condition or management. Many hedgerows and river banks with the CWP support large willow and black poplar specimens and many specimens of mature oak, ash and field maple are known across the farmland of the area. Such mature trees are likely to support key lichen and invertebrate species and are likely to comprise a key corridor for movement across the upper Thames landscape; their decline may impede the movement of key invertebrate species across the CWP, particularly important in light of anticipated changes associated with climate change. With this in mind, these mature trees should be identified, protected and maintained through appropriate management. For example, hedgerow standards are damaged by regular hedgerow flailing, mature pollard often decline due to lack of management and in-field veteran trees may be impacted by mechanical operations such as ploughing which damage their complex root systems. Where doubt exists, please seek advice.

4 Current factors affecting the habitat in the UK and the Cotswold Water Park

- Loss of hedgerows by direct destruction to create larger fields has slowed down and some planting has taken place.

- A large part of the hedgerow resource is unmanaged or not managed with biodiversity in mind. Roadside verges have been managed in the past with pesticides and flail mowers and this has had a damaging effect on wildlife.
- Where management has ceased, eg not necessary for road safety, rank grassland and scrub may be replacing species-rich grassland, and shading ditches and stone walls.
- Disturbance of roadside verges by utility companies laying and maintaining services can sometimes harm hedgerows and trees, and disturbed ground can be unsympathetically restored.
- Fertiliser run-off and drift from farmland can stimulate rank growth on verges and in drainage ditches. Ditches are generally poorly managed.
- Elm trees have been lost through Dutch elm disease.
- Lack of any appropriate management of old pollards, leading to their collapse and decline.
- Mechanised cutting/flailing of hedgerows, leading to excessively frequent cutting, loss/degradation of hedgerow standards, loss/degradation of invertebrate populations such as the **brown hairstreak** butterfly (which lay their eggs on the younger, outermost growth on hedgerows).

5 Current action in the Cotswold Water Park

- Agri-environment schemes should help to address hedgerow conservation and enhancement on farmland.
- Gloucestershire County Council has adopted a Highways BAP to help take account of biodiversity and look for opportunities to enhance it, eg rotational removal of scrub on the best verges.
- Mineral operators, developers and lake owners have planted new trees and hedgerows as part of gravel pit restoration and enhancement programmes.
- The case for hedgerow retention, mitigation and enhancement is considered carefully when applications are submitted for gravel extraction and after use development.
- Landscape Character Assessments have determined how boundary features contribute to defining the characteristics of the CWP.
- Mitigation works are in place at Cleveland Farm Quarry, Ashton Keynes, for a range of species, including the Roman snail.

6 Action Plan for Boundary Features

Objectives

- 1 Retain, enhance and restore boundary features which are important for wildlife and are a key characteristic of the landscape.

See accompanying table for Targets and Actions.

Refer also to

Farmed Land Habitat Action Plan
Lowland Neutral Grassland Habitat Action Plan
Active Quarries Habitat Action Plan
Bats Group Species Action Plan
Dragonflies and damselflies Species Action Plan
Nightingale Species Statement
Great crested newt Species Action Plan
White-clawed crayfish Species Statement
Barberry carpet moth Species Action Plan
Glow worm Species Statement
Black poplar Species Action Plan

Boundary Features HAP

Boundary Habitats Action Plan 2007 – 2016

Objective 1: Retain, enhance and restore boundary features that are important for wildlife and are a key characteristic of the landscape.

Action Plan	Target Code	Target Text	Target Year	Action Code	Action Text	Action Lead	Action Partners	Measure (units)
Boundary HAP	BOU-T1	Location and conditions of key boundary features, identified and mapped	2010	BOU-A1	Identify location and condition of boundary features of nature conservation value through Phase 1 Habitat Survey(s) especially those comprising key corridors maintaining habitat connectivity. Criteria to select key features drafted.	CWP BAP Team	NCF, landowners	Creation of map. Assessment of condition of identified features.
Boundary HAP	BOU-T2	75% of boundary features identified as above to be in favourable management	2016	BOU-A2	Conserve and enhance through agri-environment schemes and general good practice management	CWP BAP Team	NCF, landowners	Percentage of selected length of boundary features in favourable management for nature conservation.
Boundary HAP	BOU-T3	Create or restore 50km of new boundary features	2016	BOU-A3	Increase length of boundary features, improving habitat connectivity for species such as water vole (ditches) and	CWP BAP Team	NCF, landowners	15km of features created or restored.

					bats (hedgerows). Manage for nature conservation. May include restoration of dried up ditches or replanting of impoverished hedgerow			
Boundary HAP	BOU-T4	Identify, protect and maintain notable hedgerow trees, such as hedgerow standards, in field trees riparian willow pollards, ancient and veteran trees.	2016	BOU-A4	Conserve and enhance through agri-environment schemes and general good practice management	CWP BAP Team	NCF, landowners	Number of trees identified and maintained
Boundary HAP	BOU-T4	Identify, protect and maintain notable hedgerow trees, such as hedgerow standards, in field trees riparian willow pollards, ancient and veteran trees.	2016	BOU-A5	Consider need for further TPOs to protect specimen trees, and hedgerow standards.	LAs (Management of Land / Buildings / Highways	NCF	Number of new TPO's
Boundary HAP	BOU-T4	Identify, protect and maintain notable hedgerow trees, such as hedgerow standards, in-field trees riparian	2016	BOU-A6	Conservation and favourable management of black poplars will be of particular interest here, as well as trees known to or are able to support a bat roost.	LAs (Management of Land / Buildings / Highways	NCF, landowners	Number of new TPOs.

		willow pollards, ancient and veteran trees.						
Boundary HAP	BOU-T4	Identify, protect and maintain notable trees, such as hedgerow standards, in-field trees, riparian willow pollards, ancient and veteran trees.	2016	BOU-A7	Develop survey programme of notable trees for lichens and invertebrates focusing upon species of conservation concern, red data book species, UK BAP and LBAP species.	Gloucs. Naturalists Society,	NCF, CWP BAP Team	Number of trees surveyed. Output reports circulated to NCF and local records centres.
Boundary HAP	BOU-T5	Update register of protected roadside verges held by Local Authorities	2010	BOU-A8	Re-survey current protected roadside verges in the CWP. NCF partners to put forward sites for addition to registers.	LAs (Management of Land / Buildings / Highways	NCF	New sites added to register & register updated/revised.

Habitat Action Plan for Built Structures

This Habitat Action Plan does not readily fit in with those in the UK BAP or in regional or county BAPs, but is relevant to a number of other Plans, for example the HAP for UK Broad Habitat Built up Areas (which focuses upon semi-natural remnants within urban areas) and the Bat Species Action Plan. This Habitat Action Plan for Built Structures has been written and included in the CWP BAP in recognition of the amount of built development already with planning permission in the CWP.

This Habitat Action Plan includes man-made built structures such as bridges, buildings and roads. In particular, this HAP has been drafted to maximise biodiversity gain associated with new lake-side lodges, new second home developments, new leisure complexes etc. This HAP also includes new housing within towns and villages of the CWP, bridge repairs and construction.

This HAP does not include the Thames/Severn Canal or any temporary building associated with current mineral extraction.

This HAP is not designed to be used to justify further new built development; it is designed to influence the quality of what is built and to maximise nature conservation gain wherever possible.

It therefore fits with the requirements of Paragraph 14 of Planning Policy Statement 9 which requires local authorities to encourage developers to maximise the opportunities for enhancing biodiversity in new developments .

Further information

Planning Policy Statement 9, Biodiversity and Geological Conservation

Circular 06/05: Biodiversity and Geographical Conservation - Statutory Obligations and their Impact within the Planning System.

Planning for Biodiversity and Geological Conservation: A Guide to Good Practice

All of the above documents available free to download from www.communities.gov.uk

1 Conservation Priority

Status	Priority
National	Nearest equivalent is the Urban and Built up Areas and Gardens HAP within the UK BAP.
Regional	-
County	Gloucestershire BAP includes an Urban Habitat Action Plan

Built structures are relevant to the Towns, Cities and Development section of “Working with the Grain of Nature – A Biodiversity Strategy for England”, in which the programme of actions includes:

- The planning and implementation of large-scale strategic and infrastructure projects that take full account of the needs of protected areas and species and wider biodiversity
- Encouragement to local authorities and developers to see the potential of biodiversity as an enhancement to developments
- Incorporation of more biodiversity elements into green buildings

2 National and Local Status

The key issue in measuring the status of this type of habitat is its potential to support wildlife. An increase in built structures per se would not be beneficial to biodiversity. The quality of the habitat

and the opportunities it provides to support important species and habitats is crucial. There is no current data that can be used to assess the status of this habitat. There are ways in which elements of this could be measured, for example the number of barns supporting bat roosts.

3 Habitat and Ecology

Built structures provide habitats for a variety of different species at various stages in their life cycles, for example; swallows often nest in old barns; bats have summer roosts in barns, houses, bridges and other structures; amphibians and reptiles may over-winter in stone walls and other structures; unusual plant communities may develop on old walls. It is normally the protection, shelter and the more consistent climate offered by built structures which make them useful to certain species. There are also examples where built structures may mimic natural structures, for example, house martins now nest on buildings more often than natural cliffs.

Building/Structure	Potentially relevant species (this is not an exhaustive list)
Barns	Barn owl, little owl, swallow, house martin, swift, starling, tree sparrow, house sparrow, kestrel, bats
Houses/lodges	Starling, tree sparrow, house sparrow, house martin, swift, bats
Bridges	Bats (especially Daubenton's), grey wagtail, dipper, kingfisher

4 Current factors affecting the habitat in the UK and the Cotswold Water Park

- New build – the availability of new structures designed for wildlife
- Renovation – this can potentially destroy wildlife opportunities
- Dereliction – as built structures decay, more opportunities for wildlife may develop, although if this decay becomes too advanced the structure may no longer be suitable for wildlife.

5 Current Action in the Cotswold Water Park

There are several projects in the CWP aimed at increasing the biodiversity value of built structures.

- **Within new build** - planning permissions for many of the new developments in the CWP have conditions or legal agreements relating to habitat creation.
- For example at the recently completed Four Pillars Hotel at Lake 6, parts of the new hotel are timber clad with bat roosting opportunities built into the design of the cladding.
- The new education building constructed at Lower Moor Farm (Wiltshire Wildlife Trust) also includes various structures within for roosting bats.
- **Retrofit on new buildings** - even if a building is constructed without any habitat provisions, some can be retro-fitted.
- For example, Lower Mill Estate where more than 60 nest boxes specifically for house martins have been installed at Mill Village (Phase 1), successfully encouraging house martins to colonise these buildings.
- **Retention and inclusion of habitat features within renovations** - during the planning process valuable wildlife features are often found, for example bat roosts in barn renovations. These can then be retained and enhanced, with careful design.
An example of this is Clattinger Farm (Wiltshire Wildlife Trust) where renovation of disused barns will include the creation of bat hibernacula.
- **Birds Bats & Buildings** project– As part of the work of the Cotswold Local Strategic partnership a web-based guidance document has been produced to provide basic information and links to further information for all builders, developers and property owners (see www.waterpark.org)

6 Action Plan for Built Structures

Objectives

- 1 To ensure that the nature conservation features associated with built structures are protected and enhanced in the Cotswold Water Park.
- 2 To create new opportunities for nature conservation gain on built developments in the Cotswold Water Park.

See accompanying table for Targets and Actions.

Refer also to

Bat Group SAP

For further information

Pickering, Dr S (2007) Birds, Bats and Buildings Cotswold Water Park Society, Local Strategic Partnership. (www.waterpark.org)

Built Structures HAP

Built Structures Habitat Action Plan 2007 – 2016

Objective 1. To ensure that the nature conservation features associated with built structures are protected and enhanced in the Cotswold Water Park.

Action Plan	Target Code	Target Text	Target Year	Action Code	Action Text	Action Lead	Action Partners	Measure (units)
Built Structures HAP	BS-T1	Adequate assessment of all buildings with potential to support relevant species prior to maintenance, development or renovation for their existing nature conservation value.	2007 ongoing	BS-A1	<p>In dealing with planning application LA's and developers to follow guidance in PPS 9.</p> <p>To ensure that existing and in particular old buildings are adequately assessed for all bat species and breeding birds that appropriate licenses are held for nest monitoring Where necessary, employ suitably experienced and qualified bat workers for assessment of bat activity and presence.</p> <p>Survey work is to be undertaken at the correct time of year in order to record bat activity and</p>	LA's (Most Services)	NCF	<p>A register of sites assessed in the CWP contributing to this HAP to be established by 2008.</p> <p>Assessment reports for each development detailing species surveyed for, time of year and results..</p>

					thereby detection of roosting bats and to record the presence of breeding birds,			
Built Structures HAP	BS-T2	Existing nature conservation value, built structures to be retained	2007 ongoing	BS-A2	In dealing with planning application LA's and developers to follow guidance in PPS 9. Maintenance work on old structures should retain features of nature conservation value and should be undertaken at a time of year appropriate to species found there, ie outside of the bird nesting season and so as not to conflict with roosting bats.	LA's (Most Service s)	NCF	Develop a register of sites assessed in the CWP contributing to this HAP; to be established by 2007. Assessment reports for each development detailing species surveyed for, time of year and results. Record mitigation works and their success.
Built Structures HAP	BS-T3	Mitigate for lost wildlife habitat in restoration or refurbishment of old buildings	2007 ongoing	BS-A3	In dealing with planning application LA's and developers to follow guidance in PPS 9. Ensure appropriate mitigation where features of old buildings may be lost; (such features include physical opportunities for nesting birds and roosting bats) or where species may be	LA's (Most Service s)	NCF	Develop a register of sites assessed in the CWP contributing to this HAP; to be established by 2007. Assessment reports for each development detailing species surveyed for, time of year and results. Record mitigation works and their

					lost. Mitigation works should be put in place if the species or the features they rely upon may be lost. Mitigation should be long term, ie involving improved building design for wildlife rather than short term measures such as wooden nestboxes.			success.
Built Structures HAP	BS-T4	Produce and publish guidelines for builders, developers and planners advising upon maximizing the nature conservation value of new developments and renovations.	2008	BS-A4	Guidelines advising upon improved building specifications for nesting birds, retrofitting of existing buildings for wildlife and the incorporation of features into new builds. Advise upon the law, maintenance of features, measuring successes.	LA's(Planning & Development)	Natural England, developers, NCF	Production and publication of guidelines and dissemination to relevant groups.
Built Structures HAP	BS-T5	Two demonstration projects where restoration of building incorporating a range of features for nature conservation.	2012	BS-A5	LA's, developers and consultants to be alert for the opportunity to work to develop demonstration projects. Such developments would maintain and create natural nesting and roosting sites. And may include wider eaves and open fronted buildings	LA's(Planning & Development)	Natural England, developers, NCF	A report on two demonstration projects incorporating a range of features for nature conservation.

					for nesting swallows and house martins, swift tiles, construction of bat hibernacula and lofts in roof-spaces, crevices for hibernating invertebrates, creation of crevices for nesting birds such as house sparrow and starling. This work should be undertaken in compliance with relevant ISO standards.			
Objective 2: To create new opportunities for nature conservation gain on built developments in the Cotswold Water Park.								
Built Structures HAP	BS-T6	Nature conservation feature to be incorporated in ALL new large developments (25 +units or great 0.5ha) and at least 3 small-medium new developments (5-25 unit)	2010	BS-A6	LA's, developers and consultants to be alert for the opportunity to work to develop demonstration projects. Such developments would create nesting and roosting sites as part of new developments. This work should be undertaken in compliance with relevant ISO standards.	LA's(Planning & Development)	Natural England, developers NCF	Number of "features" installed and created at how many sites.
Built Structures HAP	BS-T7	Landscaping schemes designed to enhance biodiversity.	2010	BS-A7	LA's and landscape architects to ensure landscaping and planting schemes to use only	LA's (Planning & Development)	CWP BAP Team, Natural	Number of schemes where native plants only are used.

					native plants of local provenance	pment	England developes	
Built Structures HAP	BS-T8	Landscaping design and planning to promote habitat connectivity, within and beyond the site.	2010	BS-A8	LA's and landscape architects to ensure landscaping schemes to link to existing boundary features such as hedgerows and lake shorelines. Target species include otter, water vole, great crested newts and bats.	LA's (Planning & Development)	CWP BAP Team, Natural England developes	Number of schemes where habitat connectivity is promoted. To include ALL new large developments and at least 3 small-medium new developments. 2 Demonstration projects.
Bat SAP	BAT-T4	All large developments to generate a net gain for bats	2007 ongoing	BAT-A6	Landscaping schemes to create and improve and link foraging areas, commuting routes and known and newly created roosts. Built developments to include creation of bat lofts, hibernacula and bat tiles/bricks.	CWP BAP Team	NCF	All large-scale developments incorporating habitat creation and management for bats. (Measure length of flyways and commuting routes created and managed, number of roosts created etc).
Bat SAP	BAT-T8	3 Bat lofts created in buildings	2010	BAT-A13	Seek advice on best designs and techniques available. Pro-actively seek and develop opportunities to achieve this.	CWP BAP Team	Developers, LA's (Planning & Development)	3 lofts created. Refer also to Built Structures HAP

Bat SAP	BAT-T9	2 hibernacula created in buildings	2016	BAT-A14	Seek advice on best designs and techniques available. Pro-actively seek and develop opportunities to achieve this.	CWP BAP Team	Developers, LA's (Planning & Development),	2 hibernacula created. Refer also to Built Structures HAP
Bat SAP	BAT-T10	Bat bricks/tiles to be incorporated into 100 new buildings	2016	BAT-A15	Seek advice on best designs and techniques available. Pro-actively seek and develop opportunities to achieve this.	CWP BAP Team	Developers, LA's (Planning & Development),	Bat bricks and tiles incorporated into 100 new buildings. Refer also to Built Structures HAP

Habitat Action Plan for Canals

Canals are man-made waterways. They differ from natural watercourses because of their controlled levels and slow flows. They may be commercial waterways used for freight traffic, cruising canals for pleasure craft, or derelict and non-navigable canals classified by British Waterways as 'Remainders'.

1 Conservation Priority

Status	Priority
National	UK BAP includes a Habitat Statement on open standing water and canals. Canals can support a highly diverse assemblage of species
Regional	In terms of canal length the South West is not a significant area
County	Gloucestershire and Wiltshire probably have greater canal length than in the rest of the South West Region. The Gloucestershire BAP has a Canals Habitat Action Plan and the Wiltshire BAP includes them within an Open Standing Water Habitat Action Plan.

2 National and Local Status

There are 3870 km of canals in Britain, 52% of which are owned by British Waterways. This resource includes 65 SSSIs related to canals. No overall survey of the conservation value of canals in the UK has been carried out, although there have been surveys of a number of key canals. The status of the canal habitat depends upon the intensity of their use. J Briggs (1996) states that most high value canals for biodiversity have relatively light traffic, while the more popular canals have less conservation interest.

Approximately 13 km of the derelict Thames and Severn Canal crosses the Cotswold Water Park and runs close to the River Thames. Over 60 years of dereliction mean that few areas of open standing water in the Thames and Severn Canal still persist and approximately 25-30% of the length has been infilled. Open areas are still rich in aquatic and marginal plants, invertebrates and amphibians, and a number of plants and insects of local importance have been recorded. The canal also supports a diverse dragonfly assemblage along several sections, for example, near to the Spine Road Bridge. The canal is probably of greatest importance where it lies adjacent to other important habitats, eg Wildmoorway Meadows SSSI.

3 Habitat and Ecology

Disused or lightly used canals tend to have the most diverse assemblages of plants and animals. They support species from a range of other BAP habitats including 'Standing Open Water', 'Rivers and Streams' and 'Boundary Features'.

Canals may be used for shelter, dispersal or feeding by a wide range of species. Bridges and tunnels can provide excellent roosting sites for bats. Birds may nest in pollarded trees and disused buildings alongside the towpath. Aquatic animals dependent on canals include the legally protected water vole and otter, as well as numerous invertebrates such as damselflies, dragonflies, water beetles and freshwater snails. In addition to the diverse aquatic and marginal vegetation in places, canals are often associated with grassland, hedgerow and arable habitats.

The following excerpt is adapted from the Gloucestershire BAP and is particularly relevant to the Thames and Severn Canal within the Cotswold Water Park:

After abandonment, canals pass through several stages of plant colonisation and silting, and their biodiversity value is dependent on this process. After a considerable period of neglect, the open conditions with areas of standing water, which are suitable to an important range of species, start to be lost. The ecological interest may then deteriorate as the canal fills in with sediment, herbaceous vegetation and then scrub. Any remaining water will be very stagnant, shaded and lacking in oxygen and at this stage the aquatic interest starts to disappear. At the final stage of dereliction canals may completely dry out and all wetland interest is lost. However, the new habitats of scrub and woodland can still be important for wildlife, eg breeding birds, bats, badgers and even dormice if they are present in the surrounding countryside.

4 Current factors affecting the habitat in the UK and the Cotswold Water Park

- Nutrient enrichment from diffuse sources (agricultural fertilisers) and point sources (sewage outfalls to ditches and streams feeding canals) is sometimes responsible for poor water quality. This can be exacerbated by increased turbidity caused by boat traffic.
- Excessive abstraction of water from and around canals, plus infilling, can occur where canals pass through farmland.
- Urbanisation through landscaping, planting bulbs and non-native trees, surfacing wide paths, clearing scrub and trees, plus lack of appropriate management can all impact on wildlife.
- Inappropriate and overly intensive management along the canal and towpath may also negatively impact upon the nature conservation value of the canal, particularly where it is undertaken at an inappropriate time of year. These factors are likely to become increasingly relevant and important in time, as and when canal restoration works are undertaken.
- Large-scale restoration projects, carried out without proper regard to the biodiversity interest and potential of canals, can be very harmful. However, if carried out sensitively and in a well-planned and phased manner then canal restoration can be beneficial. To ensure such an outcome, certain valued existing habitat will need to be conserved or enhanced; populations of important species will need to be safeguarded and new habitats created alongside and within the canal corridor.

The Thames and Severn Canal was closed in 1933 and since then parts of it have been ploughed and in-filled, particularly in the central section of the Cotswold Water Park. Lack of water resources in the area may be a major constraint to the restoration of this canal.

5 Current Action in the Cotswold Water Park

Parts of the canal running through the central section of the Cotswold Water Park were covered by a Phase 1 survey in 1992. Recent environmental work for the canal restoration project collated, collected and analysed biodiversity information. (Burnell J, Doe J, Menendez CT, Hatch P, May 2003. Habitat Survey: The Proposed Restoration of the Cotswold Canal, Chalkhill Environmental Consultants & Gloucestershire Wildlife Trust).

During 2003, the Spine Road Bridge over the canal was restored, involving some canal work on the adjacent sections. Some bat mitigation work was undertaken although the success of this is unknown.

6 Action Plan for Canals

Objectives

- 1 Carry out environmental assessments for all new maintenance, management, restoration and development work affecting the biodiversity of the Thames and Severn Canal corridor in the Cotswold Water Park.
- 2 Maintain and enhance any wildlife habitats of value associated with the Thames and Severn Canal in the Cotswold Water Park

See accompanying table for Targets & Actions.

Refer also to

Standing Open Water Habitat Action Plan
Boundary Features Habitat Action Plan
Water vole Species Action Plan
Dragonflies & Damselflies Species Action Plan
Otter Species Statement
Bats Group Species Action Plan
Stoneworts Group Species Action Plan

For further information

J Briggs. "Canals - Wildlife Value and Restoration" British Wildlife 7 (6) 1996 p365-377
Smith *et al* 1997.
Biodiversity Audit of the Cotswold Water Park. Published by WWT
Waterways Environment Services 1996. Cotswold Canal Corridor Survey. April 1996.

Canals HAP

Canals Habitats Action Plan 2007 – 2016

Objective 1: All canal restoration will result in a net biodiversity gain

Action Plan	Target Code	Target Text	Target Year	Action Code	Action Text	Action Lead	Action Partners	Measure (units)
Canals HAP	CAN-T1	Detailed environmental assessments of the ecology of every section of the canal that is proposed for restoration are completed.	As required throughout plan period 2007-2016	CAN-A1	Seek to ensure that detailed environmental assessments for each section of the Thames and Severn Canal are carried out before restoration. Each environmental assessment should include a survey of the canal's importance and potential for wildlife, as well as a realistic appraisal of water resource constraints.	Cotswold Canal Steering Group	NCF	Assessments completed prior to restoration works commence and circulated to NCF.
Canals HAP	CAN-T2	30 year Biodiversity Action Plan drafted, agreed and implemented for the canal restoration, instigated prior to commencement of restoration.	By 2016	CAN-A2	BAP written to ensure biodiversity gain of the canal restoration, ensuring habitat creation and restoration of mitigation works is focused upon specific species and habitats of the CWP BAP, with measurable outcomes. BAP to include management and maintenance works.	Cotswold Canal Steering Group	NCF	BAP implemented by 2012

Objective 2: Maintain and enhance any wildlife habitats of value associated with the Thames and Severn Canal in the Cotswold Water Park								
Canals HAP	CAN-T3	No overall net loss of habitat associated with each section of canal restored/maintained.	As required throughout plan period 2007-2016	CAN-A3	Where habitats of nature conservation value identified in CAN1 may be lost or degraded, ensure that appropriate mitigation (compensation) measures and conservation management techniques are applied.	Cotswold Canal Steering Group	NCF	No overall net loss of habitat as identified in CAN1.
Canals HAP	CAN-T3	No overall net loss of habitat associated with each section of canal restored/maintained.	As required throughout plan period 2007-2016	CAN-A4	Maintain and enhance existing and any created habitats associated with the restoration of canal sections.	Cotswold Canal Steering Group	NCF	Existing and new habitats associated with the canal in favourable condition
Canals HAP	CAN-T4	Ensure all management and works undertaken on the canal and towpath are in line with Wildlife legislation and best practice guidelines	2007 ongoing	CAN-A5	Much of the work undertaken upon the canal and its towpath is undertaken by volunteers. All work undertaken should comply with legal requirements for protected species such as bats, great crested newt, water vole, otter , as well as for breeding birds during the nesting season. Efforts should be made to support and advise Cotswold Canals Trust and its volunteers where required to prevent inappropriate works and practices.	Cotswold Canal Steering Group & NCF	NCF	Compliance with wildlife legislation for protected species. Number of advisory visits/phone calls/emails.

Habitat Action Plan for Farmed Land

This HAP covers arable land – infield and field margin habitats and crops (including setaside), and intensive pastoral systems. It also covers fruit or vegetable production where present. Field boundary features such as hedges and ditches are addressed under the Boundary Features HAP, and farm woodlands (where present) under the Woodland HAP. Non-intensive grasslands, hay meadows etc are addressed under the Neutral Grassland HAP.

1 Conservation Priority

Status	Priority
National	The UK BAP includes arable and horticulture as a Broad Habitat; cereal field margins are the only UK BAP priority habitat under this heading. Numerous farmland species are UK BAP priorities, including many invertebrates, flowering plants, brown hare, and farmland birds such as skylark, linnet, grey partridge, corn bunting and tree sparrow.
Regional	SW BAP includes an Arable and Horticulture HAP.
County	Wiltshire BAP: Arable and Horticulture HAP. Gloucestershire BAP: Cereal Field Margins

2 National and Local Status

In the Cotswold Water Park area there is a considerable variety of farm holdings, with land used for cereal crops, lowland beef and sheep amongst others. Wheat comprises 27% of the farmed area, followed by permanent grass, at 22%. Woodland also takes up 10% of the agricultural area, as does set-aside, which appears to be a higher-than-average proportion locally. About 7% of local farms are mixed, and 4% are dairy farms. Farm size varies greatly; 35% are less than 5 ha, however 24% are over 100 ha.

Land use is also very varied. Wheat comprises 27% of the farmed area, followed by permanent grass, at 22%. Woodland also takes up 10% of the agricultural area, as does set-aside, which appears to be a higher-than-average proportion locally.

3 Habitat and Ecology

Farmland by its nature is often intensively managed leading to a high degree of disturbance during the year. The extent of the disturbance determines the habitat and the range of species present. Mixed farms tend to hold a greater diversity of habitats and species than specialised arable or pastoral systems. Farmland habitats in the context of this HAP can generally be split into in-field habitats (eg the standing crop in arable fields) and field-margin habitats such as conservation headlands, game cover strips, beetle banks, etc). Generally, the greatest wildlife diversity is found in field margins and boundary habitats. Nevertheless, there are many specialised animals and plants that prefer open pasture or crops and have little or no use for hedgerows. The floodplain of the River Thames and its tributaries, until recently, supported populations of lapwing, curlew and redshank. These species continue to breed in the Cotswold Water Park in small numbers, albeit now utilising gravel pits and habitats created through mineral restoration processes. This is a result of loss of breeding and feeding habitats on farmland as agriculture became increasingly intensive and pasture was drained and converted to arable land.

In the CWP, farmland still supports a range of red listed farmland birds (**yellowhammer, tree sparrow, linnet, turtle dove, grey partridge, reed bunting and yellow wagtail**; all UK BAP species) and mammals (**brown hare, otter, harvest mouse, polecat, water vole and bats such as soprano**

pipistrelle, lesser horseshoe, brown long-eared and noctule; all UK BAP Species). Farmland sites also support species such as the **black poplar** *Populus nigra ssp betulifolia*, **snakes-head fritillary** *Fritillaria meleagris*, **greater burnet** *Sanguisorba officinale* and **shepherd's-needle** *Scandix pecten-veneris* (UK BAP) as well as an array of other meadow indicator species.

There is insufficient data to confirm if these populations are currently stable or changing; furthermore, these populations may be impacted by mineral extraction and other changes in land use. Longer term planning may be necessary to safeguard and enhance these populations.

4 Current factors affecting the habitat in the UK and the Cotswold Water Park

In the CWP further extensive changes to farmland will occur as mineral extraction continues on new sites, particularly sites in the Central and Eastern Sections; restoration in these areas will create and restore a series of wetland and agricultural habitats, which will have clear biodiversity benefits to a range of species, including farmland birds and lowland waders. Careful thought is however required to ensure that habitats are restored that can continue to support species characteristic of the original farmland (for example **farmland birds, lowland waders**, mammals such as **brown hare, harvest mouse, bats and invertebrates**) to ensure no further loss of existing biodiversity.

With this in mind, it is key that restoration includes corridors or connecting habitats that promote linkage of habitats and species to the main River Thames corridor as well as to sites within this area. Such corridors include rivers & streams, field margins, field corners/headlands, Roadside verges, riparian buffers, arable reversion etc. These corridors will also serve to facilitate movement of species during winter and summer flooding, helping to safeguard less mobile species such as the **harvest mouse** as well as facilitating movement to and from mineral sites and surrounding farmland.

Other factors include:

- Loss of mixed farming.
- Increased use of pesticides and herbicides.
- Improvement (intensification) of grasslands resulting in loss of species-rich grasslands/hay fields.
- Changes in cropping (especially the switch from spring-sown to autumn-sown cereals and the timing of harvest)
- Land drainage.
- Loss of field boundary and field margin habitats.
- Fields generally have become larger, and the 'quiet corners' of habitats such as small copses, fallow corners, farm ponds etc. have in large part disappeared.
- The collective effect of changes in agriculture on wildlife has been the loss of quantity or quality of breeding habitat, declines in availability or abundance of food, loss of habitat diversity, and changes to habitats and farming practices that have increased species' vulnerability to predation or accidental death during harvesting etc.
- In recent years, increases in the area of land under agri-environment schemes such as Countryside Stewardship/Environmental Stewardship (HLS and ELS) have been seen, in particular amongst landowners on the banks of the River Thames between Ashton Keynes and Lechlade.

5 Current action in the Cotswold Water Park

Extensive partnership working is undertaken with a large number of landowners across the CWP for a range of projects, including:

- The Water vole Recovery Project (with Wiltshire Wildlife Trust)
- Barn owl monitoring & conservation (with Cotswold Water Park Ringing Group)
- Otter monitoring & artificial holt construction (with Wiltshire Wildlife Trust)

- Farmland bird monitoring, notably tree sparrow (in partnership with the Wiltshire Tree Sparrow Project). A number of tree sparrow colonies are known and are the focus of study and support.
- The CWP Bat Initiative has undertaken survey and roost visit on a number of farms (in partnership with Gloucestershire Bat Group and Wiltshire Bat Group).
- The Wiltshire Wildlife Trust 'North Wiltshire Rebuilding Biodiversity Project' undertakes extensive partnership working with a large number of farmers and landowners, including some within the CWP area. This partnership working has focussed upon increasing habitat connectivity within key areas, particularly for woodland and species-rich grassland.

6 Action Plan for Farmed Land

Objectives

- 1 To work with land managers to increase the biodiversity value of farmed land in the CWP .
- 2 To increase the contribution of farmland in creating a continuous corridor of land through the CWP under favourable nature conservation management, linking in with the Head of the Thames Project (CWPSoc), Futurescapes (RSPB) and Rebuilding Biodiversity (The Wildlife Trusts).
- 3 To maintain and support populations of farmland birds and mammals through periods of mineral extraction and beyond

See accompanying table for Targets and Actions.

Refer also to

Boundary Features HAP

Woodland HAP

Lowland neutral grassland HAP

Barberry carpet moth SAP

Water vole SAP

Otter Species Statement

Great crested newt SAP

Standing Open Water HAP

For further information

Habitat and species advisory sheets for most farmed habitats and for several farmland birds of high conservation concern are available from the RSPB, as well as ELS/HLS advisory material and habitat management handbooks. Contact RSPB Wildlife Enquiries on 01767 680551 for further details of all publications and sources of RSPB advice or go to website www.rspb.org.uk

Farmed Land HAP

Farmed Land Habitat Action Plan 2007 – 2016

Objective 1: To work with land managers to increase the biodiversity value of Farmed land in the CWP

Objective 2: To increase the contribution of Farmed land in creating a continuous corridor of land through the CWP under favourable nature conservation management, linking in with Head of the Thames Project (CWP BAP Team), Futurescapes (RSPB) and Rebuilding Biodiversity (The Wildlife Trusts)

Objective 3: To maintain and support populations of farmland birds and mammals through periods of mineral extraction and beyond

Action Plan	Target Code	Target Text	Target Year	Action Code	Action Text	Action Lead	Action Partners	Measure (units)
Farmed Land HAP	FL-T1	Undertake surveys of key farmland-related species of bird and mammal on 4 landholdings per year	2012	FL-A1	At least 4 landholdings surveyed each year for key farmland birds (especially turtle dove, tree sparrow, yellowhammer, yellow wagtail) and mammals (brown hare and harvest mouse)	CWP BAP Team	RSPB SWRO	4 landholding surveyed each year
Farmed Land HAP	FL-T2	Establish 2 nestbox/winter feeding projects for tree sparrow colonies in the CWP	Target: by 2007 ongoing	FL-A2	Maintain and prevent the loss of two colonies of tree sparrow in the CWP. To target colonies that may be impacted by mineral extraction.	CWP BAP Team	WOS Tree Sparrow Project, Landowners, RSPB SWRO, CWRG, NCF	2 colonies maintained (to end of 2016). Monitor breeding and/or wintering tree sparrow numbers to monitor population size.
Farmed Land HAP	FL-T3	Create and maintain a network	2016	FL-A3	Create baseline map of habitat corridors to assess habitat	RSPB SWRO	CWP BAP Team, NCF, Natural	Map produced by 2009 [Map all margins of 6m

		of habitats across the CWP to facilitate movement and feeding of farmland birds and mammals			connections on farmland in CWP C and CWP E, including field margins, boundary habitats, riparian buffers, headlands, rivers, woodland edge.		England,	or more, inc. standoffs within mineral sites]
Farmed Land HAP	FL-T3			FL-A4	Encourage creation and expansion of field margins, boundary features, riparian buffers, headlands etc to improve farmland habitat connectivity and to enable farmland birds and mammals to buffer the effects of winter flooding and mineral extraction in CWP C and CWP E. <i>[Note: Aim to increase links between Thames corridor and distant sites)</i>	CWP BAP Team	RSPB SWRO	Number of km or ha of field margins, boundary features, riparian buffers, headlands etc (May also include km of boundary habitats restored/created; see Boundary Habitats HAP).
Farmed Land HAP	FL-T3			FL-A5	Update baseline map of habitat corridors [In Action above] to assess improvement in habitat connections on farmland in CWP C and CWP E	RSPB SWRO	CWP BAP Team, NCF, Natural England,	Map produced in 2016 [Map all margins of 6m or more, inc. standoffs within mineral sites]
Farmed Land HAP	FL-T4	Create and restore habitats for farmland birds and mammals on at least 3 mineral sites in the CWP	2016	FL-A6	Using mineral restoration schemes, design and implement long term mitigation for key farmland bird and mammal species to reduce further loss of farmland birds in the CWP	RSPB SWRO	CWP BAP Team, NCF, Natural England,	3 sites designed and implemented by 2016
Farmed	FL-T4			FL-A7	Draft guidance to promote	RSPB	CWP BAP Team,	Guidance drafted by

Land HAP					habitat works and restoration for farmland birds and mammals on mineral sites in the CWP (guidance targeting local authorities and mineral companies)	SWRO	NCF, Natural England,	2010
Lowland Neutral Grassland HAP	LNG-T4	Create 20ha of species-rich grassland	2016	LNG-A4	Promote neutral grassland creation and restoration amongst landowners through agri-environment schemes and mineral restoration. Target creation and restoration of species-rich grassland to link to existing areas to increase area of habitat and connectivity. Some of this area may be targeted to areas of mineral restoration, whereby seed of local provenance and character should be selected.	Natural England	FWAG, Wiltshire Wildlife Trust (Landscapes for Wildlife), land managers, RSPB SWRO	20ha of species-rich grassland created and in process of restoration
Farmed Land HAP	FL-T5	Create 150 ha of wet grassland for waterbirds	2016	FL-A9	Target creation of wet grassland in the Central and Eastern Sections of the CWP, in particular through mineral restoration. A significant proportion should be suitable for breeding and wintering waterbirds. Some of this area may be targeted to areas of mineral restoration, whereby seed of local provenance and character should be selected.	RSPB SWRO	Mineral Companies Land owners, FWAG, RSPB SWRO, Natural England, CWP BAP Team,	Creation of 150ha of wet grassland for waterbirds

					Long term target.			
Farmed Land HAP	FL-T6	Encourage arable reversion (at least 50ha), creation of wetland features and raised water levels on 1 riparian landholding.	2016	FL-A10	Target landholdings on the Thames to further promote favourable management of land for nature conservation and flood defence. Through HLS or independently. Target the creation of breeding habitat for farmland waders such as curlew and lapwing , as well as wintering waterbirds .	CWP BAP Team	RSPB SWRO Natural England, FWAG, Landowners	1 scheme of at least 50ha by 2016
Boundary Habitats Action Plan	BOU-T3	Create or restore 50km of new boundary features	2016	BOU-A4	Increase length of boundary features, improving habitat connectivity for species such as water vole (ditches) and bats (hedgerows). Manage for nature conservation. May include restoration of dried up ditches or replanting of impoverished hedgerow	CWP BAP Team	NCF, landowners	15km of features created or restored.
Barberry carpet moth SAP	BCM-T6	Establish new populations of barberry through agri-environmental schemes.	2009	BCM-A6	Identify target areas for planting of barberry bushes and preferred planting schemes. Link up proposed agri-environment schemes with identified target areas to ensure suitable areas landholdings are selected.	CWP BAP Team	Natural England, landowners	Number of new schemes where barberry planting has been included. Numbers of barberry bushes planted.
Water vole SAP	WV-T1	Maintain and then restore water vole	2016	WV-A4	Encourage and facilitate water vole conservation by local	CWP BAP	Glos WT, Wilts WT,	Number of advisory visits, letters,

		populations to all rivers in the CWP			land owners and lake owners, through advice, support and agri-environment schemes.	Team	Landowners,	workshops, agri-environment scheme applications involved with, of successful agri-environment scheme applications. Lengths of rivers/numbers of waterbodies advised upon.
Standing Open Water HAP	SOW-T4	20 ponds created and maintained for amphibians such as great crested newt, and invertebrates such as dragonflies and damselflies	2016	SOW-A7	Create 20 shallow ponds (<1ha in area) of varying depths and sizes, preferably in groups, and manage for amphibians and invertebrates. Ponds should vary in size, depth, profile and in quantity and type of vegetation around margins. Features should include overhanging woody vegetation.	CWP BAP Team	LA's(Planning & Development), Mineral Companies Director of Conservation Policy GWT, Biodiversity Manager WWT, RSPB SWRO.	CWP BAP Team, Mineral Companies, NCF,

Habitat Action Plan for Fen, Marsh and Reedswamp

This Habitat Action Plan relates to a range of shallow wetland habitats typically found around the fringes of restored quarries in silt lagoons in the CWP.

The Cotswold Water Park represents a unique opportunity in lowland England to create large areas of fen marsh reedswamp through the restoration of mineral working particularly those within the flood plain which are unsuitable for commercial development. At Roundhouse Farm the current permission is to restore the site to 35ha of closed reedbed habitat. Current estimates for the future potential area of reedbed habitat are in excess of 400ha.

1 Conservation Priority

Status	Priority
National	Fens and reedbeds are UK BAP priority habitats under 'Fen, Marsh and Swamp' broad habitat type. UK BAP target: create 1,200ha of new reedbed by 2010 in blocks of not less than 20ha. No quantitative target for fens.
Regional	SW BAP recommends creation of 500ha of new large reedbeds on land of low conservation importance and to create an additional 100 ha of small sites between 0.5 ha and 20 ha giving priority to areas near existing wetland systems.
County	Wiltshire BAP: included under Rivers, Streams and Associated Habitats, but no specific action for fen, marsh and reedswamp. Gloucestershire BAP: includes target under Reedbed HAP for creation of 3 large (10-20ha) reedbeds in the Cotswold Water Park by 2020.

2 National and Local Status

There are about 5,000 ha of reedbeds in the UK, but of the 900 or so sites contributing to this total, only fifty are individually greater than 20 ha, and these make a large contribution to the total area. Estimates suggest over 40% of reedbeds have been lost to drainage, neglect, development and flood defence works since 1945. Recent projects to rehabilitate and create reedbeds may have reversed this trend for now but long-term sea level rise may threaten coastal reedbeds in future.

'Fen' covers a complex range of habitats involving different soils, water sources and vegetation communities. This complexity and poor recording means the existing UK resource and the scale of losses are uncertain, but fen habitats have certainly declined dramatically in the past century.

In the CWP, these habitats are increasing in area - mostly as a marginal fringe habitat of standing open water. Including reed-dominated communities, thirteen types of emergent swamp communities have been described in the Cotswold Water Park¹, but stands are small (<0.5ha) as they are restricted to lake edges with relatively shallow profiles, and species-poor as only those species that are able to withstand variable water levels occur. A 20ha reedbed creation project at Shorncote is being established. Wet fen communities have developed naturally on a number of active and former silt lagoons eg lake 79, lake 40, and the former silt lagoons at Waterhay but in the long-term are at risk of being succeeded by scrub (8+ hectares).

¹ The Cotswold Water Park Nature Conservation Review (Bell, 1992) describes 13 emergent swamp communities including: *Phragmites australis* swamp & reed beds; *Glyceria maxima* swamp; *Carex riparia* swamp; *Scirpus lacustris* swamp; *Equisetum fluviatile* swamp; *Typha latifolia* swamp; *Typha augustifolia* swamp; *Sparganium erectum* swamp; *Eleocharis palustris* swamp; and *Glyceria fluitans* swamp.

Future projects should aim for a mosaic of broad fen habitat types across as large an area as possible. Within the scope of such projects it should be feasible to define target communities that will create specific habitat types characteristic of the Cotswold Water Park. Priority fen and swamp habitats include S5 (*Glyceria maxima* swamp), S6 (*Carex riparia* Swamp), S7 (*Carex acutiformis* swamp), S13 (*Typha augustifolia* swamp), S24 (*Phragmites australis*-*Peucedanum palustre* tall herb fen) and S25 (*Phragmites australis*-*Eupatorium cannabinum* tall herb fen) all of which are described as uncommon or rare in the Cotswold Water Park. Priority Mire Communities include M22 (*Juncus subnodulosus*-*Cirsium palustre* fen meadow), M23 (*Juncus effusus/acutiflorus*-*Galium palustre* rush pasture) and M27 (*Filipendula ulmaria*-*Angelica sylvestris* mire) all of which are described as rare in the Cotswold Water Park. (*Pers.comm. A Watson 2007*)

3 Habitat and Ecology

Reedbeds are wetlands dominated by stands of the common reed *Phragmites australis*, where the water table is at or above ground level for most of the year. They tend to incorporate areas of open water and ditches, and small areas of wet grassland and carr woodland may be associated with them. Reedbeds support several rare, specialist animals, notably bittern, bearded tit, otter, water vole and many invertebrates, including several species of dragonfly. Most reedbeds need management to prevent accumulation of reed-litter and eventual drying out, when they become colonised by herbs, willows and eventually become woodland.

Fens are dynamic semi-natural systems and in general, management is needed to maintain open-fen communities and their associated species richness. Without appropriate management (eg mowing and grazing), natural succession leads to scrub and woodland formation. Some fens can contain up to 550 species of higher plants (about a third of our native plant species), up to half the UK's dragonfly species, several thousand other insect species, and are important for a range of aquatic beetles.

4 Current factors affecting the habitat in the UK and the Cotswold Water Park

- Past loss of fens, marshes and swamps by drainage and conversion to intensive agriculture.
- Excessive water abstraction from aquifers may have reduced spring line flows, and generally lowered water tables.
- Small and highly fragmented sites cannot support some of the target species, especially breeding bittern.
- Inappropriate management and neglect leading to drying, scrub encroachment and succession to woodland.
- Enrichment or hyper-trophication resulting in changing plant communities
- Unfavourable bank profiles in gravel pits limit area for reed growth.

5 Current action in the Cotswold Water Park

There is ongoing management of the reedbeds at Waterhay (8ha) and a new 15ha reedbed is under construction at Cleveland Lakes. There are continuing negotiations throughout the CWP to increase the area of quarries restored to reedbed on a number of sites.

The RSPB published the 'Habitat Creation Handbook for the Minerals Industry', June 2003. This contains detailed advice on restoring minerals workings to a variety of habitats including reedbeds.

In April 2004 the RSPB, funded by English Nature, the RSPB and the Environment Agency produced a study to assess the feasibility of large-scale wetland habitat creation, following aggregates extraction in the central section of the Cotswold Water Park around Down Ampney.

6 Action Plan for Fen Marsh and Reeds swamp

Objective 1: To maintain and manage all existing fen, marsh and reeds swamp habitat in the CWP in appropriate condition

Objective 2: To create and manage new reedbeds, fen and swamp communities for priority wetland species, linking to existing habitats and wildlife corridors within and beyond the CWP

See accompanying table for Targets and Actions.

Refer also to

Bittern Species Statement / Otter Species Statement / Reed bunting Species Statement
Dragonflies and damselflies Species Action Plan

For further information

Hawke, C J and Jose, P V (1996) *Reedbed management for commercial and wildlife interests*.
The RSPB, Sandy.

White, G J and Gilbert, J C (eds) (2003) *Habitat creation handbook for the minerals industry*.
The RSPB, Sandy.

White G, Purps J and Alsbury S (2006) *The Bittern in Europe: a guide to species and habitat management*.
The RSPB, Sandy.

Fen Marsh and Reedswamp HAP

Fen, Marsh and Reedswamp Habitat Action Plan 2007 – 2016

Objective 1: To maintain and manage all existing fen, marsh and reedswamp habitat in the CWP in appropriate condition

Action Plan	Target Code	Target Text	Target Year	Action Code	Action Text	Action Lead	Action Partners	Measure (units)
Fen, Marsh and Reedswamp HAP	FMR-T1	All fen, marsh and reedswamp existing in 2006 to be recorded, assessed.	2010	FMR-A1	Map existing habitat resource on GIS and make data available to all partners by 2007.	CWP BAP Team	Director of Conservation Policy GWT, Biodiversity Manager WWT,	GIS data collated and available to all partners.
Fen, Marsh and Reedswamp HAP	FMR-T1	All fen, marsh and reedswamp existing in 2006 to be recorded, assessed.	2010	FMR-A2	Assess conservation condition of all existing significant habitat areas and draw up management recommendations for landowners where necessary by 2008.	CWP BAP Team	Director of Conservation Policy GWT, Biodiversity Manager WWT,	Habitat assessments and management recommendations produced.
Fen, Marsh and Reedswamp HAP	FMR-T2	All fen, marsh and reedswamp existing in 2006 to be under appropriate management.	2012	FMR-A3	Dependent on completion of action (2), implement habitat management recommendations through appropriate means including direct management by partners and advice to private landowners by 2012.	CWP BAP Team	Director of Conservation Policy GWT, Biodiversity Manager WWT, RSPB SWRO	Proportion of known habitat resource under favourable conservation management.

Fen, Marsh and Reedswamp HAP	FMR-T3	All fen, marsh and reedswamp existing in 2006 to be under appropriate management to retain and enhance interest.	2012	FMR-A4	Train volunteers and form fen/marsh habitat management volunteer base by 2008.	CWP BAP Team	Director of Conservation Policy GWT, Biodiversity Manager WWT,	Volunteer database produced. No of volunteer hours recorded.
Objective 2: To create and manage new reedbeds, fen and swamp communities for priority wetland species, linking to existing habitats and wildlife corridors within and beyond the CWP								
Fen, Marsh and Reedswamp HAP	FMR-T4	One new large reedbed (20ha+) created in both the East and West sections of the CWP.	2010	FMR-A5	Advocate to LAs, landowners and mineral companies those sites most suitable for creation of fen, marsh and reedswamp habitats, for the purposes of identification in LDFs and habitat creation following mineral extraction by 2008.	CWP BAP Team	RSPB SWRO, Director of Conservation Policy GWT, Biodiversity Manager WWT,,	Area of fen, marsh and reedswamp committed to as part of mineral planning consents, by area.
Fen, Marsh and Reedswamp HAP	FMR-T4	One new large reedbed (20ha+) created in both the East and West sections of the CWP.	2010	FMR-A6	Identify sites for the creation of fen, marsh and reedswamp habitats in LDFs (inc. Minerals LDFs) in accordance with PPS9, based on the best available feasibility work. Include appropriate	LA's(Planning & Development),	RSPB SWRO, CWP BAP Team, Director of Conservation Policy GWT, Biodiversity Manager WWT,,	Area of fen, marsh and reedswamp committed to as part of mineral planning consents, by area.

					policies to support and implement these proposals by 2008.			
Fen, Marsh and Reedswamp HAP	FMR-T5	Necessary consents/permissions secured for creation of at least 150 hectares of reedbed and 10 hectares of a broad range of fen communities as part of a nationally important floodplain wetland complex in the central Cotswold Water Park (see Lowland Neutral Grassland and wet woodland HAP for additional habitat targets	2010	FMR-A7	Refine feasibility work into large-scale wetland habitat creation following mineral extraction in the central CWP, down to site level by 2007.	RSPB SWRO	CWP BAP Team	Working schemes and habitat restoration designs produced and agreed with landowners and Mineral Companies ready for submission to LAs (planning departments).
Fen, Marsh and Reedswamp HAP	FMR-T5	Necessary consents/permissions secured for creation of at least 150 hectares of reedbed and 10 hectares of a broad range of fen communities as part of a nationally important floodplain wetland complex in the central Cotswold Water Park (see Lowland Neutral Grassland and wet woodland HAP for additional habitat targets).	2010	FMR-A8	Advocate to LAs, landowners and Mineral Companies those sites most suitable for creation of fen, marsh and reedswamp habitats, for the purposes of identification in LDFs and habitat creation following mineral extraction by 2008.	RSPB SWRO	CWP BAP Team	Area of fen, marsh and reedswamp committed to as part of mineral planning consents, by area.

Fen, Marsh and Reedswamp HAP	FMR-T5	Necessary consents/permissions secured for creation of at least 150 hectares of reedbed and 10 hectares of a broad range of fen communities as part of a nationally important floodplain wetland complex in the Central Cotswold Water Park (see Lowland Neutral Grassland and wet woodland HAP for additional habitat targets).	2010	FMR-A9	Identify sites for the creation of fen, marsh and reedswamp habitats in LDFs (inc. Minerals LDFs) in accordance with PPS9, based on the best available feasibility work. Include appropriate policies to support and implement these proposals by 2008.	RSPB SWRO	LA's (Planning & Development), CWP BAP Team,	Area of fen, marsh and reedswamp committed to as part of mineral planning consents, by area.
Fen, Marsh and Reedswamp HAP	FMR-T6	New areas of priority NVC fen and marsh habitat communities created in the West and East sections of the CWP.	2010	FMR-A10	Identify sites for the creation of fen, marsh and reedswamp habitats in LDFs (inc. Minerals LDFs) in accordance with PPS9, based on the best available feasibility work. Include appropriate policies to support and implement these proposals by 2008.	CWP BAP Team	RSPB SWRO Director of Conservation Policy GWT, Biodiversity Manager WWT	Area of fen, marsh and reedswamp committed to as part of mineral planning consents, by area.
Fen, Marsh and Reedswamp HAP	FMR-T6	New areas of priority NVC fen and marsh habitat communities created in the west and east sections of the CWP.	2010	FMR-A11	Advocate the use of silt lagoons to create new priority NVC fen/marsh plant communities by 2010.	LAs (Minerals)	RSPB SWRO, CWPBAPTeam, Dir of Cnsvtn Policy GWT, Biodv MgrWWT	Area of fen, marsh and reedswamp committed to as part of mineral planning consents, by area.

Habitat Action Plan for Lowland Neutral Grassland

Prior to mineral extraction 60 years ago much of the land within the flood plain in the Water Park would have been lowland flower rich meadows. A number of these sites still exist between the quarries and on unimproved farmland.

1 Conservation Priority

Context	Priority
National	UK BAP priority habitat, MG4 grassland listed in Annex 1 of EU Habitats Directive
Regional	Priority habitat in SW BAP
County	Priority habitat in Wiltshire and Gloucestershire BAPs

2 National and Local Status

Lowland unimproved neutral grassland is the single most threatened type of grassland habitat in the UK and has suffered the greatest loss in the last seventy years. The UK Biodiversity Action Plan Habitat Statement (1995) indicates that there are now less than 15,000 ha of species-rich neutral grassland remaining in England and Wales. A more up to date figure from DEFRA (Department of the Environment, Food and Rural Affairs) indicates that there are now only 8,500 hectares of species rich neutral grassland in England.

Locally, the Cotswold Water Park contains 25 species-rich unimproved neutral grassland of which 6 are designated SSSIs. These include Pike Corner (15.24ha), Elmlea Meadows (7.18ha), Whelford Meadow (1.99ha), Wildmoorway Meadow (13.14ha), Upper Waterhay Meadow (2.85ha) and Long Meadow. North Meadow (45.67ha) and Clattinger Farm (59.55ha) Special Area of Conservation (SAC) also lies within the Cotswold Water Park.

County Wildlife Sites within the CWP Boundary includes Clayhill Field (SU051953) and Ashton Keynes Meadow (SU051936) (Wiltshire) and Crane Farm Meadows (SU060975) (Lake 4) (Gloucestershire). Furthermore, if the search is widened to the periphery of the CWP, a further 16 County Wildlife Sites are listed, predominantly in Wiltshire. This includes Chelworth Park (2 parcels)(SU081925), Clayhill Field (SU051953), Swillbrook Field (SU040930), Oaksey Moor Farm Meadows (SU004939), Swillbrook Farm Meadows (SU034930), Ashton Keynes Meadow (SU051936), The Chancel, Waterhay (SU058928), Swillbrook Farm Fields - West (SU030929). Furthermore, a significant part of Blakehill Farm Reserve (Wiltshire Wildlife Trust) (SU077915) is also included.

3 Habitat and Ecology

A flower-rich meadow or pasture in summer is a truly magnificent sight, alive with the sound of grasshoppers, bumblebees, and skylarks. Lowland neutral meadows are either hay meadows or pastures and consist of a rich mixture of native grasses and broad-leaved herbs.

Old meadows and pastures are often found on traditionally managed farms where they occur as isolated fields and usually on the heavier soils of the vales and river valleys. As its name suggests neutral grassland has a neutral pH level supporting a plant community distinct from those occurring on calcareous or acid soils. Grassland types are classified according to the National Vegetation Classification (NVC) system, and the NVC type relating to unimproved neutral (mesotrophic) meadows is the 'crested dog's tail – black knapweed community (NVC type MG5) and 'Meadow foxtail-greater burnet community (NVC type MG4). The MG4 grasslands are extremely rare, and are associated with flood meadows of river valleys, and are sometimes characterised by rare species such

as snake's head fritillary. The drier MG5 community is often floristically more diverse and associated with more free-draining neutral clay-based soils.

4 Current factors affecting the habitat in the UK and the Cotswold Water Park

- Application of artificial fertilisers has been shown to affect the floristic richness adversely, even at low levels.
- Increased use of slurry, which unlike traditional occasional light applications of farmyard manure and lime are extremely detrimental to floristic richness.
- Change from hay to more intensive silage production. Silage production means more frequent cutting and higher fertiliser input, leading to loss of floristic diversity and disturbance of wildlife using the meadows.
- Change from late summer mowing to spring and summer grazing, resulting in the loss of those meadow plants and animals that are intolerant of intensive grazing.
- Reduction in profitability of traditional agriculture leading to land being sold off for intensive horse grazing, ie livery or polo stables.
- Abandonment and neglect - which results in gradual reversion to rank grassland dominated by false oatgrass and/or tufted hair-grass and eventual reversion to scrub and secondary woodland of low nature conservation value.
- Restoration of pits as open water may affect ground water levels or alter patterns of surface water flow.
- Increased water levels may adversely affect grassland vegetation and alter management practices such as hay cutting.
- Direct loss of neutral grassland SSSIs to development is not likely to be a factor in the Cotswold Water Park. The greater risk is loss of sites not yet identified or evaluated although it is unlikely that there are significant areas of high quality neutral grassland yet to be identified. Indirect effects of development or of increasing recreation are more likely to have an impact on grasslands.
- Development and mineral extraction may be a threat to unprotected neutral grasslands and in particular to potential sites for restoration and re-creation.

5 Current Action in the Cotswold Water Park

There are currently **approximately 400 ha** of grassland being managed under Countryside Stewardship Scheme and Environmental Stewardship for lowland meadows in the CWP; this includes areas managed for historic interest, eg ridge and furrow and other field structures. (Data supplied by Natural England).

- Environmental Stewardship promotes the extensive management, restoration and recreation of neutral meadows. Neutral meadows are highlighted as a key habitat in the Upper Thames Clay Vales targeting statement
- Acquisition of the Blakehill Farm reserve by Wiltshire Wildlife Trust and extensive grassland restoration work.
- Environment Agency are completing a Review of Consents process to establish whether any existing discharge or abstraction licences are likely to impact on North Meadow/Clattinger Farm SAC.
- Site managers are maintaining positive conservation management on most CWP grassland SSSIs
- Monitoring of ground water levels being undertaken in relation to gravel extraction at several sites
- Mitigation measures being undertaken by gravel operators to protect North Meadow from depression of ground water table by using water recharge techniques
- Improved management of Elmlea Meadows SSSI by Cotswold Water Park Society.

- The Wiltshire Wildlife Trust, Landscapes for Wildlife Project, Rebuilding Biodiversity in North Wiltshire, is working to increase the area of neutral grassland in North Wiltshire through Stewardship schemes and active management support.
- Studies are in progress to determine if the pumping of gravel workings for mineral extraction may affect nearby meadows by depressing water table and changing sensitive vegetation types.
- Recent work by Dr David Gowing & Natural England at North Meadow NNR has demonstrated the critical importance of river water levels in maintaining ground water conditions and vegetation at North Meadow. Surface water management is therefore a critical factor in maintaining neutral grassland interest.

6 Action Plan for Lowland Neutral grassland

Objective 1: Maintain and increase the area and quality of lowland neutral grassland in the CWP by 2014

See accompanying table for Targets and Actions.

Refer also to

Farmed Land HAP

Lowland Neutral Grassland HAP

Lowland Neutral Grassland Habitat Action Plan 2007 – 2016

Objective 1: Maintain and increase the area and quality of lowland neutral grassland in the CWP by 2014

Action Plan	Target Code	Target Text	Target Year	Action Code	Action Text	Action Lead	Action Partners	Measure (units)
Lowland Neutral Grassland HAP	LNG-T1	Maintain favourable management of ALL SSSI grasslands and SNCI/County Wildlife Site grasslands in the CWP	2016	LNG-A1	Many SSSI and SNCI/County Wildlife Site grasslands in the CWP are not currently in favourable condition or under favourable management. Support and advice should be provided to all relevant land managers in order to promote positive land management.	Natural England	Wiltshire Wildlife Trust (Landscapes for Wildlife) land managers,	Quinquennial review of SSSI status and management. All SSSI and SNCI/County Wildlife Site grassland sites in favourable condition according to Natural England criteria
Lowland Neutral Grassland HAP	LNG-T2	Update inventory and map all unimproved grassland sites within the CWP	2010	LNG-A2		CWP BAP Team	NCF, Wiltshire Wildlife Trust (Landscapes for Wildlife)	Inventory drafted and published
Lowland Neutral Grassland HAP	LNG-T3	Explore potential for linking fragmented parcels through habitat creation and restoration.	2010	LNG-A3	Use updated inventory and map to create an "Opportunities Map", demonstrating where and how fragments can be linked to the wider landscape. Include potential through mineral restoration.	CWP BAP Team	NCF, Wiltshire Wildlife Trust (Landscapes for Wildlife)	"Opportunities Map" published

Lowland Neutral Grassland HAP	LNG-T4	Create or restore 20ha of species-rich grassland	2016	LNG-A4	Promote neutral grassland creation and restoration amongst landowners through agri-environment schemes, local projects and mineral restoration. Target creation and restoration of species-rich grassland to link to existing areas to increase area of habitat and connectivity. Some of this area may be targeted to areas of mineral restoration, whereby seed of local provenance and character should be selected.	Natural England	FWAG, Wiltshire Wildlife Trust (Landscapes for Wildlife), land managers, RSPB SWRO	20ha of species-rich grassland created and in process of restoration
Lowland Neutral Grassland HAP	LNG-T5	Protect existing neutral grassland identified in inventory	2016	LNG-A5	Promote neutral grassland protection amongst landowners through agri-environment schemes and local projects.	Natural England	Wiltshire Wildlife Trust (Landscapes for Wildlife), land managers, RSPB SWRO FWAG,	Identified sites safeguarded
Lowland Neutral Grassland HAP	LNG-T6	All mineral applications have appropriate monitoring protocol in place to ensure no loss of quality of sites of lowland neutral grassland (as per the inventory) in the CWP	2007 and ongoing	LNG-A6	Development control and mineral applications should be considered using informed data and understanding. Such knowledge will contribute to the protection of key grassland sites such as North Meadow and Clattinger Farm cSAC.	Natural England	NCF	Monitoring programmes in place for all new mineral applications potentially impacting upon key grassland sites.

Lowland Neutral Grassland HAP	LNG-T7	Continue to monitor and analyse the English Nature /Natural England and gravel pit dip well data to identify trends and fluctuations in groundwater levels.	2007 and ongoing	LNG-A7	An ongoing understanding of hydrology is essential to make informed decisions on applications for mineral extraction, with particular regard to SSSI and sites of European Importance.	Natural England	NCF	Publish and make available monitoring reports
Lowland Neutral Grassland HAP	LNG-T8	Raise awareness of the status, importance of and opportunities for unimproved grassland.	2007 and ongoing	LNG-A8	Share best practice and lessons learned through case studies of neutral grassland restoration.	Wiltshire Wildlife Trust (Landscapes for Wildlife)	NCF	Paper published and key points disseminated.

Habitat Action Plan for Sand and Gravel Quarries

This HAP relates solely to operations in sand and gravel quarries which already have consent. It cannot be used to justify granting consent for mineral extraction at new locations. This HAP is designed to ensure that the operational stages of sand and gravel quarrying deliver maximum biodiversity benefit as an interim measure ahead of long term restoration and aftercare, ideally for other wildlife habitats dealt with in this BAP.

Active quarries provide habitats for a wide range of specialist animals and plants that thrive in the unique conditions created. Considerable work can be undertaken in active quarries to support these species. Such an undertaking requires a good understanding of the mineral industry to advise site managers on working methods to enhance wildlife habitats and avoid negative impacts on protected species.

This HAP relates to two key habitat types associated with active quarries; farmland-type habitats, and bare gravel and sand habitats.

Farmland-type habitats: Many farmland birds breed and winter on land cleared prior to topsoil stripping or on land partially restored. Such tracts of land are frequently undisturbed, large open areas and often unsprayed, therefore supporting a large area of seed-bearing weeds (ideal for wintering farmland birds) and/or low sward grassland (ideal for ground nesting birds such as skylark). Such habitats are also used frequently by **brown hares** for similar reasons. Farmland-type habitats also include bunds used for the storage of topsoil during extraction; these can provide some refuges for wildlife including nesting and feeding sites. Amendment of their management can bring significant benefits to wildlife.

Bare gravel and sand-type habitats: These habitats attract specialist species highly characteristic of sand and gravel quarries, for example, **nesting sand martin, little ringed plover, ringed plover and oystercatcher** and also specialist invertebrates such as **mining bees** and **wasps**. These temporary habitats also include ephemeral aquatic habitats supporting species such as the scarce blue-tailed damselfly and some charophytes. Habitats include silt beds in varying states of operation, sand cliffs, and bare ground with little or no vegetation.

The *Sand & Gravel Quarries HAP* and *Bare Ground & Early Successional habitats for Invertebrates Habitat Statement* have close affiliations with the Habitat Action Plan for Open Mosaic Habitats on Previously Developed Land (Broad Habitat: Inland Rock), a new HAP proposed in June 2007 by the Biodiversity and Recording Information Group, *Report on the Species and Habitat Review*, and which has been adopted; an action plan has yet to be fully drafted. In time, it is likely that closer links will be forged with this HAP.

For further information see the following Habitat Statement, *Habitat Statement: bare ground and early-successional habitats for invertebrates*.

Other CWPBAP habitats associated with Sand & Gravel Quarries also include Boundary Habitats, Woodland, Fen, Marsh & Reeds swamp and Standing Open Water (including Ponds); these habitats are targeted under their specific Habitat Action Plans and will not be covered here.

1 Conservation Priority

The farmland bird species targeted by this HAP are all Red and Amber Listed species of conservation concern (Gregory *et al* 2002) of which many are already included in the UK BAP in recognition of their conservation importance; eg **skylark, reed bunting, tree sparrow, linnet, grey partridge and song thrush. Brown hare** is also a UK SAP species.

Species characteristic of sand and gravel quarries include sand martin and little ringed plover. The CWP is nationally important for little ringed plovers (24 pairs in 2004, 2.2-2.9% of the GB population). In 2004 the CWP supported about 1,300 pairs of sand martin (UK population 250,000 pairs), accounting for 0.52% of national population. It is possible that populations of sand martins in the CWP will expand as extraction begins in new areas such as the central CWP.

The bare ground within Sand & Gravel Quarries, as well as the ephemeral pools and channels, provide a series of habitats for a number of invertebrate species characteristic of such habitats. Such bare ground is often disturbed and may have suppressed vegetation succession. Relevant species groups includes various **solitary bees and wasps, ground beetles, flies and dragonflies**. A reduction in the occurrence of bare ground and early successional habitat in the wider countryside has led to a decline in many of the associated invertebrates. The habitat supports a high proportion of Red Data Book, Nationally Scarce and UKBAP species. The **scarce blue-tailed damselfly**, for example, has been recorded in active sand and gravel quarries in the CWP since the 1980's; this species is characteristic of temporary pools and disturbed ground. Furthermore a range of other mobile dragonfly species may be found in large numbers in some sand and gravel quarries, as these species take advantage of warm shallow pools for ovipositing.

Further work, including baseline surveys, is necessary to identify key invertebrate species on mineral sites in the CWP.

2 National and Local Status

Within England, as of 2005, around 64,000ha (1229 sites) of land is under current and active permission for extraction of aggregates, hard rock and coal; of this 29,315ha (177 sites) is being extracted for sand and gravel supplies*. Within the Cotswold Water Park, land with permission (and potential permission) to be dug for gravel comprises around 1260ha. Thereby, mineral extraction in the Cotswold Water Park may account for 4.3% of the total UK area of aggregate extraction. With a further 50 years of potential extraction, this area is set to increase and change as new areas gain mineral permissions.

Thus the area of land covered by quarrying activities is significant and is likely to be maintained in future. The potential for making major contributions to a range of UK and CWP BAP targets is great.

In the CWP, seven mineral companies are currently extracting on 400 ha, and have permission to extract from a further 310 ha. The county mineral plans propose allocating another 550 ha for extraction. Beyond this, there are at least another 50+ years supplies of sand and gravel deposits within the CWP boundary. It is this constantly-changing nature that is of most value to the wildlife which requires unvegetated nest sites such as sand martins and little ringed plovers. It may become necessary, in future, to create and manage permanent habitats for these species in order to maintain their numbers when sand and gravel extraction has ceased.

Furthermore, the dynamic nature of the CWP is such that the areas of active extraction will change as areas are extracted, restored and returned to after-use. It is this dynamic nature that is of most value to the wildlife which relies on periodic disturbance such as invertebrates of bare ground and open habitats, the sand martin and little ringed plover.

Linked to this HAP is the potential for restoration of mineral sites to habitats of high conservation priority (for example, reed beds, wet woodland). This HAP is mainly concerned with promoting and maximising biodiversity in active mineral sites, ie those where the processes of topsoil stripping, mineral extraction and land forming etc is ongoing. Maximising biodiversity potential through the restoration processes presents an opportunity to contribute towards targets in other HAPs and SAPs.

There is, however, an opportunity within this HAP to create and/or maintain areas of bare ground targeted towards supporting and maintaining populations of specialist invertebrate species that may be identified on these sites; in such cases restoration requirements will be very different to those of other habitats. The creation of bare ground and open habitats can be an end result for mineral restoration and is ideally achieved more through natural regeneration and minimal landscaping works. The creation of bare ground would support a range of invertebrate species as well as little ringed plover and may also be linked to the creation of vertical nesting sites for sand martins.

**pers. comm.* Alice Davies, 2006, RSPB Minerals Restoration Potential Project

3 Habitat and Ecology

Active quarries tend to be constantly changing places. Opportunist plants and animals which are able to colonise quickly, reproduce fast and disperse widely before conditions become untenable, tend to thrive. To assist scarce or declining species, the key is to identify and plan for their particular requirements as an integral part of ongoing quarry management.

On active quarry sites, farmland birds are likely to utilise boundary habitats like hedgerows, and open areas that have developed rank vegetation, particularly where plants like thistles, teasels etc have become established. If such areas are not immediately required for quarry operations ideally they should be left as undisturbed as is possible.

Lapwings may use areas of sparse or short vegetation to breed, especially close to water. Where possible, suitable areas should be identified and cordoned off to prevent disturbance.

Sand martins require sand cliffs where they can excavate nest burrows. Opportunities should be exploited to create and protect cliffs, at least long enough to allow for sand martins to nest successfully in one season. Once birds have begun to nest it is illegal to destroy the nest site. Further excavation of a sand cliff, or the passage of heavy plant close enough to collapse nest burrows, must be avoided.

Ringed and little ringed plovers need undisturbed open bare ground to breed. Areas where plovers are known to breed, or areas where they could be encouraged to breed, should be cordoned off and left undisturbed.

A range of invertebrates such as various water beetles and dragonflies such as scarce blue-tailed dragonflies require nutrient-poor sites with shallow water and little vegetation, including pools prone to drying out and seepages. Such sites can support a unique assemblage of invertebrates quite different to that found in more traditional ponds and lakes.

A common feature of most sites is a degree of habitat disturbance, which maintains bare substrate and openness of the vegetation. Active quarries have the potential to meet this species specialised requirements.

Active quarrying in the CWP has created a historical continuity of bare ground. Bare ground is an essential habitat feature for a wide range of insects and other invertebrates, lichens, and reptiles. Many of the species which need bare ground are unable to survive without it, and a high proportion of the associated invertebrates are rare or scarce. Bare ground and open habitats were once common in the wider countryside; however changes in agriculture and an intensification of land use has led to a loss of these features. Quarries, sand pits, and other extraction sites provide bare ground habitats both during and beyond their working lives, and are an important resource for the conservation of many UKBAP Priority invertebrates and other species of conservation concern.

4 Current factors affecting the habitat in the UK and the Cotswold Water Park

- Quarries are continuously changing places and habitats within them, produced as a result of quarrying processes, are often transient at best, and may be at risk of further alteration at any time.
- Quarry operations can be detrimental to wildlife if operations are undertaken at inappropriate times, eg topsoil stripping, gravel extraction, de-watering, re-flooding, scrub clearance. In some cases, such actions may breach the Wildlife and Countryside Act 1981 (as amended), so there is a need for awareness by site managers.
- Quarry operations can benefit wildlife through disturbance of bare ground and creation of new areas of bare ground and early successional habitats; such habitats are increasingly rare in the landscape as a result of agricultural intensification and built development. Such actions can have equally detrimental impact depending upon time of year (for example disturbance or destruction of bird nesting sites) or through loss of habitats (for example, loss of shallow ponds or seepages).

5 Current action in the Cotswold Water Park

Work has been undertaken with all mineral companies and quarry managers to promote wildlife-friendly management in all sites, concentrating on little ringed plover, sand martin, lapwing, reed bunting, water vole and scarce blue-tailed damselfly. This has already seen great success in supporting these breeding species, and produced accurate counts of the CWP populations.

All mineral sites allocate areas each year for ground nesting birds such as little ringed plover, and in partnership with Cotswold Water Park Ringing Group studies are undertaken upon these populations.

Sand martin management guidelines produced by the Cotswold Water Park Society in 2003 provide advice on phasing quarry operations with the breeding cycle of sand martins.

Management Plan/Biodiversity Action Plan produced for Claydon Pike, Lechlade (2004) and Eysey Manor quarry, Cricklade (2006 onwards) reconciling yearly operations with wildlife, in particular breeding birds.

6 Action Plan for Sand and Gravel Quarries

Objectives

- 1 To improve the wildlife and biodiversity potential in quarries in the pre-, during and post-extraction phases, including the restoration processes. [This does not include the restoration plans and after-use].

See accompanying table for Targets and Actions.

Refer also to

Reed Bunting Species Statement
Nightingale Species Statement
Dragonflies and Damselflies SAP
Standing Open Water HAP
Rivers & Streams HAP
Fen, Marsh & Reedswamp HAP
Boundary Habitats HAP
Farmland HAP

For further information

RSPB Minerals Restoration Potential Project (See <http://www.rspb.org.uk>)
Cotswold Water Park Society 2004. Site-Based Biodiversity Action Plan for Claydon Pike, Coln Gravel Company, Hanson Plc, Lechlade, Gloucestershire. Managing Active Quarries for Biodiversity. The Cotswold Water Park Biodiversity Action Plan Implementation Project & Biodiversity and Minerals Project (ALSF Ref: SA/2002/87).
Cotswold Water Park Society & Tarmac Ltd 2006. Biodiversity Action Plan for Eysey Manor Quarry, Cricklade, Wiltshire.
Whitehouse *et al* (in prep) *Managing Aggregates Sites for Invertebrates: A best practice guide*. Buglife – The Invertebrate Conservation Trust, Peterborough.
White G.J. & Gilbert J.C. (eds) (2003). Habitat creation handbook for the minerals industry. The RSPB, Sandy.

Sand and Gravel Quarries HAP

Sand and Gravel Quarries Habitats Action Plan 2007 – 2016

Objective: To improve the wildlife and biodiversity potential in quarries in the pre- during and post-extraction phases, including the restoration processes (but excluding the final restoration and afteruse).

Action Plan	Target Code	Target Text	Target Year	Action Code	Action Text	Action Lead	Action Partners	Measure (units)
Sand & Gravel Quarries HAP	SG-T1	All quarry managers at all quarries advised regarding wildlife-friendly quarry management every year. At least 4 visits made to each quarry during the breeding season	2007 ongoing	SG-A1	Produce management guidelines outlining amended or more appropriate methods for the following operations, done in conjunction with and supported by mineral companies, by end 2008: <ul style="list-style-type: none"> • Topsoil stripping • Topsoil storage • Extraction at the active face • Land forming/restoration and general machine movements during the extraction phases. Quarry managers and operators are fully aware of the needs of wildlife on active quarries so that no breeding birds, especially schedule 1 species, are disturbed or directly affected by active quarry operations.	CWP BAP Team	CWP BAP Team Mineral Companies Local Authorities NCF	At least 4 visits per quarry each breeding season. Guidelines produced with endorsement of minerals companies
Sand & Gravel Quarries	SG-T2	Status of little ringed plover, ringed plover, lapwing,	2007	SG-A2	Develop and maintain annual monitoring for species characteristic of active quarries	CWP BAP Team	CWRG, Mineral Companies Volunteers,	Surveys completed, 2007 baseline populations

HAP		oystercatcher, redshank and sand martin populations on active quarries in the CWP to be established as a baseline by end 2007			including Little Ringed Plover, Lapwing, Ringed Plover, Oystercatcher, Redshank, Sand Martin by 2008.		BRCs County Recorders	established.
Sand & Gravel Quarries HAP	SG-T3	Status of scarce blue-tailed damselfly populations on active quarries in the CWP to be established as a baseline by end 2007.	2007	SG-A3	Develop survey programme for scarce blue tailed damselfly on established mineral workings; establish status of this species in the CWP by end 2007 and roll-forward survey programme on 5-yearly basis.	CWP BAP Team	Mineral Companies Volunteers Biological Records Centres, County Dragonfly Recorders	Surveys completed, 2007 baseline populations established.
Sand & Gravel Quarries HAP	SG-T4	Baseline Survey of invertebrates characteristic of sand and gravel quarries undertaken by 2010	2010	SG-A4	In partnership with Buglife and Pond Conservation, develop survey programme for relevant sites in the CWP, targeting invertebrates characteristic of bare ground/pioneer-associated and aquatic invertebrates associated with mineral workings and shallow pools.	CWP BAP Team	Mineral Companies Volunteers, Biological Records Centres, Buglife (Andrew Whitehouse) Pond Conservation (Pascale Nicolet)	Surveys completed, 2007 baseline populations established.
Sand & Gravel Quarries HAP	SG-T5	Long-term status of species characteristic of active quarries is assured through habitat management and creation.	2016	SG-A5	Develop a network of 5 artificial sand martin colonies, each of 200+ holes on 5 locations around the CWP in order to sustain sand martins in the CWP after gravel extraction has ceased. Such banks should also be suitable for burrowing invertebrates.	CWP BAP Team	CWRG, Mineral Companies	Five artificial sand martin colonies established in separate locations with 200+ holes apiece.

Cotswold Water Park Biodiversity Action Plan 2007 – 2016

Sand & Gravel Quarries HAP	SG-T5	Long-term status of species characteristic of active quarries is assured through habitat management and creation.	2016	SG-A6	Assess feasibility of developing a network of sites managed for breeding little ringed plover and ringed plover, in order to sustain these species in the CWP after gravel extraction has ceased.	CWP BAP Team	Mineral Companies	5 sites of minimum 10ha each (total of 50ha) managed for breeding little ringed plover and ringed plover each year.
Sand & Gravel Quarries HAP	SG-T5	Long-term status of species characteristic of active quarries is assured through habitat management and creation.	2016	SG-A7	Establish demonstration project on 2 sites (each of at least 5ha), demonstrating best practice management for invertebrate conservation and pond management on aggregate sites. Sites to enter long term management for invertebrates characteristic of bare ground/pioneer-associated (also benefiting little ringed plover and ringed plover). Sites to include bare, disturbed, undulating ground of nutrient-poor substrate with shallow ponds.	CWP BAP Team	Mineral Companies, Buglife (Andrew Whitehouse) Pond Conservation (Pascale Nicolet)	2 demonstration projects established by 2012
Sand & Gravel Quarries HAP	SG-T6	Produce Site Biodiversity Action Plans for at least 4 sites by 2008, all sites by 2016.	2008 & 2016	SG-A8	Site BAPs to be written for key mineral sites to promote and guide wildlife-friendly quarry management. To be based upon guidance notes already drafted. To be written in partnership with quarry managers to ensure effective take-up and adoption.	CWP BAP Team,	Mineral Companies	4 Site BAPs produced by 2008. 10 site BAPs produced by 2016
Dragonfly SAP	DRA-T5	Re-establish the scarce blue-tailed damselfly as a regular breeding	2014	DRA-A10	Include this species within site BAPs for active mineral sites and within restoration plans to create small pools within shallow	CWPS	Mineral Companies	Inclusion in Site BAPs. Inclusion in mineral restoration plans.

		species in the CWP			wetlands, contributing to the creation of a network of breeding sites.			Inclusion of active mineral sites in wider network of breeding sites.
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Habitat Statement: Bare ground and early-successional habitats for invertebrates

Bare ground is an essential habitat feature for a wide range of species including many insects and other invertebrates, lichens, birds (such as Little Ringed Plover), and reptiles. A high proportion of the associated invertebrates are rare or scarce, and many are listed as UKBAP Priority Species.

The **Sand & Gravel Quarries HAP** and **Bare Ground & Early Successional habitats for Invertebrates Habitat Statement** have close affiliations with the Habitat Action Plan for Open Mosaic Habitats on Previously Developed Land (Broad Habitat: Inland Rock), a new HAP proposed in June 2007 by the Biodiversity and Recording Information Group, *Report on the Species and Habitat Review*, and which has been adopted; an action plan has yet to be fully drafted. In time, it is likely that closer links will be forged with this HAP.

Bare ground and open habitats were once common in the wider countryside; however changes in agriculture and an intensification of land use has led to a loss of these features. Quarries, sand pits, and other extraction sites provide bare ground habitats both during and beyond their working lives, and are an important resource for the conservation of many UKBAP Priority invertebrates and other species of conservation concern. In many cases however, bare ground and early-successional habitats within aggregate sites are destroyed during the restoration process during the creation of other habitats which have been perceived to be of higher conservation value.

Bare Ground may be defined in terms of two key elements:

- 1 Conditions enabling pioneer plant communities to persist (namely nutrient-poor thin soils).
- 2 Friable bare ground for burrowing bees, wasps and beetles.

Bare ground is first colonised by wildflowers and fine grasses, for example, **common bird's-foot trefoil** (*Lotus corniculatus*), **kidney vetch** (*Anthyllis vulneraria*), **horseshoe vetch** (*Hippocrepis comosa*) and **wild carrot** (*Daucus carota*); these provide food plants for many rare invertebrates, eg **dingy skipper** (*Erynnis tages*), and abundant sources of nectar and pollen.

The exposed mineral soils of quarries are generally low in nutrients, and are often well drained, delaying the process of vegetation succession, promoting bare ground and open, pioneer vegetation types. Therefore quarries and other extraction sites are of particular conservation importance, for bare ground invertebrates.

Friable bare ground (but firm enough to prevent burrows collapsing) offers nesting sites for burrowing bees and wasps. Solitary bees provision their nests with pollen and nectar, whilst the wasps collect various prey items (such as weevils). The bare ground is of greatest value when south-facing since, as with most invertebrates, bees and wasps prefer hot, sunny situations, particularly when selecting a nesting site. The topography is best when varied since this creates micro-habitats diversifying the bare ground. Some species of bee and wasp will only nest in horizontal plains whereas others prefer slopes or vertical faces in which to dig out a nest chamber.

Bare areas are favoured hunting grounds for visual predators such as spiders, tiger beetles and other ground beetles. Crevices in bare ground provide refuges for both predators and prey. Bare ground is not only an important nesting substrate but since there is no vegetation cover it can warm up quickly in the morning and provides warmth throughout the day. Invertebrates, insects in particular, are

often dependent upon warm conditions. Bees and wasps can often be seen warming themselves on bare ground or rock.

Ephemeral pools within bare ground habitats also comprise habitat for specialist water beetles and dragonflies (for example the scarce blue-tailed damselfly *Ischnura pumilio*) which require pools in the early stages of vegetation succession. Such pools may be shallow and nutrient-poor, heating up quickly in the sun and often drying out. Vegetation is often sparse and restricted to pioneer species such as spike rushes and charophytes.

Working quarries can support some of the most demanding early-successional specialists, which may survive for the entire working life of the quarry and beyond. Sadly, all too often it seems that such species decline to extinction during or soon after restoration works through neglect or inappropriate restoration schemes. It seems a short-sighted solution when resources expended on quarry restoration ignore the naturally developing ecology of the site and exterminate some of the key wildlife interest of the quarry, when simply abandoning the quarry at zero cost could be better for wildlife. Of course, abandonment is generally not a realistic option since some restoration work will be necessary to restore landscape and to mitigate for health and safety risks. However, quarry restoration should aim to provide continuity of the early-successional habitat conditions for invertebrates at the same time as managing landscape and safety issues. Exposed mineral soils should be retained wherever possible, and maintained in the long term through scarification and the use of rotational scrapes. Topsoil should not be applied and natural regeneration should be favoured over reseeded or planting.

In the Cotswold Water Park, sand & gravel quarries are typically re-flooded once restoration is complete and simple abandonment of sites may not be hydrologically feasible. In some circumstances, shallow gravel deposits may yield opportunities for promoting bare ground habitats for little ringed plovers and invertebrates, since the depth of water is less.

Important groups/species & UKBAP Priority Species

In the CWP, few surveys have been undertaken to identify species found on bare ground habitats and therefore until such surveys have been undertaken, we cannot accurately identify which species works may be targeted towards.

Species and groups likely to be found in the CWP include the **ground nesting bees and wasps, robberflies, bee-flies, butterflies (eg dingy skipper, grizzled skipper, small blue), ground beetles, spiders, reptiles, lichens.**

UKBAP Priority Species in the CWP could include the following species. Targeted surveys will clarify this list and provide direction for future conservation efforts.

Hymenoptera (bees, wasps, ants)

Five-banded weevil wasp *Cerceris quinquefasciata*

A cuckoo bee *Nomada ferruginata*

Diptera (flies)

Dotted bee-fly *Bombylius discolor*

Hornet robberfly *Asilus crabroniformis*

Lepidoptera (butterflies and moths)

Dingy skipper *Erynnis tages*

Grizzled sSkipper *Pyrgus malvae*

Small blue *Cupido minimus*

Four-spotted (moth) *Tyta luctuosa*

Reptiles

Grass snake *Natrix natrix*

Adder *Vipera berus*

Common lizard *Lacerta [Zootoca] vivipara*

Refer also to

Ponds Habitat Statement

Sand & Gravel Quarries HAP

Dragonfly Group SAP

For further information

Key, R. (2000) Bare ground and the conservation of invertebrates. *British Wildlife*, **11**, 183-191.

Whitehouse, A.T. *et al* (in prep) *Managing Aggregates Sites for Invertebrates – a best practice guide*.

Buglife - The Invertebrate Conservation Trust, Peterborough.

White G.J. & Gilbert J.C. (eds) (2003). *Habitat creation handbook for the minerals industry*.

The RSPB, Sandy.

Useful guidance may also be found on the following websites:

Buglife website: <http://www.buglife.org.uk>

Pond Conservation website: <http://www.pondconservation.org.uk/>

Species Statement: Marsh Helleborine *Epipactis palustris*

The Marsh Helleborine is a plant 20-60cm tall, with an extensive creeping root system, flowering during July to September. Flower spike one-sided with up to 20 flowers. This species is currently listed as uncommon.

Under the Wildlife & Countryside Act 1981 (as amended) it is illegal to dig up plants without the landowner's permission; furthermore this Act also list 11 orchid species on Schedule 8, affording them greater protection. The Marsh Helleborine is not listed on Schedule 8 and so is afforded only the most basic legal protection. (In Ireland, this species is afforded greater protection).

This species prefers calcareous fens, marshes, wet meadows and dune slacks where shell sand supplies the necessary lime. In recent years it has been found colonising fly-ash pools and two sites on chalk hills in Bedfordshire and north Wiltshire. Ordinarily this species prefers sites which are seasonally inundated by water. Most sites were lost prior to 1930 following the drainage of wet meadows and today, this species continues to decline in most areas of the UK, especially in southern England, where recent dry summers have led to further losses.

In Wiltshire, only 3 populations are known of which two populations have been identified in the CWP on old disused mineral workings, often upon mature silt beds. Such sites provide the calcareous conditions they require whilst often seasonally inundating. Furthermore, these sites are undisturbed and nutrient-poor, significantly slowing vegetation succession.

The long-term sustainability of these populations is currently unclear as these sites are likely to dry out in time. Both populations in the CWP are probably threatened unless a long-term solution can be found. One population is currently threatened in the short term by scrub encroachment; the other population is safe in the short term but consideration is urgently required to safeguard this larger population in the longer term. Specific habitat management and/or translocation may ensure their survival as well as consideration of water level management.

Refer also to

Sand & Gravel Quarries HAP

For Further Information

Britain's Orchids: A guide to the identification and ecology of the wild orchids of Britain and Ireland David Lang (interactive version). This website is a fully interactive, searchable version of the book; Britain's Orchids, published jointly by and [WILDGuides](#)

Habitat Action Plan for Standing Open Water

Mineral extraction and restoration has created a huge patchwork of lakes (146 in 2007) that makes this area unique. Standing Open Water is one of the most important UK BAP habitats in the CWP, supporting internationally and nationally important numbers of wintering waterbirds, as well as stonewort populations of European importance, regionally important dragonfly populations and remnant populations of the native white clawed crayfish. For these reasons, Standing Open Water and its associated habitats are of high conservation importance.

1 Conservation Priority

Status	Priority
National	“Standing Open Water” is not listed as a priority habitat on the UK BAP. “Eutrophic Standing Waters” and “Mesotrophic Lakes” are listed on the UK BAP.* Ponds and Oligotrophic and Dystrophic Lakes are now a new UK BAP Priority.
Regional	“Standing Open Water” is listed upon South West BAP
County	Standing Open Water is included on the Gloucestershire and the Wiltshire LBAPs. Within the Wilts BAP, there are specific targets and actions within Standing Open Water that include the CWP.

*Please note that the lakes of the CWP share characteristics with both Mesotrophic and Eutrophic Waters. Furthermore, the pressures and issues surrounding the lakes of the CWP are very area-specific and for these reasons, the CWP BAP is including a “Standing Open Water” HAP specifically written for the CWP.

2 National and Local Status

The UK total of the standing open water habitat is at least 300,000 ha (this figure includes bodies above 5 ha in size). The continuing demand for aggregates will continue to create temporary areas of standing open water and also bring opportunities, through the restoration process, to create more permanent ones.

There are currently 146 waterbodies comprising over 1,000 ha of standing open water in the CWP and the area is increasing. Most are lakes (waterbodies >1 ha in area) created by mineral extraction. It is estimated that the lake area was growing by 55 ha per year in the early 1990s, but this rate has now declined. The average size of water bodies in the CWP is approximately 7 ha - but this varies between 0.3 ha (Lake 21) and 38.6 ha (Lake 114). The mean depth is relatively shallow at around 2m, although some lakes may be up to 11m deep.

Subject to the consideration of birdstrike risks at RAF Fairford, there is still considerable potential for the creation of more standing open water and other wetland habitats in the CWP. A focus for future extraction will be the central section of the CWP, as researched and outlined by the RSPB (Stubbs & Wilkinson 2004). Areas of standing open water in the central CWP are likely to be smaller and shallower due to birdstrike risks (see below) and relatively shallow mineral deposits, thereby promoting reed beds, marsh and wet grassland.

Ponds (waterbodies of less than 1 ha) are poorly represented in the CWP, considering the total area of standing open water. Ponds in the CWP are known to support large and widespread populations of UK BAP species such as great crested newt and dragonflies; their invertebrate interest is currently unknown. Ponds have likely declined in quantity and quality in the CWP in line with national trends. To date ponds have been poorly represented within mineral restorations, with the focus upon lakes, reedbeds and wet woodland or restoration back to agricultural land.

3 Habitat and Ecology

Standing open water includes natural waters like cut off meanders and man-made waters like gravel pits and farm ponds. They may be classified according to their nutrient status: eutrophic (nutrient rich) mesotrophic (intermediate) and oligotrophic (poor). In the CWP there is a range of nutrient status - at least 50% are nutrient poor. The nature of the gravel pits is likely to change in time. A study on the gravel pit ecology of the CWP suggests that diverse marl pit communities may evolve into the less diverse communities characteristic of very eutrophic waters, and therefore the marl communities may disappear in time (*Bell M 1996*).

Lakes which deposit calcium carbonate are called marl lakes. In general, these are believed to be open waters with at least 100 mg/l of CaCO₃. Many of the lakes meet this criterion and in 1984, thirteen marl lakes were identified in the Cotswold Water Park; within these waters nationally rare plant communities may become established. (*Smith et al '97*). Standing open water in the CWP is particularly important for breeding and wintering birds, lower plants (Charophytes), some dragonfly species and bats (as a foraging habitat).

Oligotrophic conditions are of particular conservation importance for rare or scarce species of aquatic invertebrates, those associated with aquatic/marginal plants and those with an aquatic stage in their life cycle. Many of the lakes and waterbodies in the CWP are renowned for their caddisfly and mayfly hatches indicating high water quality.

4 Current factors affecting the habitat in the UK and the Cotswold Water Park

The principal factors affecting standing open waters in the Cotswold Water Park are:

- Eutrophication (ie nutrient enrichment, often from diverse pollution from agricultural and urban run-off).
- Pollution from litter, organic matter and silt, for example, from overhanging trees and floodwater.
- Lowering of water levels as a consequence of water abstraction, de-watering activity associated with mineral extraction, or low summer rainfall. Such events may positively and negatively impact a range of species.
- Urbanisation and agricultural intensification resulting in the filling-in of ponds
- Changes in surrounding land-use that may remove valuable adjacent habitat.
- The rate of economic growth - this affects the demand for aggregates and therefore the rate at which pits are created.
- Means of gravel extraction - the old methods of wet working gravel pits sometimes formed shallow small pools like those found in the Swillbrook Lakes complex. The dry working method now employed generally produces larger, steeper-sided and deeper pits which are often of lesser ecological value.
- Restoration after use - how the habitat is restored for the after-use will determine the success with which wildlife habitat can be integrated.
- Recreational disturbance
- Shore erosion
- Management of vegetation
- Fisheries management
- Dredging
- Introduction of alien aquatic plant species, and signal crayfish.
- Birdstrike at RAF Fairford

5 Current action in the Cotswold Water Park

Ongoing advice regarding lake creation and management through the mineral restoration process has been provided since 1996. Advice has been provided to most of the current mineral operators in the CWP at a range of sites. Advice to lake owners/land owners regarding lake management, retrofitting of lakes etc has been provided for over 40 individual lakes.

The English Nature Bird Strategy has focussed considerable attention upon the importance of lakes in the CWP for wintering waterbirds.

A programme of pond surveys, targeting **great crested newts**, was initiated in 2003, locating a significant number of new breeding locations.

6 Action Plan for Standing Open Water

Objectives

- 1 To maintain and enhance lakes with existing nature conservation interest and value.
- 2 To target the creation of lakes and other wetland features, through the mineral restoration process, for specific after-uses, habitats and species.
- 3 To develop and promote appropriate zoning of built and recreational development and nature conservation within the CWP.

Refer also to

Fen, Marsh and Reedswamp HAP
Sand and Gravel Quarries HAP
Wintering waterbirds SAP
Breeding waterbirds SAP
Dragonfly Group SAP
Bats SAP
Nightingale Species Statement
Great crested newt SAP
Bittern Species Statement
Water vole SAP
Otter Species Statement
Reed bunting Species Statement

For further information

Pond Conservation publications can be downloaded or purchased from <http://www.pondconservation.org.uk/>, including the Pond Conservation Handbook.
Smith *et al* 1997. Biodiversity Audit of the Cotswold Water Park.
Stubbs J. & Wilkinson C. (2004). A feasibility study into large-scale wetland habitat creation in the Central Cotswold Water Park. RSPB.
White G.J. & Gilbert J.C. (eds) (2003). Habitat creation handbook for the minerals industry. The RSPB, Sandy.

Standing Open Water HAP

Standing Open Water Habitat Action Plan 2007 – 2016

Objective 1: To maintain and enhance lakes with existing nature conservation interest and value

Action Plan	Target Code	Target Text	Target Year	Action Code	Action Text	Action Lead	Action Partners	Measure (units)
Standing Open Water HAP	SOW-T1	All standing open water habitat with existing nature conservation value in 2006 to be recorded, assessed.	2010	SOW-A1	Develop criteria for selection of key sites and identify areas of Standing Open Water of nature conservation value for BAP species and other species of conservation concern by end 2007. Target habitats should include: deep water, wader scrapes, duck marsh, lakes (waterbodies >1ha), ponds (waterbodies <1ha), shingle islands, vegetated islands, shingle shorelines, fringing reed shorelines.	CWP BAP Team	Director of Conservation Policy GWT, Biodiversity Manager WWT	Selection Criteria agreed. Reports of current nature conservation value of key standing open water habitats produced every 5 years from 2007. Refer also to Breeding Waterbird SAP, Wintering Waterbird SAP, Great crested newt SAP.
Standing Open Water HAP	SOW-T1	All standing open water habitat with existing nature conservation value in 2006 to be recorded, assessed.	2010	SOW-A2	Map existing habitat resource on GIS and make data available to all partners by end 2008.	CWP BAP Team	Director of Conservation Policy GWT, Biodiversity Manager WWT	GIS data collated and available to all partners.
Standing	SOW-	All standing open	2010	SOW-	Assess conservation	CWP BAP	Director of	Reports of conservation

Open Water HAP	T1	water habitat with existing nature conservation value in 2006 to be recorded, assessed.		A3	condition of all existing significant habitat areas and draw up management recommendations for landowners where necessary by 2008.	Team	Conservation Policy GWT, Biodiversity Manager WWT	condition and appropriate management recommendations produced
Standing Open Water HAP	SOW-T1	All standing open water habitat with existing nature conservation value in 2006 to be recorded, assessed.	2010	SOW-A4	Undertake aquatic invertebrate surveys at more than 50 ponds and lakes	CWP BAP Team	Andrew Whitehouse Buglife, Pascale Nicolet Pond Conservation	Reports of conservation condition and appropriate management recommendations produced
Standing Open Water HAP	SOW-T2	All standing open water habitat with existing nature conservation value in 2006 to be under appropriate management to retain and enhance interest.	2010	SOW-A5	Dependent on completion of action (3), implement habitat management recommendations through appropriate means including direct management by partners and advice to private landowners by 2012. Management should target one or more of the following: wintering and breeding waterbirds, dragonflies, water vole, otter, stoneworts, reed bunting, great crested newts, nightingale, aquatic invertebrates or other BAP species/species of conservation concern.	CWP BAP Team	Director of Conservation Policy GWT, Biodiversity Manager WWT, LAs (Minerals), lake owners, Mineral Companies.	Recommendations from action (3) implemented.

Objective 2: To target the creation of lakes and other wetland features, through the mineral restoration process, for specific after-uses, habitats and species								
Standing Open Water HAP	SOW-T3	2 lakes of 30ha+ created and maintained for Wintering Waterbirds	2016	SOW-A6	Subject to minerals planning, bird strike risk and other conditions, create 2 large lakes of 30ha or more apiece to be managed for wintering waterbirds, with a variety of depths and profiles, undulating lake floor, and indented shorelines, to encourage aquatic macrophytes and invertebrates, supporting a variety of wintering waterbirds.	CWP BAP Team	LAs (Minerals), Mineral Companies, Director of Conservation Policy GWT, Biodiversity Manager WWT, RSPB SWRO.	2 large lakes of >30ha established in accordance with the design guidelines. Refer also to Wintering Waterbird SAP
Standing Open Water HAP	SOW-T4	20 Ponds created and maintained for Amphibians such as great crested newts, and invertebrates such as dragonflies and damselflies.	2016	SOW-A7	Create 20 shallow ponds (<1ha in area) of varying depths and sizes, preferably in groups, and manage for amphibians and invertebrates. Ponds should vary in size, depth, profile and in quantity and type of vegetation around margins. Features should include overhanging woody vegetation.	CWP BAP Team	LAs (Minerals), Mineral Companies, Director of Conservation Policy GWT, Biodiversity Manager WWT, RSPB SWRO.	20 shallow ponds established in accordance with the design guidelines. Refer also to Great crested newt SAP, Dragonfly SAP
Standing Open	SOW-T5	3 long shingle and sandy shorelines	2016	SOW-A8	Create 3 long shingle shorelines, 30 metres or	CWP BAP Team	LAs (Minerals), Mineral	3 long shorelines established in

Water HAP		created and maintained for Stoneworts, passage waders, breeding waders and invertebrates			more long, of less than 10 degrees slope into shallow water; create a wide drawdown zone (10-15 metres). Manage to keep free of vegetation.		Companies, Director of Conservation Policy GWT, Biodiversity Manager WWT, RSPB SWRO.	accordance with the design guidelines. Refer also to Charophyte SAP .
Standing Open Water HAP	SOW-T6	Create or maintain 10 bare shingle islands for stoneworts, invertebrates, breeding little ringed plover, ringed plover, oystercatcher, common tern and other loafing and roosting birds.	2016	SOW-A9	Create and maintain 10 bare shingle islands of varying sizes, 100 to 500 m ² in area, in groups or singly, with shallow margins to create feeding areas for waders. If possible, these islands should be incorporated into a wider shallow water wetland area, and should flood in winter to reduce vegetation growth.	CWP BAP Team	LAs (Minerals), Mineral Companies, Director of Conservation Policy GWT, Biodiversity Manager WWT, RSPB SWRO.	10 islands established in accordance with the design guidelines. Refer also to Charophyte SAP .
Standing Open Water HAP	SOW-T7	30 vegetated islands created and maintained for breeding waterbirds and otter.	2016	SOW-A10	Create and maintain 30 vegetated islands of varying sizes, shapes and profiles, with shallow margins; vegetation should range from reed and bulrush fringes, fen communities and scrub to tall trees. Vegetated islands should be smaller in size but larger in number, preferably in groups or as part of a	CWP BAP Team	LAs (Minerals), Mineral Companies, Director of Conservation Policy GWT, Biodiversity Manager WWT RSPB SWRO.	30 islands established in accordance with the design guidelines. Refer also to Breeding Waterbird SAP, Otter SAP, Reed Bunting SAP

					wider shallow water wetland such as Shorncote reedbed in order to maximise the edge habitat for breeding waterbirds and water vole. Larger islands should be created with woodland carr.			
Standing Open Water HAP	SOW-T8	Vegetated shorelines on at least 20 lakes in the CWP created, maintained and enhanced for breeding waterbirds, wintering waterbirds, songbirds, invertebrates, water vole, otter and others. Total area of new/enhanced habitat exceeds 1ha.	2016	SOW-A11	Create, maintain and enhance vegetated shorelines on at least 20 lakes in the CWP; vegetation should include fringing reedbeds, reedswamp, fen, overhanging trees, carr, scrub and others where appropriate. Size of vegetation patches will vary between sites according to opportunity. Wherever possible, the nature conservation gain should be maximised. Fringing vegetation should exceed 2 metres in width, extending into shallow water to enable expansion of areas and overall total length of habitat achieved should exceed 5000m to achieve and area of 1ha of newly created habitat.	CWP BAP Team	LAs (Minerals), Mineral Companies, Director of Conservation Policy GWT, Biodiversity Manager WWT, RSPB SWRO.	Shorelines on at least 20 lakes established in accordance with the design guidelines. Refer also to Breeding Waterbird SAP, Wintering Waterbird SAP, Water vole SAP, Fen Marsh & Reedswamp HAP, Woodland HAP.

Standing Open Water HAP	SOW-T9	2 additional areas of 5-10ha of shallow water wetland created and maintained as wader scrape and duck marsh for breeding waterbirds, breeding waders, passage birds, wintering waterbirds, water vole, otter, invertebrates, reed bunting and others. Existing areas maintained.	2016	SOW-A12	Create extensive shallow water wetlands with extensive shallows and ridges/islands of 5-10ha. Average winter depth of 0.3-1.5 metres. The bed should be constructed at a range of depths to the known water levels in different seasons (also serving to allow for changes in water table following mineral extraction). Topsoil should be spread inside the basins and trees/scrub removed annually. Water level control should be encouraged where possible. Sites to include Wheatley Barn Farm, Shorncote Reedbed, Horcott Reedbed, Cleveland Lakes and Manor Farm Kempford.	CWP BAP Team	LAs (Minerals), Mineral Companies, Director of Conservation Policy GWT, Biodiversity Manager WWT, RSPB SWRO.	Existing habitats identified and maintained against 2006 baseline levels. New wetlands established in accordance with the design guidelines. Refer also to Breeding Waterbird SAP, Wintering Waterbird SAP, Water Vole SAP. Refer also to Marsh, Fen & Reedswamp HAP, Woodland HAP.
Objective 3: To develop and promote appropriate zoning of built and recreational development and nature conservation within the CWP								
Standing Open Water HAP	SOW-T10	To ensure CWP Master Plan recognises and	2010	SOW-A13	To develop a workable strategy for the CWP, that identifies areas (zones)	CWP BAP Team	NCF	Master plan includes policies to maximise the nature conservation

		enhances the existing nature conservation value of standing open water and maximises its potential for creation of this habitat.			where positive management of Standing Open Water would bring greatest conservation gains. This will involve the appropriate zoning of development, mineral restoration and habitat creation and enhancement, thereby fully integrating and balancing the needs of agriculture, industry, local communities, sports & recreation groups, visitors and nature conservation and RAF Fairford.			potential of the existing and future standing open water.
Standing Open Water HAP	SOW-T11	Promote habitat creation and management for nature conservation, especially wintering water birds, that is compatible with policies of the Birdstrike Working Group.	Target: 2006 ongoing	SOW-A14	Liase with the Birdstrike Working Group to promote mineral restoration policies compatible with and balancing the risk of bird strike at RAF Fairford.	CWP BAP Team	Birdstrike Working Group, LAs (Minerals),	Production of mineral restoration plans (or reviews of existing plans) that balance habitat creation targets, mineral restoration and potential for bird strike on 2 sites in the Eastern and Central CWP. <i>Refer also to Wintering Waterbird SAP</i>
Wintering Waterbirds Group Species Action Plan	WW-T3	Obtain a greater understanding of the distribution and abundance of wintering waterfowl in the CWP	Target: 2006 ongoing	WW-A4	Promote the study of lake ecosystems and utilisation by wintering waterbirds, in relation to types and quantities of disturbance, quality of feeding grounds,	Wildfowl & Wetlands Trust, Slimbridge & Bristol University	CWP BAP Team, Natural England	Studentships (PhD, MSc, BSc) and research posts. Fieldwork, surveys, scientific publications and output of findings and

					seasonality and other relationships. Explore weekend and weekday counts and the impact of disturbance from built developments.			conclusions. Refer also to Standing Open Water HAP
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Habitat Statement: Ponds

This Habitat Statement is designed to lie within the Standing Open Water Habitat Action Plan, in order to promote and raise awareness of ponds as an important habitat in their own right in the CWP. Prior to this Statement, ponds have been included on the CWP BAP within the Standing Open Water HAP.

Ponds were included in the 2007 UK's Biodiversity Action Plan as a priority habitat and a Habitat Action Plan (HAP). The HAP targets have been agreed (see below) and the actions are currently being developed. It is anticipated that the Pond HAP will be ready for implementation by Spring 2008. Following this, this Habitat Statement may be upgraded to a Habitat Action Plan. Targets relating to Ponds continue to be located within the Standing Open Water HAP.

Criteria for BAP Priority Habitat Ponds

BAP Priority Habitat Ponds are defined as permanent and seasonal standing water bodies up to 2ha in extent which meet one or more of the following criteria:

- **Habitats of high conservation importance.**
 - Ponds that meet criteria under Annex 1 of the Habitats Directive, eg Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.
- **Species of high conservation importance.**

Ponds supporting:

 - Red Data Book species; BAP species, eg white-clawed crayfish, great crested newt, common toad, grass snake, water vole, Bechstein's bat and other bat species; Species fully protected under the Wildlife and Countryside Act Schedule 5 and 8, for example white-clawed crayfish
 - Habitats Directive Annex II species, eg great crested newt, Desmoulin's whorl snail, ramshorn snail, white-clawed crayfish, bullhead, otter, greater horseshoe bat.
 - Nationally scarce wetland plant species or three nationally scarce aquatic invertebrate species. (eg lesser bearded stonewort, clustered stonewort).
- **Exceptional assemblages of key biotic groups:**
 - Ponds supporting exceptional populations or numbers of key species. Based on (i) criteria specified in guidelines for the selection of biological SSSIs (currently amphibians and dragonflies only), and (ii) exceptionally rich sites for plants or invertebrates (ie supporting ≥ 30 wetland plant species or ≥ 50 aquatic macroinvertebrate species).
- **Ponds of high ecological quality:**
 - Ponds classified in the top PSYM category ("high") for ecological quality (ie having a PSYM score $\geq 75\%$). (See www.pondconservation.org.uk for further information on PSYM)
- **Other important ponds:**
 - Individual ponds or groups of ponds with a limited geographic distribution recognised as important because of their age, rarity of type or landscape context eg pingos, duneslack ponds, machair ponds. This category is less relevant to the CWP.

National Pond HAP Targets

The Pond Habitat Action Plan (HAP) has four targets which aim to maintain and enhance freshwater biodiversity:

- Target 1: Maintain the number of high quality pond sites.
- Target 2: Maintain the quality of flagship pond sites (a subset of high quality pond sites).

- Target 3: Restore pond sites to high quality status to deliver the Species Action Plan targets.
- Target 4: Create new pond sites of high quality potential.

High quality ponds are defined as those fulfilling one of more BAP Priority Habitat criteria as defined above.

Ponds in the CWP

Within the CWP, ponds are a relatively scarce habitat when considered as a proportion of the overall wetland area of the CWP. The majority of the water bodies in the CWP are lakes of over 2ha in size, created through mineral extraction and restoration. They are however important in providing a different type of freshwater habitat to larger standing waters, and have been shown to be particularly important for biodiversity in a regional context (Williams *et al* 2004).

To date, relatively few ponds have been created through the mineral restoration process. Opportunities to create ponds through the mineral restoration process are extensive, serving to replace ponds lost through mineral extraction as well as creating additional sites (and perhaps replacing sites lost on farmland through intensification of agriculture).

Pond data is currently relatively scarce in the CWP, particularly for both wetland plants and invertebrates (except adult dragonflies and damselflies). However, anecdotal evidence suggests that many of the ponds found in the CWP support rich and diverse assemblages, particularly for invertebrates.

Based on existing information, it is highly likely that a large number of ponds in the CWP will be high quality sites:

- A number of ponds within the CWP are known to support “Species of high conservation importance” such as UK BAP and LBAP species, as well as various Red Data Book species. For example, great crested newt, common frog, downy emerald dragonfly, and reed bunting.
- A number of ponds are also likely to qualify as “Habitats of conservation importance” because they support plants assemblages which can be classified as Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.
- Further surveys of pond plant and invertebrates are likely to highlight many species-rich sites, increasing the number of potential qualifying sites, particularly under the “Exceptional assemblages of key biotic groups” and the “Ponds of high ecological quality” criteria.

Urgent work is required in the CWP to (i) develop an inventory of pond sites and (ii) carry out surveys to identify high quality pond sites. These may then be protected, maintained and favourably managed. A programme of pond creation, particularly on new sites is also required to promote pond creation during mineral restoration works, which currently do not actively do this. Further education of Local Authorities is urgently required to include pond creation within mineral restoration plans.

Refer also to

Standing Open Water HAP
Sand & Gravel Quarries HAP
Fen, Marsh and Reedswamp HAP
Great crested newt SAP
Breeding waterbirds SAP
Dragonflies and damselflies SAP
Bats SAP
Water vole SAP

For further information

Information on the biodiversity importance of ponds, the Pond HAP, pond surveys and pond creation on aggregate sites can be found on the Pond Conservation websites:

<http://www.pondconservation.org.uk/>

Whitehouse, A.T. *et al* (in prep) Managing Aggregates Sites for Invertebrates – a best practice guide.

Buglife - The Invertebrate Conservation Trust, Peterborough. Buglife website:

<http://www.buglife.org.uk>

Williams P., Whitfield M., Biggs J., Bray S., Fox G., Nicolet P. and D. Sear (2004). Comparative biodiversity of rivers, streams, ditches and ponds in an agricultural landscape in Southern England. *Biological Conservation* 115: 329-341.

Williams P., Biggs J., Whitefield M., Thorne A., Bryant S., Fox G. and P. Nicolet (1999) *The Pond Book: a guide to the management and creation of ponds*. Pond Conservation: The Water Habitats Trust, Oxford.

Habitat Action Plan for Rivers and Streams

The Cotswold Water Park lies at the head of the River Thames and there are numerous ditches and streams draining into the Thames. In the upper reaches many of the courses are winterbournes following only when there is sufficient ground water typically in the winter.

Water courses in the Cotswold Water Park have been subject to human change particularly from water power in the 17th and 18th century and more recently through land drainage and mineral extraction. Rivers and streams are crucial corridors for the movement of many species through the areas between the restored quarries. Typically only in flood conditions do these water courses flow into the lakes. During extraction many ditches receive flows from quarries that are being dewatered and many restored lakes have an outflow into a ditch or stream through flows during high water levels.

1 Conservation Priority

Context	Priority
National	UK BAP (listed as "Broad Habitat")
Regional	"Rivers, Streams and Associated Habitats" is listed upon South West BAP
County	Included within Gloucestershire and Wiltshire L BAPs

2 National and Local Status

In the UK there are 6,644 river systems and 109,101 associated stream systems (Environment Agency records). Few rivers have not been physically modified by management in this country. This modification includes flood defences, realignment, impoundments, flow regulation and canalisation.

There are at least 66.5 km of river and stream habitat in the Cotswold Water Park, including the Swill Brook, River Thames, River Churn, Ampney Brook, Marston Meysey Brook and the River Coln. In addition there are a number of minor watercourses. It is a natural characteristic of watercourses draining the limestone and valley gravels to the north of the Cotswold Water Park to be subject to low flows in summer with a downstream movement of the head of the stream. Rivers such as the Swill Brook and Derry Brook drain the heavy clays to the south of the Cotswold Water Park.

The Environment Agency's monitoring data of rivers in the Cotswold Water Park indicates that generally water quality is very good to fair.

Watercourse	River Quality Objective (RQO)	RQO Pass or Fail (02-04)	GQA Chemistry (02-04)	GQA Biology (02-04)
Churn	1	Pass	A	A
Swill Brook	3	Pass	C	C
Thames	Upper Reach 3 Middle Reach 2 Lower Reach 3	Pass Pass Pass	C	A
Shorncote Ditch	4	Pass	C	C
Ampney Brook	1	Pass	A	A
Marston Meysey Bk	2	Pass	B	A
Coln	Lower Reach 1 Upper Reach 2	Pass Pass	B/A	A

Leach	1	Pass	A	A/B
<p>The River Quality Objective (RQO) is a target used to help protect and improve the quality of the water in our rivers. A target is set for a stretch of river, which, if met, means that the river will reliably support the type of fishery that we would like to see maintained there. If a river achieves this target we are confident that it will also nearly always meet our requirements for wildlife and conservation, for recreation, and for abstraction for irrigation and the water supplies we use, after treatment, in our homes and businesses. Taken from the Environment Agency website http://www.environment-agency.gov.uk. Further details also available here.</p> <p>The Environment Agency's method for classifying the water quality of rivers and canals is known as the General quality Assessment scheme (GQA). It is designed to provide an accurate and consistent assessment of the state of water quality and changes in this state over time. The scheme consists of separate windows on water quality.</p> <ul style="list-style-type: none"> • The Chemical GQA describes quality in terms of chemical measurements which detect the most common types of pollution. It allocates one of six grades (A to F) (A= Very Good, F= Bad) to each stretch of river, using the same, strictly defined procedures, throughout England and Wales. • The biological scheme is based on the macro-invertebrate communities of rivers and canals. Macroinvertebrates are small animals that can be seen with the naked eye. They include insects such as mayflies and caddis-flies, together with snails, shrimps, worms and many others. Macro-invertebrates are the most widely used organisms for biological assessment because they are found in virtually all fresh waters, they do not move far and respond to everything contained in the water, as well as to physical damage to their habitat. They can be affected by pollutants that occur infrequently or in very low concentrations and which may be missed by chemical sampling. Concentrations of various macroinvertebrate taxa are calculated and aggregated and scored A to F (A= Very Good, F= Bad). 				

Historically there have been concerns over the impacts of public water supply abstraction on the Thames and Swill Brook (from Ashton Keynes Public Water Supply (PWS) abstraction), and the Lower Churn and the Ampney Brook (from the Baunton, Marston Meysey and Latton PWS abstractions). These concerns have meant that, under an agreement with Thames Water, Baunton summer abstraction has ceased and the Latton abstraction will be reduced from 28 to 15 Ml d⁻¹. The summer abstraction from the greater Oolite aquifer has ceased at Marston Meysey, but the winter abstraction from the inferior Oolite aquifer has continued. The positive effects of these reductions on the Churn and Ampney Brook are being monitored, and the Thames and Swill Brook will continue to be monitored to assess any potential reductions in flow due to the Ashton Keynes PWS abstraction.

3 Habitat and Ecology

Rivers and Streams in the CWP are generally characterised by a rich ecology and high water quality. Gravel extraction and built development, as well as increased demand from local towns, has placed greater pressure upon rivers and streams. Recent dry summers and winters have led to severe low flows in some watercourses. Despite these impacts, rivers & streams within the CWP have undergone improvements in recent years, with increasing water quality noted and improvements in ecology. Otter populations are returning to healthy numbers once more, bolstered by a controversial introduction in the 1990s. Remnant water vole populations on the Thames, Churn and Swill Brook have also undergone dramatic expansion in recent years thanks to widespread mink control efforts in the Upper Thames, coordinated in the CWP by the Cotswold Water Park Society but involving on a wider scale, many partners including the Wildlife Trusts and Environment Agency. Several dragonfly species can be found on rivers in the CWP that suggest high water quality, for example, the banded demoiselle and white-legged damselfly.

Non-native species continue to severely impact the ecology of rivers in the CWP, notably, American mink, American signal crayfish and Himalayan balsam. Native white clawed crayfish are now rare within the CWP, due to predation and spread of disease by the signal crayfish. Himalayan balsam is widespread on the Churn and Thames and little work, thus far, has been undertaken to rectify this.

Flooding on the River Thames, between Cricklade and Lechlade, is frequent during the winter, and increasing during the Spring. Many landowners here have entered land into agri-environment schemes such as Countryside Stewardship and Higher Level Environmental Stewardship admitting

that land on the banks of the Thames is becoming increasingly unpredictable to manage for intensive agriculture. Arable reversion, creation of wader scrapes, and removal of land from production is common in this area.

4 Current factors affecting the habitat in the UK and the Cotswold Water Park

These are summarised in the UK report as follows:

- Pollution, including eutrophication
- River engineering works
- Introduction of invasive plants and animal species
- Overgrazing of banks
- Industry and development
- Excessive groundwater and surface water abstraction.

Most of the factors listed above are also operational in the Cotswold Water Park, including:-

- **Water Abstraction;** Significant reductions in abstractions have been achieved at Latton, Baunton, and Marston Meysey under the AMP* process. These reductions are expected to greatly improve the flows in the Ampney Brook and the Churn, especially during low flow periods. The improvements in the flows will be monitored. The possible impacts of the Ashton Keynes abstraction on the Thames and the Swill Brook will continue to be monitored. (*Asset Management Plan)
- **Flooding;** Localised flooding provides opportunities for the interchange of species between rivers and lakes in the Cotswold Water Park. It is suspected that flooding from the Thames and the Churn may be leading to nutrient enrichment in some of the CWP SSSI lakes resulting in a negative impact on the aquatic plant species for which they were designated
- **River Engineering;** The majority of main rivers have been engineered to some extent and this has significantly affected the riverine habitat as well as removing the natural connection with floodplain habitats.
- **Industry and Development;** This has had many influences including:
 - Influencing the courses of local streams and rivers
 - Pollution
 - Gravel extraction has created lakes, which may be subject to high evaporative losses. This may reduce groundwater levels, which can exacerbate low flows.
- **River Management;** In the past, unsympathetic management related to land drainage, flood defence and industrial and urban development, has led to a loss of habitat and species from the watercourses and their corridors. Although river management is undertaken much more sympathetically now, degraded lowland rivers can take a very long time to recover.
- **Point Discharges;** There are several discharges of sewage effluent into watercourses in the Water Park. Some of these have the potential to impact the water quality and therefore the habitats and species present. Improvements in effluent quality have been made to the majority of the large, potentially damaging discharges.

5 Current Action in the Cotswold Water Park

- River corridor surveys have been completed for all main watercourses.
- Otter populations were monitored to complement the UK Otter Survey and subsequent monitoring is taking place.
- Water quality and biological sampling and monitoring has continued on all main watercourses
- Annual river flood defence maintenance has been carried out in accordance with best practice and with consultation with the relevant parties.

- Water Level Management Plans have been completed for all water dependent SSSIs in the Cotswold Water Park.
- Surveys of fish and invertebrate populations on the Churn, Coln, Ampney Brook and Leach are currently being done twice a year as part of the Upper Thames Low Flow study. Other watercourses are surveyed every 3 or 5 years.
- Key improvements in discharge standards under AMP for Ampney St Peter (Ampney Brook), Fairford (river Coln), Lechlade (river Leach) and Ashton Keynes (river Thames) sewage Treatment works (STW). In addition, the largest sewage discharge in the Water Park, Cirencester STW, has had phosphate stripping implemented which will significantly reduce the phosphorus load in the Shorncote Ditch and the river Thames
- Investigations into the potential impacts of Latton, Baunton and Meysey Hampton PWS abstraction led to significant reduction in abstraction under AMP.
- Monitoring of flows and the responses of fish and macro-invertebrates to the AMP reductions in abstractions will continue.

6 Action Plan for Rivers & Streams

Objectives

Ensure the continued improvement of Rivers & Streams and associated habitats in the CWP

See accompanying table for Targets and Actions.

Refer also to

Standing Open Water Habitat Action Plan

Water vole Species Action Plan

Dragonfly Group Species Action Plan

Otter Species Statement

For further information

Environment Agency

<http://www.environment-agency.gov.uk/>

Rivers and Streams HAP

Rivers and Streams Habitat Action Plan 2007 – 2016

Objective 1: Ensure the continued improvement of Rivers & Streams and associated habitats within the CWP

Action Plan	Target Code	Target Text	Target Year	Action Code	Action Text	Action Lead	Action Partners	Measure (units)
Rivers and Streams HAP	RS-T1	Continue to monitor the effects of reductions in abstraction on flow and biology with the CWP	2010 ongoing	RS-A1	Continue to collect data on flows and levels of rivers considered at risk from abstraction (Churn, Coln, Ampney Brook, Leach, and Perrots Brook). As well as hydrological data, invertebrate and fish data will be collected. Build upon datasets established to monitor water quality of main rivers in the CWP.	EA		Annual Summary
Rivers and Streams HAP	RS-T2	Maintain existing water quality where it is high (A or B in GQA assessment), and improve the water quality of streams of poorer quality in line with Environment Agency policy.	2010 ongoing	RS-A2	Continue to monitor the water quality of the main rivers in the Water Park. Continue to monitor the key water quality parameters in the main CWP watercourses and continue with the macroinvertebrate monitoring.	EA		Rolling 3 year reporting
Rivers and Streams HAP	RS-T3	Ensure that 'Good Ecological Status' is secured for all watercourses in the CWP as required under the EU Water Framework Directive.	2016	RS-A3	Continue with existing water quality monitoring and ecological monitoring and supplement it as required to meet the requirements of the Water Framework Directive. Identify and cost supplementary monitoring required.	EA		Assessment of watercourses
Rivers and Streams HAP	RS-T4	Maintain and enhance the habitat quality of the	Target 2010	RS-A4	Ensure that all consentable activities do not lead to loss of habitat and were possible	EA	CWP BAP	Number of applications

		channel and river corridor in the CWP			enhance the existing situation. Seek opportunities to create and enhance habitat through the planning process. Work with landowners and organisations to actively seek to improve degraded wetland/riverine habitat.		Team, NCF	and consents processed with nature conservation gain. Amount of habitat enhanced/created. Number of landowners and organisations advised.
Water Vole SAP	WV-T1	Maintain and then restore water vole populations to all rivers in the CWP	2016	WV-A6	Direct improvement of riparian habitat for water voles through river restoration projects at varying scales, minor habitat improvements, and amended management.	CWP BAP Team	Environment Agency, NCF, Landowners	Length of habitat restored

Habitat Action Plan for Woodland

Woodlands have probably been a relatively rare habitat in this area since early humans began to clear land for agriculture. Archaeological work to mineral extraction has revealed over 6000 years of human habitat and during the Roman period it appears that large areas of land over-lying the gravels were cultivated for crops and grasslands to support the population in Corinium. There are extensive blocks of ancient woodland to the north in Cirencester Park and to the south in the Braydon Forest. A potential long term objective would be to link these woodlands around the western end of the Water Park to provide corridors which would allow species to migrate in response to climate change and also to ameliorate water flow into the Thames catchment. The flood plain area of the Water Park may be one of the few places in lowland England which may have the potential for the restoration of large tracts of wet woodland

1 Conservation Priority

Context	Priority
National	There are 2 broad habitat types in the UK (Coniferous Woodland and Broadleaved, Mixed and Yew Woodland) as well as six UK priority habitat woodland types (Lowland Beech & Yew, Lowland Wood Pasture & Parkland, Native Pine Woodlands, Upland Mixed Ashwoods, Upland Oakwood and Wet Woodland).
Regional	There are two South West priority woodland types
County	Gloucestershire BAP and Wiltshire BAP include HAPs for Woodlands

2 National and Local Status

Overall the area of woodland in the UK is gradually increasing because of planting, regeneration and natural colonisation, and is currently estimated at 800,000ha. In the South West at least 3,000ha of ancient woodlands have been lost in the period 1930 – 1985. During this time many more ancient woodlands were converted to plantations causing qualitative as well as quantitative losses.

In 1997 (Smith *et al*) there were estimated to be 134ha of woodland in the CWP (this figure includes woodland of more than 1 ha in size). This was likely to have been a conservative figure as there are many linear riparian and small interlinked secondary woodlands found within lake compartments which have not been assessed. Since 1997 additional planting has taken place, especially in association with mineral and other developments.

Ancient woodland is poorly represented (12.3ha) and most of the remainder is secondary or plantation woodlands of relatively recent origin. Secondary woodlands often consist of a combination of ash and pedunculate oak on drier areas and some examples support an interesting ground flora.

Other important habitats are likely to be the riparian woodlands along the Coln and Swill Brook, which comprise riparian ash and willow/alder carr woodland. However little information currently exists about these woodlands

3 Habitat and Ecology

Broad-leaved woodlands are among the most biodiverse habitats in the UK, particularly ancient woodlands. Three key types are recognised:

- **Ancient woodlands;** defined as those which have had a continuous woodland cover since at least 1600 AD to the present day, and have only been cleared for underwood or timber production. They may also contain areas of secondary woodland or plantations.

- For convenience, plantation woodlands which are on ancient woodland sites will also be referred to in this sub-habitat group.
- **Plantations**, including conifer plantations; referring to plantation woodlands on previously un-wooded land. Few examples of this type exist in the CWP.
- **Secondary woodlands and scrub**; woodlands which have not been continuously wooded since 1600. In the CWP significant areas of secondary woodland are of the carr woodlands type. These are characterised by shrubs (less than 5 m tall) and trees - typically willows (*Salix spp*). Alders (*Alnus glutinosa*) are often a successional stage of carr on drier ground. Carr woodlands tend to be even aged, but of low timber quality and inaccessible because of wet ground. Woodland carr is commonly seen in vegetation succession upon disused silt beds, for example, Lake 40, Lake 68d/68c. Woodland carr may be considered the climax community of vegetation succession of reed beds and fen.

4 Current factors affecting the habitat in the UK and the Cotswold Water Park

To date there has been no strategic or coordinated plan regarding woodland management or creation in the CWP leading to a series of inter-related problems;

- Loss and degradation of woodland (and hedgerows and individual trees) associated with mineral extraction and built development.
- Frequent inappropriate mineral restoration during the 1990s resulted in the planting of inappropriate tree species and varieties around lakes, at a time when woodland was seen only as a good thing wherever it was planted.
- Planting of inappropriate species and varieties of tree and shrub (often not locally sourced varieties) within new and existing woodlands and new landscaping schemes, for example, second home developments.
- Lack of appropriate management of naturally regenerating trees around lake margins, leading to wind shadow on recreational lakes, impacting upon aquatic macrophytes, leading to mature large willows in need of management and surgery which can become health and safety issues in public areas.
- A lack of appropriate management of standard trees found within boundary features leading to health and safety issues where urgent surgery management is required, for example the Spine Road where numerous mature trees and shrubs are in need of management due to encroachment upon cycle ways, footpaths and increasing risk of collapse of mature trees into the Spine Road.

These problems have been exacerbated by:

Lack of, or inappropriate, management of existing woodlands.

- Loss of trees to disease, for example elm (Dutch Elm disease), alder (Phytophthora) and willow (Willow Scab).
- Lack of species diversity – many of the trees in the Cotswold Water Park are poplar and willow varieties which have a relatively short life span if not managed appropriately.

5 Current Action in the Cotswold Water Park

- There are a number of individual trees and woodlands protected by Tree Preservation Orders (TPOs), for example the old oak tree at lake 6, Manor Farm and lakes 103 and 104.
- Several woodlands are designated as County Wildlife Sites or Site of Nature Conservation Importance
 - Dukes Break
 - Vines Break
 - Cerney Wick Copse
 - The Folly

- Natural England's site management guidelines provide advice for the 60 most significant lakes for wildfowl. This report also gives guidance on the management of the scrub and carr woodland where it fringes these lakes.
- A strategy has been drafted regarding the management of mature trees along the Spine Road.
- Lower Mill Estate is undertaking the restoration of a small coppice woodland on the north bank of the Swill Brook (4ha approx) (2004 ongoing).
- Swillbrook Lakes Reserve (Wiltshire Wildlife Trust); Management of the poplars has been undertaken on health and safety grounds (2006), and an Osprey platform has been created.
- Poole Keynes: a small Woodland Grant Scheme also included small scale pond creation. The planting scheme was amended by CWPSoc to benefit nightingales.
- Restoration work at Manor Farm Quarry, Kempsford (Bardon Aggregates) saw the planting of new areas of wet woodland upon the backfilled silt beds (2005/2006).
- During October 2005, Lower Mill Estate launched their Beaver Project, introducing a small number of European beaver to an enclosed lake within the Estate, as part of efforts to assess their impact upon the management of fringing willow and an alder woodland. The European beaver represents a great opportunity for promoting low key management of lake-fringing willow and riparian woodland corridors.

Opportunities arising

- The Great Western Community Forest. This covers 36,260ha around Swindon, stretching north into the CWP near Ashton Keynes and Lechlade. It is not the aim of community forests to create a continuously wooded area, but a mosaic of woodland and farmland.
- The Cotswold Water Park Society Head of the Thames Project represents an opportunity for a strategic overview of woodland and riparian tree management in the CWP.
- The potential for large scale woodland/wet woodland creation in the central section of the Cotswold Water Park, following mineral extraction. (RSPB Futurescapes project).
- The Rebuilding Biodiversity in North Wiltshire Project, *Landscapes for Wildlife*, also represents an opportunity for a landscape level strategic overview.
- The CWP lies equi-distant between 2 large blocks of woodland: Cirencester Park / Sapperton Woods (Gloucestershire) and the Braydon Forest (North Wiltshire). The linkage of these woodlands through the CWP would do much, at a landscape-level, to support the movement and dispersal of a variety of species, for example, bats.

6 Action Plan for Woodlands

Objectives

- 1 To promote landscape-level planning and coordination of woodland management and creation across the CWP
- 2 To promote appropriate management of riparian woodlands in the CWP

Refer also to

Black Poplar Species Action Plan
Bat Group Species Action Plan
Boundary Features Habitat Action Plan
Standing Open Water Habitat Action Plan
Dragonfly Group Species Action Plan

For Further Information

Stubbs J. & Wilkinson C. (2004). A feasibility study into large-scale wetland habitat creation in the Central Cotswold Water Park. RSPB.

Smith JE, Millett MC, Grimwood N, Pedlow A, Menendez CT, Politt MS, Hogan E (1997).
Biodiversity Audit of the Cotswold Water Park. Report to the RSPB. The Wildfowl & Wetlands Trust,
Slimbridge, January 1997.

Woodland HAP								
Woodland Habitat Action Plan 2007 – 2016								
Objective 1: To promote landscape-level planning and coordination of woodland management and creation across the CWP								
Action Plan	Target Code	Target Text	Target Year	Action Code	Action Text	Action Lead	Action Partners	Measure (units)
Woodland HAP	WD-T1	Publish strategic plan for woodland management and creation in the CWP.	2010	WD-A1	Such a document should detail 1) woodland areas, their species and preferred management, 2) preferred areas for woodland creation and why, preferred species at each site and justification for species used 3) preferred management at each site 4) linkage to the BAP process 5) linkage to the mineral restoration process. Publication and adoption of this plan should be promoted by all partners in the NCF, local authorities, mineral planners etc.	CWP BAP Team	LA's (Management of Land/Buildings/Highways), Landowners	Publication of strategic plan
Woodland HAP	WD-T2	Establish policies in relevant mineral and local plans that will deliver strategic woodland management	2016	WD-A2	Develop model policy specifically promoting native species of local provenance, creation of large areas of woodland	CWP BAP Team	LAs (Minerals), Landowners	Adoption of policy

		and creation.			and linkage of woodland via woodland corridors. Discourage planting of woodlands along lake margins and small ecologically insignificant plantings.			
Woodland HAP	WD-T3	Publish an advisory leaflet detailing preferred species for tree and hedgerow planting in the CWP	2010	WD-A3	Leaflet should promote trees found locally naturally, local provenance, native species/varieties. Should link to the CWP BAP, for example, encourage planting of barberry to support the barberry carpet moth. Refer to the Boundary Habitats HAP.	CWP BAP Team	Wiltshire Wildlife Trust Rebuilding Biodiversity	Publication of advisory leaflet
Woodland HAP	WD-T4	Create 130ha of Wet Woodland	2016	WD-A4	Create large stands of wet woodland in areas as per findings of the Strategic plan. Wet woodland represents an opportunity for the reduction of birdstrike potential in the Central and Eastern Sections of the CWP. Link to the RSPB Futurescapes Project and mineral restoration.	RSPB SWRO	NCF, Mineral Companies, CWP BAP Team	Creation of 130ha of Wet Woodland

Objective 2: To promote appropriate management of riparian woodlands in the CWP								
Woodland HAP	WD-T5	Target the management of new and existing lake fringing trees/woodland towards specific species and objectives, including but not exclusively stoneworts, otter, bats, downy emerald dragonfly, and beavers.	By 2010 and Ongoing	WD-A5	Lake fringing trees/woodland in the CWP is frequently the result of unimaginative gravel pit restoration or natural regeneration. Some species will benefit from this developing habitat whilst many species may also suffer as a result, for example, stoneworts. Thus, new and existing lake fringing woodland management should be targeted toward specific species, for example, feeding and roosting bats, dragonflies such as downy emeralds, and mammals such as otter and beaver, or at specific objectives such as screening rights of way. In future the planting of trees around lakes should be avoided unless for specific biodiversity or landscape gain.	CWP BAP Team	NCF, Mineral Companies	All managed and created lake-fringing trees/woodland will be targeted for specific objectives and gains.
Stoneworts	STO-	Best Practice Guidance	2016	STO-	To target improved	Natural England	NCF	Publication of

SAP	T4	for management of lakes for stoneworts developed and published		A8	restoration of mineral sites, improved management of existing and newly created lakes for stoneworts, for specific species and stoneworts communities. To include guidance upon riparian woodland and reed bed management on lake edges.			Best Practice Guidance.
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Species Action Plan for Barberry Carpet Moth (*Pareulype berberata*)

1 Conservation Priority

Context	Priority
National	Classified as Endangered in the GB Red Data Book Listed under Schedule 5 of the Wildlife and Countryside Act 1981 Listed in the UK BAP: Priority species
Regional	Not listed in the SW BAP
County	Listed in the Gloucestershire BAP Not listed in the Wiltshire BAP

2 National and Local Status

Formerly the moth occurred throughout southern England and as far north as Yorkshire. Following a decline, there are now just ten known colonies remaining in the wild in the UK distributed in the following six counties: Suffolk, Gloucestershire, Wiltshire, Hampshire, Oxfordshire and Dorset (UK BAP 1999, Waring 2000, Butterfly Conservation 2004). The moth has been the subject of a Natural England Species Recovery Programme since 1995. As part of the recovery programme the moth has been successfully re-introduced to a number of new sites in Wiltshire and one site in Lincolnshire (Waring 2000).

In the Cotswold Water Park, the moth has been recorded as a single colony in the hedgerows containing barberry bushes around the fields off Fridays Ham Lane, near Ashton Keynes. There are also several known colonies of barberry moth in North Wiltshire, to the south of the CWP, and it is listed as a priority species in the Gloucestershire BAP. In recent years, a further new colony was discovered on the periphery of the CWP.

3 Habitat and Ecology

The medium sized barberry carpet moth *Pareulype berberata* is named after the foodplant of its larvae, barberry *Berberis vulgaris*, which occurs in hedgerows and woodland edges in sunny situations. The caterpillar of the barberry carpet moth feeds on the leaves of the barberry bush. The caterpillar usually pupates just below the surface of the soil under the foodplant. If the soil is too compacted, then the caterpillar will either spin a cocoon amongst fallen leaves or spin together two leaves on the bush.

After a successful pupation, the adult will mate and lay eggs successfully without feeding but has been seen to drink water, nectar and honeydew. The adults generally fly from dusk until dawn, and are sometimes disturbed from amongst the foodplant by day. The female moth will seek out a barberry bush and will lay her egg singly or in pairs on the leaves. The moth has two generations a year; the first adult brood is active in May with the caterpillars emerging in June. These caterpillars pupate towards the end of July and eventually produce a second adult brood which are active around August. The caterpillars resulting from this second brood will over-winter in the pupa stage before emerging as adults the following April/May to begin the cycle again.

The barberry bush has been reported in woods and particularly in hedgerows throughout Britain. Most of the bushes on which the caterpillars are found are in hedgerows, up to 5m in height and receive full sun. The highest densities tend to be found on untrimmed, overgrown bushes. The main

site in the Cotswold Water Park is a large hedgerow between Fridays Ham Lane and a parallel footpath which contains a number of transplanted barberry bushes from a nearby quarry.

4 Current factors affecting the habitat in the UK and the Cotswold Water Park

- **Habitat loss** – The barberry bush has undergone a dramatic decline since the 19th century as a result of widespread eradication by landowners as it is a host of the wheat-rust fungus *Puccinia graminis*. Today the majority of commercial wheat is now resistant to this fungus and it is no longer necessary to take such drastic action.
- **Hedge maintenance** – Where barberry bushes survive, they are frequently damaged by inappropriate hedge management making them unsuitable for the caterpillars. Pruning of the plant should only take place in the winter after the leaves have fallen, and only a third of the available bushes should be pruned in any one year.
- **Accidental burning** – Previous colonies have been lost through burning or the scorching effects of a nearby fire.
- **Leaf litter** – Over-zealous management of the leaf litter and ground around the barberry bush during the pupation stage is likely to damage the pupa and make them vulnerable to predation or extreme weather conditions.

5 Current Action in the Cotswold Water Park

To date, the actions have been to:

- Monitor the colonies at Fridays Ham Lane and the Millennium Green, Ashton Keynes on an annual basis (survey work undertaken under licence, Dr P Waring & J Grearson)
- Working with a quarry company in the translocation of several barberry bushes that were to have been lost as a result of quarrying. These bushes contained the caterpillar and pupa of the moth (Waring & Grearson 2002).
- Undertaken propagation of the barberry bush for re-planting around the Cotswold Water Park.

6 Action Plan for Barberry Carpet Moth

Objectives

- 1 To maintain and increase distribution of barberry carpet moth at the CWP.

See accompanying table for Targets and Actions.

Refer also to

Boundary Features Habitat Action Plan

For Further Information

Butterfly Conservation (2004) Barberry Carpet *Pareulype berberata*: factsheet. DEFRA

UK BAP (1999) UK Biodiversity Group Tranche 2 Action Plans - Volume IV: Invertebrates p371, JNCC

Waring P. & Grearson J. (2002) Funds Raised by National Moth Night help conserve Endangered

Barberry Carpet *Pareulype berberata* (D.&S.) Atropos 15

Waring P. (2000) Conserving the Barberry Carpet moth. British Wildlife Feb 2000 175-182

Barberry Carpet Moth Species Action Plan

Barberry Carpet Moth Species Action Plan 2007 – 2016

Objective 1: To maintain and increase distribution of barberry carpet moth at the CWP.

Action Plan	Target Code	Target Text	Target Year	Action Code	Action Text	Action Lead	Action Partners	Measure (units)
Barberry Carpet Moth SAP	BCM-T1	Establish current presence/absence of barberry carpet moth at known sites in the CWP	2007	BCM-A1	Establish appropriate annual monitoring programme, under appropriate Licence, for all known sites within CWP.	CWP BAP Team	Natural England, Butterfly Conservation	Circulation of results and methodologies to relevant parties without compromising security of populations
Barberry Carpet Moth SAP	BCM-T2	Safeguard and increase known populations of barberry and barberry carpet moth.	2007	BCM-A2	Ensure known populations are safeguarded; produce management plans for populations to ensure appropriate land management.	CWP BAP Team	Natural England, Butterfly Conservation, landowners	Management Plans and ongoing monitoring reports.
Barberry Carpet Moth SAP	BCM-T3	Survey 5km of hedgerows for barberry	2012	BCM-A3	Identify likely areas for survey, based upon desk survey of historic and recent records.	CWP BAP Team	Natural England, Butterfly Conservation	Report detailing criteria for selection of surveyed sites, site descriptions, methodologies, and results.
Barberry Carpet Moth SAP	BCM-T4	Survey all known barberry plants for barberry carpet moth	2016	BCM-A4	Survey sites identified as above during hedgerow surveys as well as other identified sites. Surveys to be undertaken under Licence,	CWP BAP Team	Natural England, Butterfly Conservation, Landowners,	Report detailing sites surveyed, methodology, and results.

					under direction of Butterfly Conservation. Surveys targeting currently unknown populations. Data shared with BRCs.		NCF	
Barberry Carpet Moth SAP	BCM-T5	Establish 2 additional colonies in the CWP.	2010	BCM-A5	Research and assess feasibility of establishing 2 new populations in the CWP, identify potential sites, management required for habitat and action required to establish new populations by reintroduction, translocation or natural re-colonisation. Reintroduce larva of local provenance. Monitor annually thereafter in agreement with the UK Species Recovery Programme	Butterfly Conservation	CWP BAP Team, landowners	Report detailing proposed methods, locations and feasibility. Two new colonies. Annual monitoring reports thereafter.
Barberry Carpet Moth SAP	BCM-T6	Establish new populations of barberry through agri-environmental schemes.	2010	BCM-A6	Identify target areas for planting of barberry bushes and preferred planting schemes. Link proposed agri-environment schemes to existing populations.	CWP BAP Team	Natural England, Landowners	Number of new schemes where barberry planting has been included. Numbers of barberry bushes planted.
Barberry Carpet Moth SAP	BCM-T7	The habitat requirements of the barberry carpet moth are taken into consideration in all relevant planning applications within the CWP.	2010	BCM-A7	Ensure that all developments and mineral applications that may impact upon mature hedgerows are required to survey for barberry plants. Appropriate mitigation should be included at identified sites.	LA's (Planning & Development)	CWP BAP Team, NCF	Numbers of application where considerations for species made, numbers of applications where surveys were undertaken, number

								of successful surveys
Barberry Carpet Moth SAP	BCM-T7	The habitat requirements of the barberry carpet moth are taken into account in relevant development policies, plans and proposals within the CWP.	2010	BCM-A8	Produce and publish advisory leaflet with hedgerow management guidelines for barberry carpet moth and distribute to developers, mineral companies, landowners and nature conservation groups.	CWP BAP Team	Natural England, Butterfly Conservation	Publication of advisory leaflet.

Species Action Plan for Bats

(*Chiroptera sp.*)

1 Conservation Priority

Status	Priority
National	<p>All bats and their roosts are protected under Schedule 2 of the Habitats Regulations (1994) and Schedule 5 of the Wildlife and Countryside Act (1981) (as amended).</p> <p>Four species of bat (Bechstein's, Barbastelle, Greater Horseshoe and Lesser Horseshoe) are also listed on Annex IV of the Habitats Directive, which requires the designation of Special Areas of Conservation of key sites for these species.</p> <p>All bats are protected under the Bern Convention.</p> <p>All species of bat are included under the Agreement on the Conservation of Bats in Europe (the Bonn Convention).</p> <p>The UK BAP lists all bat species as being of Conservation Concern.</p> <p>Six species of bat (Bechstein's, Barbastelle, Lesser Horseshoe, Greater Horseshoe, Greater Mouse-eared and Pipistrelle) are included in the UK BAP as priority species. In 2007, this list of 6 species was updated to Bechsteins, Noctule, Soprano Pipistrelle, Brown Long-eared, Lesser Horseshoe and Greater Horseshoe Bat</p>
Regional	There is a SAP for Pipistrelle bats within the South West Regional BAP.
County	<p>Six species of bat are included in the Wiltshire BAP based on the national and local importance of their populations in Wiltshire (Barbastelle, Bechstein's, Pipistrelle, Greater Horseshoe, Lesser Horseshoe, and Natterer's).</p> <p>The first five species are selected in the Gloucestershire BAP as priority species.</p>

2 National and Local Status

All species of bat are believed to have suffered population declines in the UK during the 20th century and are therefore believed to be under threat. However, we still know too little about the distribution and population sizes of our native species, let alone trends in population. Population estimates are still very approximate and often reflect the efforts of local recorders as much as the real distribution of bats. In addition, some species are easier to detect than others (for example, large colonies of bats in buildings are more likely to be detected than small colonies of bats which roost and feed high in the canopies of trees). In time, the National Bat Monitoring Programme should be able to provide accurate population trends for all species of UK bat.

Relatively little data is currently available on the distribution of bat species and none available on population trends within the Cotswold Water Park. However, habitats within the Cotswold Water Park, including extensive wetlands and lakes, mature hedgerows, woodland and species-rich grassland, provide excellent foraging habitat for bats. Recent bat detector surveys undertaken in the Cotswold Water Park during summers 2005 and 2006 have recorded very high levels of bat activity. During this time, a total of 12 species of bat have been recorded in the CWP including the Lesser Horseshoe Bat, Bechstein's Bat and Nathusius's Pipistrelle Bat. It is thought likely that further survey work will confirm the importance of the Cotswold Water Park for a number of bat species.

A brief summary of national population trends for those species of bat known to occur in the Cotswold Water Park is provided below together with information on local records. It is likely that further species will be added to this list as further baseline data becomes available.

Species	National numbers and trends	Known local records
Common pipistrelle (<i>Pipistrellus pipistrellus</i>)	Remains the most abundant and widespread bat in the UK but has undergone a significant decline in numbers this century - estimates from the National Bat Colony Survey suggest that the population of pipistrelle bat (including both common and soprano pipistrelle – see below) has declined by approximately 70% between 1978 and 1993 (Harris <i>et al</i> 1995). The current UK population estimate stands at 2,430,000 (Battersby [ed] 2005). Initial results from detector surveys since 1998 indicate a recent substantial increase in common pipistrelle populations, however, recent results from colony surveys indicate a stable population – further investigation and longer time series required to confirm trends (Battersby (ed) 2005).	Approximately 20 roosts recorded in the CWP and immediate area in Wiltshire (includes records for pipistrelle that have not been differentiated between common and soprano pipistrelle) (type of roost not known). No roost data available from Glos. Commonly recorded on bat detector transects.
Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)	Common across the UK: current UK population estimate is 1,300,000 (Battersby (ed) 2005). This species was only recently separated from the common pipistrelle so no historic information on population trends available. Recent surveys indicate that the population of this species is stable although further investigation, longer time series and larger sample sizes required to confirm trends (Battersby (ed) 2005).	See common pipistrelle above. No roost data available from Glos. Commonly recorded on bat detector transects. Large number of roosts discovered during field work in 2005 and 2006, including several roosts of over 200 bats.
Brown long-eared (<i>Plecotus auritus</i>)	Common across the UK with an estimated population of 245,000 (Harris <i>et al</i> 1995). One of the most widely distributed and common species at the beginning of the 20 th century but has undergone a long-term decline in relative abundance and distribution. Surveys for the National Bat Monitoring Programme have not indicated any recent population trends but further surveillance is required (Battersby [ed] 2005).	Approximately 11 roosts recorded in the CWP and immediate area in Wiltshire (type of roost not known). No roost data available from Glos.
Serotine (<i>Eptesicus serotinus</i>)	The Serotine has a southern distribution. There is no clear consensus on historic population trends, however, studies in Kent and elsewhere indicate a serious decline in the population. The current British population is thought to be about 15,000. Based on recent surveys, the population is currently thought to be stable (Battersby [ed] 2005), however, larger sample sizes and longer time series are required to produce robust results.	2 roosts recorded in the CWP and immediate area in Wiltshire (type of roost not known). No roost data available from Glos.
Noctule (<i>Nyctalus nyctalus</i>)	There are thought to be around 50,000 bats in the UK. In the early 20 th century, this species was common and widespread, however, recent observations suggest a	No roosts recorded in the CWP and immediate area.

	substantial decline, particularly after the 1940s. Based on recent surveys, the population is currently thought to be stable (Battersby [ed] 2005); however, longer time series and surveillance of roost sites are required to produce robust results.	Commonly recorded on bat detector transects.
Whiskered (<i>Myotis mystacinus</i>)	The British population is believed to be about 64,000 (Harris <i>et al</i> 1995). Historic population trends are unclear; however, the whiskered bat population may have declined significantly. Recent survey results (Battersby [ed] 2005) suggest that the population is stable. However, it was not possible to separate whiskered bats from Brandt's bats in the analysis and therefore new survey techniques are required to detect individual species trends.	Two records in the CWP from bat box checks and a grounded bat.
Daubenton's (<i>Myotis daubentonii</i>)	Widespread in the UK with an estimated population of 560,000 bats. Considered abundant in England and Wales at the turn of the 20 th Century and widespread in Scotland, the species subsequently declined in the north. There is evidence that populations of this species are currently increasing across the UK although further data is required to confirm this trend (Battersby [ed] 2005).	2 bridge roosts recorded in the CWP to date; ongoing survey work is likely to uncover more. Commonly recorded on bat detector transects – the CWP appears to be a stronghold for this species.
Natterer's (<i>Myotis nattereri</i>)	Widespread in the UK with an estimated population of 148,000 bats (Harris <i>et al</i> 1995). No historic population trend data available. However, recent surveys (Battersby [ed] 2005) indicate that there has been a significant increase in the UK population of this species since 1997 – at least 5 year's additional data required to confirm this trend.	Two maternity roosts recorded in the CWP to date. No data available from Glos. However, Natterer's were commonly recorded during 2005 transect surveys.
Lesser horseshoe (<i>Rhinolophus hipposideros</i>)	Now only recorded in south-west England and Wales - current estimates suggest a UK population of 18,000. The UK population appears to have undergone a significant decline in the last hundred years: it was formerly present in south-east England, the Midlands and northern England. However, recent surveys since 1995 indicate steady upward trends for this species in England and Wales (Battersby [ed], 2005).	2 roosts recorded in the CWP and immediate area (both night roosts). Recently discovered roosts are yet to be confirmed.

3 Habitat and Ecology

All bats

Bats are nocturnal flying mammals. All British bats use ultrasonic echolocation to find their insect prey. Adult bats start mating in the autumn and this can continue through the winter period into early spring. Whilst hibernating in the winter, they go into a state of torpor to save energy by reducing heart and breathing rate. Adult females congregate to form nursery colonies in late spring where each female generally produces a single baby in late June. At three weeks, nearing adult size, they are able to fly out at dusk with the adults.

All temperate bat species require a variety of roost types throughout the year. Different roosts are used for different purposes such as breeding, hibernating and mating. Bat colonies can be mobile and will move regularly, particularly during the summer months. Roosts can be based in a variety of structures but buildings, trees and bridges are commonly used and caves, mines or tunnels are often used as hibernacula. All bats also require suitable feeding areas that support their invertebrate prey. Bats will regularly use the same flightlines or commuting routes such as hedgerows to navigate from their roosts to their foraging areas.

Common pipistrelle

The pipistrelle's principal roost sites are buildings with trees being used to a lesser extent. Modern buildings are often favoured, particularly in soffit boxes and between the roofing felt and tiles. Churches are also popular roost sites. Pipistrelles are highly social and nomadic animals and require a large number of suitable roosts to maintain each colony. Pipistrelles will forage wherever there is sufficient vegetation to support an adequate insect population from woodland and rivers to suburban gardens and city parks.

Soprano pipistrelle

See common pipistrelle above. More research is required to establish how these two species differ in habitat requirements. However, although it has similar foraging habitats to the common pipistrelle, the soprano pipistrelle is more closely associated with riparian habitat and this is reflected in its diet, which has a greater proportion of aquatic flies. In addition, the soprano pipistrelle usually forms larger nursery roosts than the common pipistrelle and some roosts exceed 1,000 bats. This species is recorded more frequently than the common pipistrelle, with a large number of roosts discovered during 2005 and 2006.

Brown long-eared

Usually found in tree holes or old buildings, churches and barns and often found in bat boxes. Hibernates in tree holes, buildings and in caves and mines. Feeds in woodland within the canopy, around parkland trees, gardens and along hedgerows. It frequently gleans insects from the surface of vegetation and hovers to use its large ears to listen for moving prey.

Serotine

The principal known roost sites are in buildings (generally those over 80 years old). Serotines also hibernate in buildings but will use caves, mines and cellars. Serotines need semi-improved or unimproved grassland and mature woodland, linked by hedgerows. Grazed permanent pasture with a high population of dung beetles forms an important component of this bat's foraging habitat.

Noctule

Usually found roosting in trees and occupies woodpecker and rot holes. Noctules are seldom found in buildings. It feeds in the open, often over trees, but has a strong affinity to water.

Whiskered

Usually found in older, mainly stone buildings, including churches. Also found in trees and often in bat boxes. Hibernates in underground sites. The whiskered bat is found wherever there are trees but feeds mainly in deciduous woodland and riparian habitats.

Daubenton's

Predominantly roost in bridges and trees and sometimes in buildings. Hibernates in underground sites such as caves and mines. Habitually feeds low over rivers, canals and other water bodies and will forage in riparian woodland. Will glean insects from the surface of water, as well as from the air.

Natterer's

Roosts in tree holes and buildings and will use bat boxes but hibernates almost exclusively in caves and mines. Found in a wide range of 'woodland' habitats from open parkland and large gardens to dense woodland including coniferous plantations. Will glean insects from vegetation in addition to hawking for flying insects.

Lesser horseshoe

Summer roosts are usually in buildings – maternity roosts are often in cellars or boiler rooms of large old houses. Hibernacula are typically underground sites. Lesser horseshoes predominantly forage in woodland and also need ancient hedgerows and riparian habitats.

4 Current factors affecting the species in the UK and the Cotswold Water Park

Lack of baseline data for bats in the Cotswold Water Park. Relatively few roosts have been recorded prior to 2005 and the status of these roosts is not known. Few bat surveys have been undertaken. Consequently, it is not possible to determine bat population trends and it is not possible to state definitively what factors are affecting bats within the Cotswold Water Park.

However, based on UK trends, the following factors are likely to be affecting bats in the Cotswold Water Park:

- Destruction of/disturbance to roost sites, including loss of buildings (eg barn conversions), roof repairs/renovations, bridge repairs and loss of trees. Loss of mature trees because of mineral workings and other development is likely to have a significant impact on bats in the Cotswold Water Park.
- Destruction of roosts due to the use of toxic timber treatment chemicals (though this has become less of an issue in recent years due to the increasing use of synthetic pyrethroids which are less toxic to bats).
- Lack of access for bats to roost in modern and commercial buildings.
- Intensification of agriculture leading to a reduction in insect prey diversity and abundance (eg through increased use of pesticides and Ivermectin for treatment of cattle). Intensification of agriculture (acting through factors such as fertiliser use, drainage, intensive grazing and conversion of pasture to arable) has also resulted in loss or simplification of habitats such as hedgerows, wetlands and species-rich grassland (see below).
- Loss of insect-rich feeding habitats and flightlines due to loss of grassland, woodland, hedgerows, wetlands and other habitat mosaics. Loss of such habitats because of minerals working and other development is likely to be significant in the Cotswold Water Park. Although new habitats will eventually develop on active and restored minerals sites, there is a lack of information on how landscape-scale changes due to mineral working are affecting bat populations.
- Poor public image and understanding of bat behaviour and requirements.
- Ineffective wildlife legislation and enforcement to protect bats and their roosts.

5 Current action in the Cotswold Water Park

The Cotswold Water Park Bat Initiative (CWPBI) was launched in May 2005 to coordinate bat conservation and monitoring in the CWP. The overall aim of the project is to enable the gradual and systematic build up of information on the bat species within the Cotswold Water Park, identifying

through a variety of activities, their populations, roosts and foraging sites. This information will be stored centrally and supplied to the county Biological Records Centres and will be used to inform development control, site management plans, conservation efforts and contribute to mineral restoration plans. The project is intended as a long-term initiative.

The CWPBI is a project run jointly by the Wiltshire and Gloucestershire Bat Groups, coordinated by the Cotswold Water Park Society, and relies on the efforts of volunteers from both groups. To-date, project activities have included:

- Collation of existing data on bats across the county boundary
- Establishing a database for bat data and establishing data exchange protocols with the two Biological Records Centres.
- A series of building surveys and emergence surveys.
- A series of activity transects undertaken across the Cotswold Water Park using bat detectors. (Over 25 transect surveys during 2005 and 2006)
- Checking existing bat boxes and establishment of 5 new monitoring schemes
- Production of a project plan.

Volunteers will build and expand on these activities in the future in accordance with the project plan.

6 Action Plan for Bats

Objectives

- 1 Establish a comprehensive baseline for bats in the CWP (in terms of distribution of species and location of important habitat features).
- 2 Protect existing bat roosts (including tree roosts) and important habitat features for bats, including commuting routes and foraging areas.
- 3 Enhance habitat for bats in the CWP by providing an increased number of roosting opportunities, improving existing and creating new foraging areas (particularly hedgerows, wetlands and woodlands).
- 4 Increase the profile and awareness of bats as a valuable ecological resource within the CWP
- 5 Develop a committed volunteer base to support the CWP BI

See accompanying table for Targets and Actions.

Refer also to

Woodland (including wet woodland and lakeside planting) HAP
Boundary features (including hedges, walls, ditches and verges, ancient or species-rich hedgerows, flower-rich verges, ditches, canals) HAP
Farmed land HAP
Fen, marsh and reedswamp HAP
Lowland neutral grassland (including flower-rich meadows) HAP
Rivers and Streams HAP
Standing Open Water HAP
Built structures (including bridges, barns, housing, and holiday lodges) HAP
Canals HAP

Further information:

Altringham, J. D. (1996). *Bats – Biology and Behaviour*. Oxford University Press, Oxford.
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Bats Species Action Plan								
Bats Species Action Plan 2007 – 2016								
Objective 1: Maintain and enhance bat populations in the CWP								
Objective 2: Protect and enhance habitats and roosts used by bats in the CWP								
Objective 3: Increase public awareness of bats in the CWP								
Action Plan	Target Code	Target Text	Target Year	Action Code	Action Text	Action Lead	Action Partners	Measure (units)
Objective 1: Maintain and enhance bat populations in the CWP								
Bat SAP	BAT-T1	Establish comprehensive baseline data for bat populations in the CWP	2008	BAT-A1	Create and maintain database of bat records for the Cotswold Water Park, following advice from GCER and WSBRC with regarding to effective recording of bat data.	CWP BAP Team	WSBRC, GCER	Database created by 2007 and maintained annually
Bat SAP	BAT-T1	Establish comprehensive baseline data for bat populations in the CWP	2008	BAT-A2	Establish regular data exchange mechanism between Glos and Wilts Biological Records Centres and the database maintained by the CWPBI.	CWP BAP Team	WSBRC, GCER	Data exchanged annually between local records centres and CWPBI.
Bat SAP	BAT-T1	Establish comprehensive baseline data for bat populations	2008	BAT-A3	Undertake bat activity transects across the CWP with bat detectors to	CWP BAP Team	Glos Bat Group, Wilts Bat	25 transects undertaken by 2007.

		in the CWP			determine species present in the CWP, areas of importance for bats, activity levels, important flightlines and foraging areas and where possible, roost sites. These surveys may also comprise the basis for a repeatable monitoring programme.		Group	
Bat SAP	BAT-T2	Locate 3 new bat roosts each year.	2007 ongoing	BAT-A4	Find new roosts each year, through building survey, house visits, emergence surveys and dawn swarming surveys and determine type of roost, species and numbers of bats.	CWP BAP Team	Glos Bat Group, Wilts Bat Group	3 (or more) new roosts found each year
Bat SAP	BAT-T3	Establish 5 new bat box monitoring schemes	2010	BAT-A5	Establish new bat box schemes to determine bat species present in the Cotswold Water Park and their distribution. Box schemes are an additional tool to clarify species habitat use in an area, as well as being a way of involving volunteers and creating training opportunities in bat handling and identification. Care should be taken to ensure that adequate resources, time and people	CWP BAP Team	Glos Bat Group, Wilts Bat Group	5 bat box schemes established Monitoring of bat boxes undertaken 2-3 times per year. Records of all checks

					are available to monitor these schemes. A variety of habitats should be targeted for monitoring and study.			
Objective 2: Protect and enhance habitats and roosts used by bats in the CWP								
Bat SAP	BAT-T4	All large developments to generate a net gain for bats	2007 ongoing	BAT-A6	Landscaping schemes to create and improve and link foraging areas, commuting routes and known and newly created roosts. Built developments to include creation of bat lofts, hibernacula and bat tiles/bricks.	CWP BAP Team	NCF	All large-scale developments incorporating habitat creation and management for bats. (Measure length of flyways and commuting routes created and managed, number of roosts created etc).
Bat SAP	BAT-T4	All large developments to generate a net gain for bats	2007 ongoing	BAT-A7	Where bats are likely to be present and affected by development, planning applications should be submitted with adequate baseline on bats, assessment of potential impacts on bat populations and mitigation measures for bats. There should be an	LA's (Planning & Development)	NCF	Number of permitted developments that include/have delivered positive measures for the enhancement

					overall gain in biodiversity.			of the status of the BAP species.
Bat SAP	BAT-T5	Protect all known roost sites	2007 ongoing	BAT-A8	Liaise with landowners and managers to alert them to the presence of roosts and other important bat habitat features (particularly mature trees and hedgerows). Provide advice on conservation management of roosts and nearby foraging habitat.	CWP BAP Team	Glos Bat Group, Wilts Bat Group	Number of times advice provided to landowners/managers per year.
Bat SAP	BAT-T6	Protect and enhance foraging areas and key habitat features comprising commuting routes between roosts and foraging sites.	2016	BAT-A9	Identify and map known/potential roosts and key habitat features such as commuting routes and foraging areas. (By 2008). Efforts should be made to maintain habitat connectivity between key corridors such as the canal, river corridors, disused railway line and key hedgerows. Efforts should be made to link human settlement where the majority of bat roosts may be found, with foraging areas through these habitat corridors.	CWP BAP Team	Glos Bat Group, Wilts Bat Group	Production of map by 2008
Bat SAP	BAT-T6	Protect and enhance foraging areas and key	2016	BAT-A10	Identify obstructions to habitat connectivity for	CWP BAP Team	Glos Bat Group,	Publication of report detailing

		habitat features comprising commuting routes between roosts and foraging sites			commuting bats using map produced [above] and identify solutions. (By 2009)		Wilts Bat Group	obstructions and solutions where possible
Bat SAP	BAT-T6	Protect and enhance foraging areas and key habitat features comprising commuting routes between roosts and foraging sites	2016	BAT-A11	Undertake habitat creation and management where appropriate to improve habitat connectivity as identified [above]. By 2016.	CWP BAP Team	Landowners,	Length and/or area of habitat created to restore habitat connectivity
Bat SAP	BAT-T7	All Bridge structures, where bats present or likely to be present, to be assessed for bat usage prior to maintenance or repairs that may adversely affect bats.	2007 ongoing	BAT-A12	Incorporate bat surveys, at the appropriate time of year, early into the planning stages of bridge repair/ maintenance works and ensure appropriate mitigation is provided during the works if necessary.	LA's (Management of Land/Buildings/Highways)	CWP BAP Team, Natural England	Number of bridge repairs works undertaken following a bat survey and mitigation where necessary. Also refer to Built Structures HAP
Bat SAP	BAT-T8	3 Bat lofts created in buildings	2010	BAT-A13	Seek advice on best designs and techniques available. Pro-actively seek and develop opportunities to achieve this.	CWP BAP Team	Developers, LAs (Planning & Development)	3 lofts created. Also refer to Built Structures HAP
Bat SAP	BAT-T9	2 hibernacula created in buildings	2016	BAT-A14	Seek advice on best designs and techniques available. Pro-actively seek and develop opportunities to achieve this.	CWP BAP Team	Developers, LAs (Planning & Development)	2 hibernacula created. Also refer to Built Structures HAP

							ment)	
Bat SAP	BAT-T10	Bat bricks/tiles to be incorporated into 100 new buildings	2016	BAT-A15	Seek advice on best designs and techniques available. Pro-actively seek and develop opportunities to achieve this.	CWP BAP Team	Developers, LAs (Planning & Development)	Bat bricks and tiles incorporated into 100 new buildings. Also refer to Built Structures HAP
Bat SAP	BAT-T11	2 roosts created in new/repared bridges	2016	BAT-A16	Seek advice on best designs and techniques available. Pro-actively seek and develop opportunities to achieve this.	CWP BAP Team	LA's (Management of Land/Buildings/Highways)	2 roosts included in bridges. Also refer to Built Structures HAP
Bat SAP	BAT-T12	Management by Environment Agency of riparian habitat is undertaken in accordance with the Management Guidelines for Daubenton's Bat (Environment Agency Habitat and Species Handbook).	2007ongoing	BAT-A17	Ensure Environment Agency management of riparian habitat is undertaken in accordance with the Management Guidelines for Daubenton's Bat, including management of willow pollards and other large trees and the maintenance of some overhanging branches.	Environment Agency	CWP BAP Team	Length of river (km) managed in accordance with the Management Guidelines for Daubenton's bat.
Objective 3: Increase public awareness of bats in the CWP								
Bat SAP	BAT-T13	Undertake 2 guided bat walks in the CWP per year	2007ongoing	BAT-A18	Walks may be undertaken as part of existing programmes of events.	CWP BAP Team	Glos Bat Group, Wilts Bat Group	2 bat walks per year

Bat SAP	BAT-T14	Develop the CWP BAP Team website to include a section on the CWPBI.	2007 ongoing	BAT-A19		CWP BAP Team	Glos Bat Group, Wilts Bat Group	Section on CWP BAP Team website created and updated at least annually.
Bat SAP	BAT-T15	Give 1 illustrated talk per year on bats to interested parties upon request.	2007 ongoing	BAT-A20		CWP BAP Team	Glos Bat Group, Wilts Bat Group	1 talk given per year.
Bat SAP	BAT-T16	Provide 1 training event per year for bat workers in the CWP	2007 ongoing	BAT-A21	Working with Gloucestershire and Wiltshire Bat Groups bring together a range of expertise and training opportunities including mist netting, bat box checks, roost visits, building surveys and bat detector surveys. Training events may include detector surveys, bat sound analysis and mist netting and identification of bats in the hand.	CWP BAP Team	Glos Bat Group, Wilts Bat Group	1 training event per year.
Bat SAP	BAT-T17	Publication of annual newsletter	2007 ongoing	BAT-A22	This will provide to volunteers, landowners and partner organisations as well as funding organisations.	CWP BAP Team		Publication and distribution of newsletter each year.

Species Statement for Bittern (*Botaurus stellaris*)

The Bittern, *Botaurus stellaris*, is a threatened/declining UK BAP species and a red-listed species of conservation concern (Birds of Conservation Concern, 2002). With only 15 booming male Bitterns recorded on 33 sites in the UK in 2007, this species has undergone a severe long term decline. (Males 'boom' to attract females, indicating their readiness to breed; counting booming males is the most reliable method of monitoring the population).

Targeted conservation action since 1990 led to a recovery to 55 booming males on 31 sites in 2004; exceeding the UK BAP target for 2010 (50 males) six years early. Despite this recovery, breeding bitterns remain rare and concentrated in relatively few areas of the UK, and are still vulnerable. To achieve the next key UK BAP target of 100 booming males by 2020 will require the creation of extensive new reedbeds across the UK. In winter, bittern numbers are boosted by migrants from central Europe.

In the CWP, the first record of a wintering bittern was in August 1981. Since the winter of 1993-94, at least one bittern has been recorded wintering in the Cotswold Water Park every year. In summer 2003, a pair of bittern was sighted in various locations, and two reports of 'booming' were received, which although thought not to indicate breeding on that occasion are positive signs that bitterns may colonise the area within the target timescale.

Breeding bitterns are confined to lowland marshes and reed beds where they feed upon aquatic animals, principally fish, amphibians and invertebrates. To breed successfully, bitterns require large, wet reedbeds (20 ha minimum), with up to 20% open water in a network of dikes and meres, and with at least 600m of reed edge habitat per hectare (reed edge habitat defined as reed within 30m of open water). Fish prey must be able to penetrate the reedbed so they are accessible to the feeding bitterns. Wintering bitterns can occur in much smaller areas of reedbed, reed fringes at lake edges, and occasionally dense willow carr.

In the CWP, the establishment of breeding bitterns is limited by the current lack of reed bed and marsh of a suitable size and quality. Within the lifespan of the CWP BAP it is anticipated that large areas of reed, wet grassland and marsh will be established on a number of mineral sites, for example, Cleveland Farm, Eysey Manor and Roundhouse Farm. In future, works will be required to ensure that these areas of habitat are of suitable quality, with adequate amounts of suitable fish prey, with appropriate long term management regimes in place.

The RSPB's feasibility study of large-scale wetland habitat creation in the central Cotswold Water Park (2004) identified the potential for further large reedbed creation. These findings are now reflected in the targets in the Fen, Marsh and Reedswamp HAP.

The establishment of bittern as a breeding species in the CWP is largely dependent upon the establishment of large areas of reed bed. It is considered that once large areas of reed bed have been established in the area, that further work will be required to improve their suitability for breeding bittern by assessing food prey density and undertaking further habitat works. In time, it may be necessary to re-draft a Bittern Species Action Plan to replace this Species Statement.

Refer also to

Fen, Marsh and Reedswamp Habitat Action Plan

For further information

Smith *et al* 1997. The Biodiversity Audit of the Cotswold Water Park.

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Species Action Plan for Black Poplar (*Populus nigra betulifolia*)

1 Conservation Priority

Status	Priority
National	None*
Regional (South West)	None*
County (see 'Other relevant Action Plans below')	Wiltshire BAP (but not listed as a key species) Gloucestershire BAP (but not actually mentioned)

*Could be covered under Action Plan for hedgerows/linear features

2 National and Local Status

The European black poplar is confined to Britain, Ireland, Northern France, and parts of Western Germany. The boundaries of the distribution of this subspecies from the continental type species *Populus nigra*, are indistinct due to naturalisation and have been much obscured by artificial cultivation (Wrexham Biodiversity Group, 2004). Black poplar is considered important enough on a European scale to be included in the European Forest Genetic Resources Programme (EUFORGEN), operating under the auspices of International Plant Genetic Resources Institute (www.ipgri.cgiar.org).

The black poplar is native to England and Wales as far north as a line from the Mersey to the Humber, with a few trees occurring in south Yorkshire and as far north as the River Tees (Durham Wildlife Trust, 2000). There are around 5000 individual trees in the Aylesbury Vale in Buckinghamshire, perhaps half of the UK total.

Holland (1992) identified 355 Trees between 1973 and 1992 in Gloucestershire and parts of North Wiltshire. Planted black poplars can be seen in good numbers in the Severn Vale, along the River Chelt and other small rivers and brooks flowing towards the Severn; on roadsides and in hedgerows where the presence of a ditch or old pond is usually indicated; on open farmland, and in corners of old orchards and gardens. Male trees can also be seen on many village greens.

Most of the female black poplars in Wiltshire are found in the extreme north. Green (1997) reported good populations of male trees along the Wylve Valley in the south of the county. The population in the Avon watershed is now known to be of considerable size – over 350 trees. A map showing 1995 distribution in Wiltshire can be found in this report by Green.

In the Cotswold Water Park, black poplar specimens have been found in Fairford, South Cerney, Siddington, Cerney Wick, Kempsford, Dunfield, Whelford, Lechlade, and Ashton Keynes (Holland, 1992).

3 Habitat and Ecology

The black poplar is a robust, broadly rounded tree which can grow to a height of 30 metres, with a crown of 20 metres and a trunk diameter (at breast height) of up to 250cms. The black poplar has separate male and female trees. Catkins appear before the leaves. Black poplars can live for over 250 years and there are historical records of extant individuals dating back to before 1715 (White, 1993). New trees grow up quite readily from fallen trunks and in time appear as separate trees.

The black poplar was formerly a component of floodplain woodland but now occurs as isolated specimens in wet meadows, along hedgerows, beside farm ponds and near to rivers.

Short-lived windblown black poplar seeds need to fall onto ground that is kept both bare and wet and free of competition from the end of June until October. Where conditions do allow seedlings to germinate these are likely to be hybrids, as pollen contamination from cultivated varieties is probable (Sussex Biodiversity Partnership).

4 Current factors affecting the species in the UK and Cotswold Water Park

- The majority of surviving native black poplar are approaching the end of their natural life spans, and very few have been planted since 1850 (Sussex Biodiversity Partnership).
- Historically female trees have been selectively removed due to the sticky white fluff which they produce. This means the ratio of male to female trees is 50:1 across most of the range, so cross-pollination is rare (Flintshire Biodiversity Partnership, 2002).
- Genetic research has found 65% of black poplars to be of the same genotype (Wrexham Biodiversity Group, 2004), and lack of genetic diversity means that this species may now be particularly vulnerable to climate change.
- Fertile seed is rare, and the lack of suitable conditions for germination greatly exacerbates low levels of regeneration from seed.
- Loss of individual specimens through felling for development and road building, because of safety or nuisance concerns, and removal of wind-fall trees which would otherwise survive in situ or regenerate from the stump and loss of suitable habitat. Canalisation and bank-side development results in the direct loss and damage of black poplars (London Biodiversity Partnership). Because individual specimens are widely dispersed, site-based conservation can be difficult.
- During the summer of 2000, the virulent disease poplar scab – *Venturia populina*, hit Manchester black poplars. In most cases this leads to death over a three-year period. Poplar scab has now been confirmed in the Aylesbury Vale, and may pose a significant threat to black poplars in other regions particularly as an ageing population with a narrow genetic base may offer little resilience.
- General lack of clarity regarding the genetic definition of the sub-species has led to confusion over the integrity of the sub-species, and also concern over the ability of the species to adapt to new situations in the face of climate change.
- Results reported by Holland (1992) suggest that although elsewhere in the UK, and in the counties of Wiltshire and Gloucestershire, females are in short supply, in the Cotswold Water Park area they appear to outnumber male specimens by 5:1. This means that specific actions to increase the number of female black poplar specimens, which are often present by necessity in other Black Poplar Species Action Plans, may not be required in this Plan.
- At present, little is known or understood regarding the distribution of Black Poplars (of either sex) within the CWP, beyond the work undertaken by Holland in 1992. Therefore, black poplars that are currently unrecorded are at risk of development works and mineral extraction.
- Fluctuations in water levels and water table through water abstraction and mineral extraction may also pose a threat to black poplars, although the extent of this threat is unclear. Future plans by the RSPB to create extensive shallow wetlands in the Central Section of the CWP may pose a significant opportunity however, for the further propagation and planting of this species within a functioning floodplain habitat.

5 Current action in the Cotswold Water Park

- Recent fieldwork (K Adams, 2005, 2006) has highlighted significant populations of black poplar in the Eastern CWP and Swindon Borough, in particular of females. This appears to

support the findings of Holland (1992) whereby notably more females than males were recorded. Clarification of the distribution of both sexes of the tree is required in the CWP in order to support and guide conservation efforts.

- New trees have also been recorded at several other sites during 2006 during ad hoc fieldwork by the Cotswold Water Park Society.

6 Action Plan for Black Poplar

Objectives

- 1 To maintain distribution of the black poplar in the Cotswold Water Park
- 2 To establish sustainable populations of black poplar in the Cotswold Water Park

See accompanying table for Actions and Targets.

Refer also to

Boundary Features Habitat Action Plan
Rivers and Streams Habitat Action Plan
Canals Habitat Action Plan

For further information

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Black Poplar Species Action Plan

Black Poplar Species Action Plan 2007 – 2016

Objective 1: To maintain and enhance distribution of black poplar at the CWP.

Action Plan	Target Code	Target Text	Target Year	Action Code	Action Text	Action Lead	Action Partners	Measure (units)
Black PoplarSAP	BP-T1	Establish the current distribution of black poplar in the western and eastern sections of the CWP.	2008	BP-A1	Carry out a desk study of existing distribution data ofb, ground-truthing and recording sex of specimens. Share all data with GCER and the WSBRC. If possible GPS all known trees and map onto GIS.	CWP BAP Team	Director of Conservation Policy GWT, Biodiversity Manager WWT, LA's (Management of Land/Buildings/Highways)	Production of one map showing the historical distribution of black poplar.
Black PoplarSAP	BP-T1	Establish the current distribution of black poplar in the western and eastern sections of the CWP.	2012	BP-A2	Conduct a strategic survey of appropriate habitat to fill gaps in distribution data.	CWP BAP Team	Director of Conservation Policy GWT, Biodiversity Manager WWT, LA's (Management of Land/Buildings/Highways)	Updated map of distribution data produced.

Species Action Plan for Breeding Waterbirds

For the purposes of this group SAP, breeding waterbirds includes ducks, grebes, rails, swans and herons of conservation concern breeding in the Cotswold Water Park. Other waterbirds, for example, waders such as lapwing, redshank and little ringed plover, are supported in specific sections of the Standing Open Water HAP and Active Quarries HAP and consequently are not considered here.

1 Conservation Priority

Status	Priority
National/European	Amber Listed (Birds of Conservation Concern, 2002-2007), including gadwall, teal, shoveler, pochard, mute swan. SPEC 2 (Species concentrated in Europe with unfavourable conservation status): pochard SPEC 3 (Species not concentrated in Europe with unfavourable conservation status): shoveler, tufted duck, gadwall SPEC status reflects breeding and wintering populations.
Regional	SW Species of Conservation Concern (pochard, gadwall, shoveler, teal)
County	Pochard, tufted duck and gadwall previously included individually on CWP BAP 1997-2007.

2 National and Local Status

National Status

Many familiar waterbirds have surprisingly small breeding populations in the UK. For example, pochard has a UK breeding population of just 251-406 pairs, gadwall only 790 pairs. The CWP breeding populations may comprise a significant proportion of the national population and so can make significant contributions to their conservation.

Table 1 outlines the conservation status of breeding waterbirds in the CWP at a national and European level, also giving the UK breeding populations. Many species are experiencing current increases (see Table 2). Species such as pochard, tufted duck and shoveler have declined in recent years and are currently listed with unfavourable conservation status across Europe.

Table 1: Conservation Status & UK Breeding Populations for waterbirds relevant to the Cotswold Water Park

Species	Birds of Conservation Concern*	SPEC**	UK breeding population***	UK Long Term Trend % (1970-2005) ****	BBS Trend % (1994-2006)****
Little Grebe	-	-	3,800-13,000	199	72
Great Crested Grebe	-	-	6,100	Na	157
Mute Swan	Amber (BI)	-	23,900-25,600 pairs	168	8
Gadwall	Amber (SPEC, BL, WI)	SPEC 3	790 pairs	?	?
Teal	Amber (WI)	-	1,600-2,800	?	?
Mallard	-	-	63,000-158,900	99	20
Shoveler	Amber (WI)	SPEC 3	1,000-1,500 pairs	?	?
Pochard	Amber (WI)	SPEC 2	324-426 pairs	?	?
Tufted Duck	-	SPEC 3	10,200-11,500 pairs	37	94
Coot	-	-	22,600-28,800 breeding adults	97	66
Moorhen	-	-	270,000 territories	-2	21

* Gregory RD, Wilkinson NI, Noble DG, Robinson JA, Brown AF, Hughes J, Proctor DA, Gibbons DW and Galbraith CA (2002). The Population status of birds in the UK, Channel Islands and Isle of Man: An analysis of conservation concern 2002-2007. *British Birds* 95: 410-450.

** SPEC: Species of European Conservation Concern

*** From Birds In Europe 2004, accessed October 2005 from the BirdLife International website at: http://www.birdlife.org/action/science/species/birds_in_europe/index.html with species accounts accessed at:

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**** From The State of the UK's Birds 2006 (RSPB, BTO, WWT, Natural England, Countryside Council for Wales, Environment & Heritage Service (Northern Ireland) and Scottish Natural Heritage. Data derived from Common Bird Census data (1966-2000) and Breeding Bird Survey (1994-2006), as well as some long term trends from the Waterways Bird Survey (1974-2006).

Abbreviations:

BI: >20% of European breeding population in UK

BL: 50% of UK breeding population in 10 or fewer sites but not rare breeders

WI: 20% of NW European non-breeding populations in UK

SPEC 2: Species Concentrated in Europe with unfavourable conservation status

SPEC 3: Species not concentrated in Europe with unfavourable conservation status

Local Status

Recent data on breeding waterbirds in the Cotswold Water Park is inadequate. The last comprehensive CWP-wide surveys to be undertaken are detailed in Callaghan *et al* (1993) and Hilton *et al* (1994). The CWP was found to support nationally important populations of coot and great

crested grebe (as well as for late summer aggregations of tufted duck and pochard) and also qualified for national importance due to the assemblage of breeding birds present.

Other recent data includes ecological monitoring work undertaken through Section 106 planning agreements, MSc studies by students from WWT Slimbridge for certain years, and the WWT Slimbridge Feral Goose Survey (2000) which produced considerable data on some species of breeding waterbirds. However, there is a clear need for the collation of historic and current breeding records for the Cotswold Water Park.

3 Habitat and Ecology

Breeding waterbirds such as great crested grebe, mute swan, mallard, gadwall, shoveler and pochard have broadly similar habitat requirements for breeding: a dense fringe of shoreline and bank vegetation such as marginal reed bed, with access to open water.

Species such as tufted duck, pochard and gadwall tend to favour quiet localities without disturbance or high risk of predation, such as dense stands of marginal reed and vegetated islands. Predator control (corvids and American mink) is also extremely beneficial, since these species are frequently predated whilst incubating upon the nest. Feeding habitat requirements are more variable, but can be split into 5 key types:

- Abundant small fish and amphibians, eg great crested grebes
- Invertebrate-rich brood rearing habitat, eg all duck species, great crested grebe
- Shallows rich in floating seeds and invertebrates, eg teal, shoveler, moorhen, little grebe
- Deeper water with abundant invertebrates, eg pochard, tufted duck
- Abundant submerged water plants, eg gadwall, pochard, mute swan and coot

A wide range of habitats is, therefore, required by breeding waterbirds, representing a variety of water depths, shorelines, profiles and water features.

4 Current factors affecting these species in the UK and the Cotswold Water Park

- Quality of design of mineral restoration schemes: many past restoration schemes created poorer habitat for breeding waterbirds, such as lakes with steep sides, straight shorelines and uniform profiles that are prone to erosion. Some newer schemes like Shorncliffe reedbed (Lake 84/85) and Village Lake (Lake 99) represent significant improvements, but considerably more can be done.
- Disturbance by human recreation and activities is a key consideration. Water sports, for example, can create currents and wash that may damage and drown nests. Human activity, ranging from water sports to uncontrolled dogs can significantly reduce breeding success as well as the overall suitability of the habitat.
- Waterbirds may breed on lakes with little suitable habitat for nesting or for feeding broods. Vegetated islands are often nested upon despite high levels of disturbance. In many cases, suboptimal breeding habitat is utilised where no alternative is possible, thereby reducing the chances of breeding success.
- Predation by corvids, raptors, foxes and American mink is a key consideration at several sites in the CWP.

5 Current action in the Cotswold Water Park

Considerable research into the impacts of mink predation on waterbird populations in the CWP has been carried out (Aldridge N. S. 2000, Worden 2002, and Harris G. 2004). The CWP mink control programme, originally developed to support water vole conservation, has also resulted in the breeding waterbird populations and breeding success increasing significantly.

Considerable habitat creation and enhancement has been undertaken through the retro-fitting of lakes, the mineral restoration process and through the amendment of mineral restoration plans as outlined in the Standing Open Water HAP.

6 Action Plan for Breeding Waterbirds

Objectives

To maintain and increase numbers of breeding waterfowl in the CWP.

See accompanying Table for Targets and Actions.

Refer also to

Standing Open Water Habitat Action Plan

Fen, Marsh and Reedswamp Habitat Action Plan.

Sand and gravel quarries Habitat Action Plan

For further information

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Breeding Waterbirds Species Action Plan

Breeding Waterbirds Species Action Plan 2007 – 2016

Objective 1: To maintain and increase numbers of breeding waterfowl in the CWP.

Objective 2: To maintain and increase nationally important breeding waterbird populations.

Action Plan	Target Code	Target Text	Target Year	Action Code	Action Text	Action Lead	Action Partners	Measure (units)
Breeding WaterbirdsSAP	BW-T1	Initiate and maintain a monitoring and recording programme of key breeding waterbirds around CWP with surveys every 5 years	Annually	BW-A1	Monitor populations of waterbirds including those for which the CWP is nationally important. Surveys to be linked to habitat surveys where possible. Collate & Submit records to county bird recorders, biological record centres, Rare Breeding Birds Panel (RBBP) and other relevant interested parties where appropriate.	CWP BAP Team	Volunteer surveyors Land/Lake owners Mineral companies Wildfowl & Wetlands Trust, Slimbridge	Annual Reports and database entries for relevant species and to relevant groups
Breeding WaterbirdsSAP	BW-T2	Manage 10 lakes for breeding waterbirds	2012	BW-A2	Undertake management supporting breeding waterbirds on 10 lakes; techniques	CWP BAP Team	Director of Conservation Policy GWT, Biodiversity Manager WWT, landowners	Measure as per targets for Standing Open Water HAP. 10 lakes managed for

					include creation of wildfowl refuges, habitat creation such as reed bed creation and felling of willows into water to create nest sites and reduction of disturbance of lake shorelines. Habitat creation targets as per Standing Open Water HAP.			breeding waterbirds.
Breeding WaterbirdsSAP	BW-T3	Maintain through appropriate management a series of key sites with known value for populations of breeding waterbirds. Select key sites and establish management strategy by 2007.	Target: 2007	BW-A3	Develop criteria for the selection of key sites and select sites. Establish management strategy for each key site, in partnership with landowners where required, to improve habitat for breeding waterbirds.	CWP BAP Team	Wildfowl & Wetlands Trust, Slimbridge	Publish Selection Criteria, List of Key Sites and Management strategy for each site.
Breeding WaterbirdsSAP	BW-T3	Maintain through appropriate management a series of key sites with known value for	Every 5 years	BW-A4	Monitor key breeding areas every 5 years to assess effectiveness of management strategy	CWP BAP Team	Wildfowl & Wetlands Trust, Slimbridge	Output report written every 3 years detailing results for monitoring

		populations of breeding waterbirds. Select key sites and establish management strategy by 2007.						
Breeding WaterbirdsSAP	BW-T4	Best Practice Guidance for management of lakes for breeding waterbirds published	Target: By 2008	BW-A5	Publish & distribute advisory notes and guidance promoting the creation, enhancement and management of wetland habitats for breeding waterbirds, making available to all lake/land owners, mineral companies and lake service providers.	CWP BAP Team	Wildfowl & Wetlands Trust, Slimbridge, NCF, LAs	Publication & distribution of advisory notes regarding habitat creation through mineral restoration and retro-fitting and habitat management for breeding water birds.
Breeding WaterbirdsSAP	BW-T5	Protect and enhance newly identified core waterbird breeding areas through the planning process	Ongoing	BW-A6	Where relevant ensure all ecological assessments adequately survey for breeding waterbirds and adequately mitigate for any negative impacts of development.	LAs (Planning & Development)	NCF	Ecological reports of high standard, assessing the importance of the site for breeding waterbirds, through survey work undertaken at the appropriate times and season for species of concern in the CWP.

Breeding WaterbirdsSAP	BW-T5	Protect and enhance newly identified core waterbird breeding areas through the planning process	Ongoing	BW-A7	Where relevant ensure all planning applications consider the key waterbird breeding sites.	LAs (Planning & Development)	NCF	All planning applications impacting upon key sites for breeding waterbirds consider the requirements of breeding waterbird.
Breeding Waterbirds SAP	BW-T6	Create new habitat for breeding waterbirds as per the Standing Open Water HAP	Target: By 2016	BW-A8	Targets as for SOW HAP. Areas to be targeted as per the CWP Naturemap, improving existing lakes and retrofitting lakes where appropriate, targeting lakes with low/no recreational disturbance	CWP BAP Team	Volunteer surveyorsLand/Lake owners Min. Companies WWT, Slimbridge	Measures as for Standing Open Water HAP

Species Action Plan for Dragonflies & Damselflies (*Odonata sp.*)

A Group Species Action Plan for dragonflies & damselflies is included in recognition of the large and diverse assemblage of these species found within the CWP. Although, virtually none of the UK BAP species or Red Data Book species is recorded in the CWP, the area does support an outstanding assemblage. It also supports populations of the nationally scarce downy emerald and probable relic populations of the scarce blue-tailed damselfly (Near Threatened in the Odonata Red Data List, to be published in 2008).

Under JNCC guidelines (Guidelines for selection of biological SSSIs, Chapter 19, accessed at www.jncc.gov.uk/page-2303 (20.8.06)) sites may be selected for designation as Sites of Special Scientific Interest based upon presence of certain scarce or declining species or based upon the assemblage of species present. Sites in Gloucestershire and Wiltshire are required to demonstrate breeding populations of 15 or more species prior to selection. Whilst there is currently no identified need or driver to designate any sites in the CWP as SSSI's based on dragonfly populations, it is noteworthy that several sites support nationally scarce populations and/or rich dragonfly assemblages meeting the necessary criteria to do so.

As the CWP continues to expand and mature, the area is likely to become increasingly important for dragonflies and damselflies. Future mineral restoration schemes will include larger areas of a range of wetland habitats, increasing the available habitat for this group of species. Furthermore, climate change also yields fresh opportunities as species are able to increase their northerly range. In 2006, a pair of lesser emperors were witnessed egg laying at Swillbrook Lakes, first breeding recorded for this species in the CWP. Other continental species that are likely to colonise the CWP in the near future include the small red-eyed damselfly and red veined darter.

1 Conservation Priority

Status	Priority
National	<p>Only the Southern Damselfly is a listed UK BAP priority species (also described at Internationally Threatened). An additional 6 species were listed, however, as "Species of Conservation Concern", including Scarce Emerald Damselfly, Northern Damselfly, Norfolk Hawker, Orange Spotted Emerald, Scarce Chaser and White Faced Darter. None of these species have been recorded in the CWP. In 2007, the Norfolk Hawker was also listed as a UK BAP Priority Species.</p> <p>A number of UK species are listed on the IUCN (World Conservation Union) Red Data Book threat category, including Norfolk Hawker (Endangered), Scarce Emerald Damselfly and Northern Damselfly (Vulnerable) and Southern Damselfly, Northern Emerald and Scarce Chaser (Rare). The Southern Damselfly is also listed in Annexe II of the EU Habitats Directive and in Appendix II of the Council for Europe Bern Convention on the Conservation of European Wildlife & Natural Habitats; these require governments to take action to protect this species and its habitats.</p> <p>The Southern Damselfly and Norfolk Hawker are listed on Schedule 5 of the Wildlife & Countryside Act 1981, which confers some degree of protection. Under this Act, a series of SSSI were designated either for their rare breeding species or their outstanding assemblages of species.</p>

	It is the outstanding assemblage of species that is remarkable in the CWP; since 2000, 20 species have been recorded in the CWP, nearly all of which have been recorded breeding.
Regional	Only the Southern Damselfly is listed on the SW BAP; this species is not recorded in the CWP.
County	None of the UK Species are currently listed on either the Gloucestershire or Wiltshire County BAPs.

2 National and Local Status

Around 40 species are found in the UK, of which 20 have been recorded in the CWP. Three species (Orange Spotted Emerald, Norfolk damselfly, Dainty damselfly) have become extinct in the UK in the past 40 years, due to poor or declining water quality and inappropriate habitat management. Of the remaining species, many are considered at risk often for reasons unknown.

Through climate change and the increasing availability of certain wetland habitats, such as gravel pits, some species are increasing their range within the UK, moving north, for example the Black Tailed Skimmer and Ruddy Darter. In recent years however, continental species have begun to successfully colonise the UK and are being seen more frequently each year. This includes the Lesser Emperor, Small Red-eyed Damselfly and Red Veined Darter.

Scarce Blue-tailed Damselfly have been recorded on a number of occasions in the CWP in the past 20 years in low numbers at a scattering of locations, associated with active quarries of un-restored mineral working, where suitable habitats may be found.

Within the CWP, sites known to support more than 15 breeding species includes Swillbrook Lakes (Lakes 46/48) (also supporting the Downy Emerald) and Wheatley's Barn Farm (Lake 95). As the CWP continues to expand and mature, the area is likely to become increasingly important for dragonflies and damselflies. Future mineral restoration schemes will include larger areas of a range of wetland habitats, increasing the available habitat for this group of species. Furthermore, climate change also yields fresh opportunities as species are able to increase their northerly range. In 2006, a pair of Lesser Emperors were witnessed egg laying at Swillbrook Lakes, first possible breeding recorded for this species in the CWP. Other continental species that are likely to colonise the CWP in the near future include the Small Red-eyed Damselfly and Red Veined Darter.

Site selection requirements for individual species may include nationally scarce species such as Downy Emerald and Scarce Blue-tailed Damselfly. Furthermore in much of the South-west including Gloucestershire and Wiltshire, outstanding assemblages may be designated on sites with more than 15 species known to be breeding (JNCC, 2006).

Few firm conclusions, however, can be drawn regarding local trends in the CWP, since there is insufficient long-term data at present.

The Cotswold Water Park Dragonfly List

20 species have been recorded in the CWP since 2000:

- Banded Demoiselle
- Emerald Damselfly
- Large Red Damselfly
- Azure Damselfly
- Common Blue Damselfly
- Scarce Blue-tailed Damselfly
- Blue-tailed Damselfly
- Red-eyed Damselfly

- White-legged Damselfly
- Migrant Hawker
- Southern Hawker
- Brown Hawker
- Emperor
- Lesser Emperor
- Downy Emerald
- Four-spotted Chaser
- Broad-bodied Chaser
- Black-tailed Skimmer
- Common Darter
- Ruddy Darter

3 Habitat and Ecology

The dragonflies and damselflies are long, slender-bodied insects bearing large compound eyes and two pairs of wings. Nearly all species are inextricably linked to wetland habitats, normally still or slow moving; larval development within the first 1-3 years of life is within water. Characterised by bright colours and intricate patterns, the dragonflies and damselflies are an essential part of our wetlands, feasting upon small insects such as mosquitoes and midges.

Within the CWP, some species are associated with the watercourses (eg White-legged Damselfly, Banded Demoiselle), whilst the majority are also associating with the gravel pits and associated habitats such as reed beds, marsh and lake margins. In particular, extremely large swarms of Common Blue Damselfly may be seen on some of the more mature lakes.

Locations such as Swillbrook Lakes (Lakes 46/48) support a rich and diverse assemblage of species due to the varied habitats found here. Swillbrook Lakes, for example, comprises areas of deep standing open water, broad vegetated channels, small ponds which periodically dry up, and small ponds linked to larger waterbodies. Within these areas are varying plant communities and varying substrates, shorelines with overhanging trees (suitable for emerging Downy Emeralds), also providing leaf litter required for feeding by Downy Emerald larva prior to emergence shorelines with emergent vegetation (suitable for most emerging damselflies and dragonflies). It is the variety and diversity of habitats which enables this reserve to support over 16 species of dragonfly and damselfly.

The diversity of habitats reflects the breeding requirements of the species involved; most damselflies will emerge as adults the year following egg laying, whereas many of the larger hawk dragonflies may spend one to five years in larval development before emergence, undertaking 10-15 moults during nymphal life.

4 Current factors affecting the species in the UK and the Cotswold Water Park

Within the CWP, many species may be benefiting from maturation of the wetlands as stands of marginal vegetation and overhanging trees develop and increase, providing necessary emergence, egg laying and feeding habitat. Conversely, species such as the Broad Bodied Chaser and Scarce Blue-tailed Damselfly will be disadvantaged by vegetation succession, preferring the earliest stages of vegetation succession and an almost bare substrate. Dragonflies and damselflies are sensitive to changes in their habitat due to subtly different requirements at different stages of their life cycle. Habitat loss, pollution, changes in land management and built development/industrialisation are the key threats and more specifically:

- Pollution incidents can have serious impacts on both adult and larval stages, eg sewerage, industrial effluents, diesel, excess sediments, run-off from fertilisers used in agriculture, wind drift from insecticides, and the consequences of using herbicides on marginal vegetation.
- Habitat loss through drainage of watercourse, abstraction of groundwater (leading to loss of flushes, smaller streams, ponds and bogs), canalisation and over-engineering of watercourses to improve flows, dredging and over-deepening of watercourses (removes silty substrates or gravels used by nymphs),
- Changes in/insufficient/excessive land management can have a varying impact depending upon the species and the habitat; grazing of river banks and pond margins by livestock removes suitable emergence habitat, poaching of river banks may lead to siltation of gravels, over shading trees may be detrimental to some species and yet beneficial to species such as the Downy Emerald, excessive vegetation may cause choking of the channel (detrimental to species such as the Beautiful Demoiselle which requires faster flows), over-managed river banks and channels may have insufficient vegetation on slower moving watercourses for species such as the Banded Demoiselle and Blue Tailed Damsel. Bare substrates and early vegetation succession benefits species such as Broad Bodied Chaser and Scarce Blue-tailed Damsel, but is inadequate for many other species.
- Over-stocking with fish may cause high turbidity of waters, potentially leading to reduced plant growth and nutrient enrichment. Fish are also significant predators of nymphs. Large numbers of waterbirds attracted to a water body may cause nutrient enrichment via their droppings, leading to algal blooms and potentially restricting plant growth and insect life. Waterbirds may also excessively graze lake margins and trample aquatic plants. Within the CWP, the main threat here is large flocks of Canada Geese. The largest concentrations of waterbirds in the CWP occurs in winter, whereby grazing of lake margins may potentially promote improved growth in following seasons.

Climate change is also a threat to global and UK populations, marginalising the northern species of Scotland, through increased temperatures, drying out bogs and reducing water flow in upland streams. At the same time, climate change may potentially enable colonisation by continental species of southern England and Wales. This process is already being seen in the CWP.

5 Current Action in the Cotswold Water Park

- In recent years work in the CWP has focussed upon the Scarce Blue-tailed Damsel, a species known to be breeding in low numbers within suitable habitat found with active mineral sites. CWPSoc has undertaken field work specifically successfully searching for this species at key locations in 2004, 2005 and 2006.
- Survey work has also been undertaken to establish the locations of Downy Emerald populations (3 key populations found to date): Swillbrook Lakes (Lakes 46/48), Lower Moor Farm (Lake 52) and Whelford Pools (Lakes 111/111b).
- In partnership with county recorders and other volunteers, small-scale ad hoc surveys have been undertaken across a number of sites by the CWP Soc. To date little coordinated survey work has been undertaken and relatively little is known about the distribution of key dragonfly populations.
- Survey work was undertaken in 2006 for the Banded Demoiselle as part of the national online surveys undertaken for National Insect Week by British Dragonfly Society, British Entomological Society and Biological Records Centre, Huntingdon.

6 Action Plan for Dragonflies & Damselflies

Objectives

- 1 Promote the survey and recording of dragonflies and damselflies in the CWP

2 Promote the conservation of dragonflies and damselflies in the CWP

Refer also to

Standing Open Water Habitat Action Plan
Fen, marsh and reedswamp Habitat Action Plan
Rivers and Streams Habitat Action Plan

Further information

British Dragonfly Society <http://www.dragonflysoc.org.uk/>
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Dragonfly Group Species Action Plan

Dragonflies and Damselflies Species Action Plan 2007 – 2016

Objective 1: Promote the survey and recording of dragonflies and damselflies in the CWP

Objective 2: Promote the conservation of dragonflies and damselflies in the CWP

Action Plan	Target Code	Target Text	Target Year	Action Code	Action Text	Action Lead	Action Partners	Measure (units)
Dragonfly SAP	DRA-T1	Monitor and record the dragonfly and damselfly assemblage of the CWP.	2007. Ongoing	DRA-A1	Undertake surveys at 5 or more sites per year, undertaking 4-5 visits per site throughout season in order to record the majority of the dragonfly assemblage present.	CWP BAP Team	County Recorders, Reserve Managers, Volunteers,	Number of sites surveyed annually from 2007. Numbers of records generated.
Dragonfly SAP	DRA-T1	Monitor and record the dragonfly and damselfly assemblage of the CWP.	2007. Ongoing	DRA-A2	Create and maintain database of records for the Cotswold Water Park. Establish exchange mechanism with GCER and WSBRC, the Dragonfly Recorder Network and exchange data 1-2 times annually.	CWP BAP Team	WSBRC GCER County Recorders	Database created.
Dragonfly SAP(SOW HAP)	SOW-T4	Create and maintain 20 Ponds for Amphibians such as Great Crested Newts, and invertebrates such as Dragonflies and Damselflies	Target: 2016	SOW-A7	Ponds should be created in groups, and managed for Amphibians and Invertebrates. Ponds should be varying in size, depth, profile and in quantity and type of vegetation around margins. Features should include overhanging woody vegetation	CWP BAP Team	Landowners, Mineral Companies	Creation of 20 Ponds in groups, of varying sizes, depths, profiles and vegetation. <i>Refer also to Great Crested Newt SAP</i>

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Dragonfly SAP	DRA-T3	Manage 10 lakes, their margins and associated habitats for dragonflies and damselflies	2007 onwards	DRA-A4	Identify target species on all sites and tailor appropriate management for these species. Link appropriate management to other species such as Water Vole, Great Crested Newt etc. Produce management recommendations with clear guidelines.	CWP BAP Team	GWT Reserve Manager WWT Reserve Manager Kat Parkes, British Dragonfly Society	Produce management guidance and recommendations for 10 sites and manage accordingly
Dragonfly SAP	DRA-T4	Maintain and increase known populations of Downy Emerald	2010 onwards	DRA-A5	Establish monitoring programme of known populations.	CWP BAP Team	County Recorders GWT Reserve Manager WWT Reserve Manager Volunteers	Annual Report on numbers of adults (emerging, copulating, ovipositing) and exuvia
Dragonfly SAP	DRA-T4	Maintain and increase known populations of Downy Emerald	2010 onwards	DRA-A6	Produce management guidance to promote appropriate habitat management for this species and manage sites supporting this species accordingly.	CWP BAP Team	Kat Parkes, British Dragonfly Society GWT Reserve Manager WWT Reserve Manager Volunteers	Management Guidance for each site. Stable or increasing populations as indicated by ongoing monitoring.
Dragonfly SAP	DRA-T5	Re-establish the Scarce Blue-tailed Damselfly as a regular breeding species in the CWP	2016	DRA-A7	Collate all historic records for this species in the CWP. Use this data to establish monitoring programme targeting historic sites and areas of current suitable habitat. Undertake surveys annually during flight season.	CWP BAP Team	County Recorders	Report upon species distribution within the CWP. Publish proposed monitoring programme. Annual surveys of selected sites.
Dragonfly SAP	DRA-T5	Re-establish the Scarce Blue-tailed	2016	DRA-A8	Undertake flagship project to create and manage habitat suitable	CWP BAP	Kat Parkes, British Dragonfly Society	Creation and management of

		Damselfly as a regular breeding species in the CWP			for breeding of this species. Undertake annual monitoring.	Team	Mineral CompaniesCounty Recorders	habitat suitable for Scarce Blue-tailed Damselfly.Re-established population, present on study site(s).
Dragonfly SAP	DRA-T5	Re-establish the Scarce Blue-tailed Damselfly as a regular breeding species in the CWP	2016	DRA-A9	Based upon success of flagship project, initiate plans for a wider network of sites across CWP suitable for breeding, utilising site BAPs for mineral sites, mineral restoration plans. Encourage involvement of new large scale developments.	CWP BAP Team	Mineral CompaniesCounty Recorders	Selection of potential sites and potential partners and report.
Dragonfly SAP	DRA-T5	Re-establish the Scarce Blue-tailed Damselfly as a regular breeding species in the CWP	2010	DRA-A10	Include this species within site BAPs for active mineral sites and within restoration plans to create small pools within shallow wetlands, contributing to the creation of a network of breeding sites.	CWP BAP Team	Mineral Companies	Inclusion in Site BAPs.Inclusion in mineral restoration plans. Inclusion of active mineral sites in wider network of breeding sites.
Standing Open Water HAP	SOW-T1	All standing open water habitat with existing nature conservation value in 2006 to be recorded, assessed.	2010	SOW-A1	Develop criteria for selection of key sites and identify areas of Standing Open Water of nature conservation value for BAP species and other species of conservation concern by end 2007. Target habitats should include: Deep Water, wader scrapes, duck	CWP BAP Team	Director of Conservation Policy GWT, Biodiversity Manager WWT	Selection Criteria agreed. Reports of current nature conservation value of key standing open water habitats produced every 5

					marsh, lakes (waterbodies >1ha), Ponds (waterbodies <1ha), shingle islands, vegetated islands, shingle shorelines, fringing reed shorelines.			years from 2007. Refer also to Breeding Waterbird SAP, Wintering Waterbird SAP, Great Crested Newt SAP.
Rivers and Streams HAP	RS-T4	Maintain and enhance the habitat quality of the channel and river corridor in the CWP	Target 2010	RS-A4	Ensure that all consentable activities do not lead to loss of habitat and where possible enhance the existing situation. Seek opportunities to create and enhance habitat through the planning process. Work with landowners and organisations to actively seek to improve degraded wetland/riverine habitat.	EA	CWP BAP Team, NCF	Number of applications and consents processed with nature conservation gain. Amount of habitat enhanced/created. Number of landowners and organisations advised.

Species Statement for Glow Worms (*Lampyris sp.*)

Glow worms are also known as lighting beetles, shineworms, glassworms or fireworms. They are in fact beetles, not worms. At present they have no legal protection nor are they listed upon the UK BAP, SW BAP, Gloucestershire BAP or Wiltshire BAP. The species is a priority species of the South Gloucestershire BAP. Glow worms are considered to be declining across the UK, but a lack of survey data prevent firm conclusions being drawn. Local extinctions of colonies are well known throughout the UK.

Two glow-worm species occur in Britain: common glow worm (*Lampyris noctiluca*) and lesser glow worm (*Phosphaenus hemipterus*). Only the common glow worm has been recorded in the CWP. The population status of the glow worm is difficult to establish as only the female adults glow strongly and can be easily counted. This means male adults and larvae can be over-looked when undertaking surveys. In addition, glow worms are biennial or even triennial which can give a false impression of a population crash in certain years as the adults only live for a few weeks. The most recent estimate of glow worm's distribution from a nationwide survey in 1991/1992 recorded the species from 515 sites across the UK (Scagell 1992).

Within the Cotswold Water Park, glow worms have been recorded along the old railway line between South Cerney and Cricklade and from the canal towpath between Cerney Wick and South Cerney. The railway line is managed by the Cotswold Water Park Ranger & Estates Service for the glow worms found here, coppicing scallops to break up the canopy and to encourage a richer herb layer, benefiting the main food source of snails and ensuring that no mowing is undertaken along the railway line during the 'glowing' season.

The life cycle of the common glow worm lasts over two to three years. After hatching, the larvae are relatively immobile and prey on small snails. Glow worm larvae are therefore generally found in moist conditions and are active at night when there are plenty of snails. Glow worm larvae hibernate in the winter and during their second or third summer, around June or July, they pupate and become adults.

The female adults are not able to fly but instead cling to a prominent high point eg grass stems and start their display at dusk for several hours to attract the males. The light can be seen from 40 metres. Adult glow worms do not eat and, therefore can only survive for a few weeks. In that time they need to mate and lay eggs. All this depends on the low-flying male spotting the glowing female and mating successfully.

Though glow worms favour chalky or limestone areas, they can be recorded wherever small snails are found. Gardens, hedgerows or railway embankments are all frequent locations of the species. There is a perception that the glow worm prefers open grass or hedge to woodland, but nothing can be ruled out. In the Cotswold Water Park, they are found along the disused railway line, which generally is heavily shaded by trees and scrub but does have sections of open grassland bordering the track.

Inappropriate habitat management and habitat loss can result in population losses as well as the use of Insecticides (such as slug pellets which affect their food source; snails). Grass cutting or hedge management during the 'glowing' season is harmful as the females can lose their glowing vantage points. Too much or too little grazing can also be harmful. Habitat fragmentation can lead to a local

extinction if there are no nearby sites from which the adult females can re-colonise. The restricted mobility of females and larvae makes it very difficult for this species to disperse. Artificial lighting may negatively affect male glow worms which find artificial lighting very distracting; males are often drawn to house and street lighting rather than glowing females. This makes mating much less likely and can be a real threat to glow worm colonies.

The glow worm will benefit from improved habitat management works that contribute to the Boundary Habitat HAP and Lowland Neutral Grassland HAP.

Refer also to

Boundary Features HAP

Lowland Neutral Grassland HAP

For Further Information

Scagell R (1992) 1992 Glow Worm Report; records of *Lampyric noctiluca* in Britain. Downloaded from The UK Glow Worm Survey Homepage at:

<http://www.galaxypix.com/glowworms/#About%20glow%20worms>

Species Action Plan for Great Crested Newt (*Triturus cristatus*)

1 Conservation Priority

Context	Priority
National	UK BAP threatened/declining species: Short Listed. Listed on Annexes II and IV of the EC Habitats Directive and Appendix II of the Bern Convention. It is protected under Schedule 2 of the Conservation (Natural Habitats, etc.) Regulations, 1994, (Regulation 38) and Schedule 5 of the WCA 1981.
Regional	SW Species of Conservation Concern SW Species Action Plan
County	Gloucestershire county BAP Wiltshire county BAP

2 National and Local Status

The great crested newt is still quite widespread in Britain, although frequently occurring in only very localised populations. For example, it may be common in parts of lowland England and Wales, including the Thames Valley. The species tends to be absent from more upland areas and is absent or rare in Cornwall and Devon. It is absent from Northern Ireland.

The species has suffered a decline in recent years with studies in the 1980s indicating a national rate of colony loss of approximately 2% over five years. It is estimated that there are a total of 18,000 ponds within Britain, although only 3,000 of these have been identified. The British population is amongst the largest in Europe, where it is a threatened species in several countries.

Populations within the CWP are poorly known or understood. Few recent records for the area exist. The Cotswold Water Park Society began a programme of great crested newt surveys during 2004, targeting ponds around Ashton Keynes and Somerford Keynes. Significant populations were recorded during 2004 and 2005 around Ashton Keynes.

3 Habitat and Ecology

In common with other amphibian species, the great crested newt requires a range of habitats to support it throughout the life cycle, ie aquatic habitats for breeding and terrestrial habitats outside of the breeding season and for hibernation.

Furthermore, great crested newt populations should be considered at a landscape level since they require a network of ponds, between which movements can occur. Such meta-populations can be very stable since a decline at one pond may be supported by other meta-populations within the landscape. Problems quickly arise however, when meta-populations are lost, eg ponds lost during development, mineral extraction or ponds isolated from other nearby ponds, as the landscape becomes fragmented by roads or large built developments. Isolated populations are unstable and may be lost and therefore the decline at a landscape level accelerates.

Great crested newts arrive at breeding ponds during March and April, where following an elaborate courtship, eggs are laid on aquatic plants. Single eggs are placed within a folded piece of vegetation,

eg the leaves of *glyceria* or water mint. Eggs hatch during April/May with young newts leaving the pond during late summer.

After breeding, adult great crested newts return to the land and spend the rest of the summer and autumn foraging for invertebrates in woodland, hedgerows and rough grassland. Adult and juvenile great crested newts hibernate from mid-October to mid-February, usually in hedgerows, scrub and mature woodland.

Consequently, great crested newts rely upon having high quality terrestrial habitats for foraging, for movement between breeding areas and foraging areas and for hibernation.

In the CWP there are numerous small ponds and scrapes which, due to the high water table, occasionally dry out in late summer. Such ponds can potentially support great crested newts, particularly since they are fish-free. Furthermore, there are significant areas of hedgerow, rough grassland and scrub which are likely to be key foraging areas.

4 Current factors affecting the species in the UK and the Cotswold Water Park

The major cause of decline of great crested newts in the UK is habitat loss, degradation and fragmentation due to:

- In-filling of ponds through intensification of agriculture or for public safety
- Ponds drying up through natural vegetation succession
- Loss and/or fragmentation of terrestrial habitats and ponds due to built development, mineral extraction, road construction, leading to loss of foraging areas, breeding ponds, and hibernation sites. Thus developments within the vicinity of breeding ponds will still impact upon local populations even if the breeding pond itself is not disturbed.
- A fall in water tables through, for example, de-watering associated with mineral extraction or abstraction by water companies, may lead to the loss of breeding ponds,
- Deliberate or accidental fish introductions to ponds will increase the predation of great crested newt larvae,
- Pollution, such as agricultural and diffuse pollution, may result in eutrophication of ponds.

5 Current Action in the Cotswold Water Park

- Prior to 2000, few surveys for great crested newt had been undertaken in the CWP, with only sporadic records as evidence of any fieldwork. The majority of these records date back to the 1980s. Unconfirmed records exist for some sites in the CWP.
- In 1999 surveys undertaken by the Environment Agency recorded great crested newts at several sites.
- Since 2000, surveys have been undertaken at several locations around Ashton Keynes and Somerford Keynes;
 - Church Farm, Ashton Keynes
 - Clayhill Copse, Ashton Keynes,
 - Swillbrook Lakes Reserve (Lakes 46/48)
 - Lower Mill Estate (various ponds)
 - Cokes Pit LNR (Lake 34) (various ponds)
 - Keynes Country Park (Lake 31) (the education pond)
 - Cotswold Canal, north of Spine Road bridge
 - A garden pond in Cerney Wick
 - Shorncote Village,
 - Waterhay / The Leigh

- Some sites have been surveyed several times, as part of ongoing monitoring by volunteers and the Biodiversity team. Great crested newts have been recorded at several sites, whilst at several sites additional amphibian records have been generated.
- Some development control work has been undertaken, or advice provided, with regard to great crested newts. For example, Lower Mill Estate (Howells Mere Development), Watermark (Lake 16).
- Several ponds have been created on land owned or managed by the Cotswold Water Park Society, for example, at Cokes Pit LNR (Lake 34) and Keynes Country Park (Lake 31), whilst new ponds have been created at Blakehill Reserve (Wiltshire Wildlife Trust) and Clayhill Copse.
- In addition, a network of 5 ponds has been created in the Nature Reserve at Lower Mill Estate and at several lake developments.
- Gloucestershire's 'No Newts is Bad Newts' project to implement the local SAP has a project site in the CWP.

6 Action Plan for Great Crested Newt

Objectives

- 1 Enhance knowledge of GCN populations in the CWP
- 2 Ensuring GCN populations are protected and enhanced through policies in Local Development Framework and Mineral Development Frameworks
- 3 Raise awareness of GCNs and promote good practice amongst planners, developers and mineral companies

Please see accompanying table for Targets and Actions

Refer also to

Standing Open Water Habitat Action Plan.

For Further Information

Anon. 2001. Great Crested Newt Mitigation Guidelines. English Nature August 2001.

Langton TES, Beckett CL and Foster JP (2001), Great Crested Newt Conservation Handbook. Froglife, Halesworth.

Great Crested Newt Species Action Plan

Great Crested Newt Species Action Plan 2007 – 2016

Objective 1: Maintain & enhance Great Crested Newt populations in the CWP

Action Plan	Target Code	Target Text	Target Year	Action Code	Action Text	Action Lead	Action Partners	Measure (units)
GCN SAP	GCN-T1	Establish baseline data for GCN in the CWP	Target: 2007	GCN-A1	Undertake desk study and collate all GCN records for the CWP post-1980. Re-survey and confirm old records where necessary. Share data with BRCs.	CWP BAP Team	CWP BAP Team Volunteer surveyors GCER & WSBRC	Publication of report
GCN SAP	GCN-T2	Survey 2 new ponds per year for amphibians	2016	GCN-A2	Based upon desk survey and opportunities arising, use data to target further pond surveys. Target surveys to gaps in current known distribution of GCNs in the CWP.	CWP BAP Team	CWP BAP Team Volunteer surveyors GCER & WSBRC	Records shared with BRCs. Annual report. 2 ponds per year surveyed.
GCN SAP	GCN-T3	Monitor 10 ponds per year	Target: 2010	GCN-A3	Survey 10 ponds per year and contribute data to local and national monitoring schemes such as the National Amphibian Surveys (NARSS).	CWP BAP Team	CWP BAP Team Volunteer surveyors GCER & WSBRC	Records shared with BRCs. Annual report. 2 ponds per year surveyed. Refer to Standing Open Water HAP
Standing Open Water HAP	SOW-T4	20 Ponds created and maintained for Amphibians such as GCNs, and invertebrates such as dragonflies and	2016	SOW-A7	Create 20 shallow ponds (<1ha in area) of varying depths and sizes, preferably in groups, and manage for amphibians and invertebrates. Ponds should vary in size, depths,	CWP BAP Team	LAs (Minerals),, Mineral Companies, Director of Conservation Policy GWT, Biodiversity Manager WWT, RSPB	20 shallow ponds established in accordance with the design guidelines. Refer also to Great Crested Newt SAP,

		damselflies			profiles and in quantity and type of vegetation around margins. Features should include overhanging woody vegetation.		SWRO.	Dragonfly SAP
GCN SAP	GCN-T4	Link 5 known GCN sites through favourable habitat management of terrestrial and aquatic habitats	Target: 2016	GCN-A4	Adopt a landscape-level approach to GCN conservation, encouraging creation of habitat corridors to link foraging areas, hibernation sites and breeding ponds.	CWP BAP Team	NCF, Natural England	Link 5 known GCN breeding sites
GCN SAP	GCN-T5	Provide and disseminate advice and advisory material to organisations and individuals with responsibilities to GCNs on their sites	<i>Target; ongoing</i>	GCN-A5	Through site visits and landowner liaison, support landowners where GCNs are found. A wide range of material has been produced by Froglife, English Nature, Pondlife etc on the subject.	CWP BAP Team	Natural England	5 individuals or organisations to be advised per year

Species Statement for Nightingale (*Luscinia megarhynchos*)

The nightingale (*Luscinia megarhynchos*) is Amber Listed (Birds of Conservation Concern, 2002), listed only as a UK BAP and SW BAP Species of Conservation Concern. It is not listed on either the Gloucestershire or Wiltshire BAP. This is a nationally declining species.

The last UK nightingale survey (BTO, 1999) recorded 4,410 singing males (a decline of 8% since the previous survey in 1980). Nightingales are typically declining in the west of the country (eg in Hampshire, Dorset, Gloucestershire, Wiltshire and Oxfordshire). The Amber listing of this species recognises the moderate contraction (25-49%) of UK breeding range over the last 25 years (Gregory *et al* 2002).

The majority of nightingales recorded in Gloucestershire and Wiltshire, are found within the CWP; for this reason the nightingale is included within the CWP BAP recognising the regional importance of the CWP.

The CWP has held a small population of nightingales for several years, and in recent years numbers may have increased markedly. Swillbrook Lakes reserve (Lakes 46/48) has seen numbers increase from 3 singing males in 2002, to 12 in 2007. Ongoing survey work in 2003 to 2007 has indicated 25-30 singing males, mostly in the Somerford Keynes/Lower Mill Estate area of the CWP West, but with some also recorded in the Whelford/Bowmoor area of the CWP East.

Nightingales are summer migrants to the UK, typically arriving in the CWP in the third week of April. It is an unobtrusive bird except for its remarkably rich song, powerful and varied, for which it is renowned. Nightingales are known to breed in a variety of habitats, ranging from dense hedgerows, coppice woodlands, blackthorn thickets, scrub to wet woodland (Hudson 1979), but all characterised by a dense shrubby under-storey. A dense layer of twigs and leaf litter that shades out plant growth, leaving bare soil or leaf litter, provides ideal feeding conditions for foraging adults and young. Young nightingales leave the nest after only 10 days or so after hatching and are at risk of predation, so a dense thicket of undergrowth is essential for cover.

In recent decades, nightingales have declined due to changes in habitat management and climate change. A reduction in woodland coppicing allows the age and structure of coppice suitable to mature beyond its suitability for nightingales. Scrubby habitats are often cleared and hedgerow management favours lower, less dense hedgerows. Previously mainly recorded in woodland coppice habitats, during the 1999 BTO surveys nightingales were recorded more in scrubby habitats (BTO 1999). Furthermore, being located at the western edge of their range in the UK, where nightingales are typically declining, the populations through Glos, Wilts and the CWP are at risk of decline, particularly where this situation is exacerbated by habitat loss and fragmentation.

In the CWP, habitat suitable for breeding nightingales is largely all of similar age and composition, ie unmanaged or infrequently managed hedgerows associated with old mineral workings. Without appropriate management to maintain these locations for breeding nightingales, it is likely that populations in the CWP will decline in time. Hence there is considerable need for the establishment of new locations for breeding nightingales, sites that will be of the appropriate age and structure in years to come, as well as the need to maintain current areas for existing populations. The dependence on habitats adjacent to mineral workings means nightingales are vulnerable to subsequent lakeside development or further mineral extraction.

In recent years, nightingales have benefited from improved hedgerow management at sites such as Swillbrook Lakes Reserve (Wiltshire Wildlife Trust reserve) through partnership working between Lower Mill Estate and Wiltshire Wildlife Trust. These works are improving the hedgerow where several pairs of nightingale breed, through better management and restoration where sections of hedgerow had died. Likewise, the Cotswold Water Park Society manages islands on Cokes Pit Local Nature Reserve with consideration for breeding nightingales, enabling birds to breed here, whilst also benefiting a range of other species.

The nightingale will benefit from habitat creation and management works contributing to the Woodland HAP, Boundary & Linear Features HAP and the Sand & Gravel Quarries HAP.

Refer also to

Woodland HAP

Boundary Features HAP

Sand & Gravel Quarries HAP

For further information

Smith *et al* 1997. The Biodiversity Audit of the Cotswold Water Park.

Gregory RD, Wilkinson NI, Noble DG, Robinson JA, Brown AF, Hughes J, Proctor DA, Gibbons DW and Galbriath CA (2002); The Population Status of birds in the UK, Channel Islands and Isle of Man: An analysis of conservation concern, 2002-2007. *British Birds* 95: 410-450.

Davis P (1980); Nightingales in Britain in 1980, *Bird Study* 29: 73-79

Fuller RJ & Henderson ACB (1992); Distribution of breeding songbirds in Bradfield Woods, Suffolk, in relation to vegetation and coppice management. *Bird Study* 39: 73-88

Hudson A & Bayes K (1989); Nightingales in Britain in 1976. *Bird Study* 26; 204-212.

BTO Nightingale Survey (1999) (website accessed 2004). British Trust for Ornithology.

<http://www.bto.org/survey/complete/nightingale.htm>

Species Statement for Otter (*Lutra lutra*)

The otter is a globally threatened/recovering UK BAP species. Protected under the Wildlife & Countryside Act 1981 (as amended) (Sections 9.1 and 9.4, Schedule 5), the otter is also listed in the Bern Convention. It requires special protection under the European Habitats Directive (92/43/EEC) and is listed upon Annex 2. It is a South West Species of Conservation Concern and a priority species in the Environment Agency's Thames Region Biodiversity Strategy. The otter is listed in the Wiltshire BAP and the Gloucestershire BAP.

The otter was formerly widespread throughout the British Isles, but underwent a rapid decline in numbers from the 1950s to the late 1970s and was effectively lost from the Midlands and the South East counties of England by the 1980s. This decline may have been exacerbated by a combination of factors, but appears to be very closely linked to the introduction of highly toxic and persistent organochlorine insecticides such as Dieldrin and Aldrin as seed dressings and sheep dips in the 1950s.

A number of national surveys since the 1970s, have tracked a slow but steady recovery of the otter population. In the fourth England national otter survey, carried out from January 2000 to February 2002, signs of otters were found at 34% of the 3,327 sites visited. The third national survey (1991-1994) was the first to show positive signs of otters in the Thames region. The fourth survey showed a 300% rise in percentage positive signs, albeit starting from a low base and this was significantly influenced by an independent release of captive-bred animals by the Otter Trust in the upper Thames in 1999. Thames region still had one of the lowest percentages of positive sites (8%) of all the main catchments assessed in the national surveys.

The EA and BBOWT undertook a detailed otter habitat survey of the rivers of the Upper Thames catchment and a brief assessment of the Cotswold Water Park (*Sykes, 1994*). This report identified good potential otter habitats on the River Coln, Ampney Brook and the Thames (in the western section). Since 1999, however, there has been a substantial increase in otter activity in the Cotswold Water Park, and now otters are widespread in the CWP and seem to have become well established.

The otter is a semi-aquatic species, feeding mainly on fish and producing small litters usually of two to three cubs. Their maximum longevity is between 10-15 years. Dependence on the water environment makes otters vulnerable to impacts from river and riparian management, water pollution and, to some extent, human recreational activities. Food supply is probably the ultimate factor determining the distribution of the otter in a catchment and the viability of the population, although the availability of secure lying-up and breeding sites may also be important. Mortality, primarily by road deaths has the potential to delay full recovery of otter populations and remove fit individuals from a population.

There are many factors that need to be taken into account to ensure the ongoing viability of this spreading population in the CWP and Upper Thames, including the availability of suitable habitat cover (including safe breeding sites for bitch otters), the availability of prey and levels of disturbance from footpaths and human recreational activities. Heed also needs to be given to the threat of road mortalities, as well as the conflict of interest with fisheries within the CWP, eg specimen carp fisheries, and a long term resolution of these conflicts needs to be found. In addition, it is important that wildlife corridors are maintained and enhanced to enable safe and undisturbed access for otters to the various lakes and habitat complexes and between the watercourses and the gravel pits.

It is important that there is adequate surveillance of the population so that any significant problems are detected early. The Cotswold Water Park has the potential for a higher carrying capacity of otters than other similar-sized geographic areas due to the large number of gravel pits and the associated enhanced food supply.

In the CWP the otter will greatly benefit from works contributing to the Rivers & Streams HAP, Standing Open Water HAP and Fen, Marsh and Reedswamp HAP, largely through the provision of additional resting places and additional food supply. In time, further work may be required to assess the availability of resting places and food supply to identify any shortfall and whether this can be rectified.

Refer also to

Rivers & Streams HAP
Standing Open Water HAP
Fen, Marsh and Reedswamp HAP

For further information

Environment Agency 1999. Otters and River Habitat Management (2nd Edition).
Published by Environment Agency.

Species Statement for Reed Bunting (*Emberiza Schoeniclus*)

The reed bunting is a UK BAP threatened/declining species. It is a South West Species of Conservation Concern. It is listed on the Gloucestershire and Wiltshire BAPs under Farmland Birds SAP. Reed buntings are a Red-listed species (Gregory *et al* 2002), having declined throughout the UK by 59% between 1975 - 2000 (combined BBS/CBC data from BTO website).

The CWP supports a large population of reed bunting, during the summer and winter. Transect surveys by the Cotswold Water Park Society demonstrated a large population during the breeding, with minor fluctuations between years. Ringing studies by the Cotswold Water Park Ringing Group/Cotswold Water Park Society also demonstrated a large wintering population, with a small number of birds migrating from elsewhere in the UK to winter in the CWP (in line with national trends). Work is needed to maintain the CWP reed bunting population, through appropriate habitat creation, restoration and management.

The reed bunting is a ground-nesting species favouring stands of dense herbaceous vegetation, historically associated with wetland habitats such as gravel pits & lakes, ponds, ditches, streams and wet meadows. In recent decades it has also colonised “drier” farmland habitats, such as cereal & oilseed rape fields and field margins. In addition, they favour marginal and unmanaged areas with a high coverage of rough grasses, docks and brambles, a reflection of their ground-nesting habits as well as their dietary requirements. Reed buntings feed predominantly on seeds and grain, whilst also requiring a supply of invertebrates during the breeding season. This indicates a need for unmanaged areas where both weedy herbaceous vegetation and the associated insect fauna are found together.

A combination of habitat loss (hedges, ditches, ponds, uncultivated field margins, wet grassland, hay meadow, marsh and fen) through cultivation and land drainage, in combination with changes in agricultural practice has reduced suitable breeding and feeding areas for reed buntings (Peach *et al* 1999). In common with a suite of other farmland bird species, the utilisation of broad spectrum herbicides and pesticides (serving to reduce the quantity of food available for breeding birds by eradicating weedy areas rich in seeds and invertebrates (Peach *et al* 1999)) and the shift to autumn-sown crops from spring-sown crops (resulting in the loss of over-wintered stubble, previously an important source of seeds during the winter for a range of granivorous bird species (Peach *et al* 1999)) have had particularly significant impacts.

In the CWP, the reed bunting will benefit greatly from the creation and improved management of wetland habitats such as lakes, ponds, reed bed, fen as well as wet grassland. Improved management of land adjacent to rivers and streams and conservation efforts within farmland can also support this species.

Refer also to

Fen, Marsh and Reedswamp Habitat Action Plan.
Standing Open Water Habitat Action Plan
Sand and Gravel Quarries Habitat Action Plan
Farmed Land Habitat Action Plan
Rivers & Streams Habitat Action Plan

For Further Information

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Species Action Plan for Stoneworts

(Charophytes)

This plan covers all stonewort (Charophyte) species.

1 Conservation Priority

A survey of lakes in 2004 indicated that the Cotswold Water Park currently qualifies as a site of European Importance for these threatened aquatic plants (Millett *et al* 2005). Three species are considered to be of particular interest, these are; *Chara curta*, *Nitellopsis obtusa*, *Nitella mucronata*. Details of the conservation status of these species are as follows:

Lesser Bearded Stonewort or *Chara curta* (formerly *Chara aspera* var *curta*)

Context	Priority
National	UK BAP species classified as near threatened. Also a globally threatened and declining species although as a result of extra survey work and conservation effort this species has been removed from the UK priority list
Regional	SW species of conservation concern
County	To be determined

Starry Stonewort or *Nitellopsis obtusa*

Context	Priority
National	UK BAP species classified as endangered Also an IUCN red list species classified as vulnerable
Regional	To be determined
County	To be determined

Pointed Stonewort or *Nitella mucronata*

Context	Priority
National	Nationally Scarce
Regional	To be determined
County	To be determined

Other recently recorded species (Millett *et al* 2005) include *Chara aspera*, *Chara contraria*, *C. virgata*, *C. globularis*, *C. vulgaris* and *Nitella flexilis* agg.

2 National and Local Status

The Cotswold Water Park is currently listed as a nationally important site for stoneworts (Stewart NF, 2004) and supports at least eight different species. The Cotswold Water Park SSSI comprises of a series of lakes which have been designated for their aquatic macrophyte communities, and one of the two types of lake included is distinguished by their rich stonewort plant communities.

The UK is internationally important for lesser bearded stonewort (*Chara curta*) with few sites outside Britain and Ireland. Its strongest populations are to be found in the Northern Isles, it has also been recorded from several sites in East Anglia with another 30 to 35 sites scattered elsewhere in Britain. It is relatively widespread in Ireland but only a few records exist elsewhere in the world where it

appears to be confined to Northern Europe and North Africa. Although it has decreased markedly in East Anglia there are a number of new sites for this species across Britain. In the Cotswold Water Park it has recently been recorded from over 25 lake sites making the Cotswold Water Park the second strongest centre for this species in Britain after the Northern Isles.

Vulnerable internationally, the starry stonewort (*Nitellopsis obtusa*) has a scattered distribution across Europe and is also known from southern Asia and the West Indies. In the UK it is currently only confirmed as present in the Norfolk Broads, the Mendip Reservoirs and Gloucestershire. In the 1990s it was recorded from a gravel pit at Frampton on Severn and in 2004 it was found for the first time in the Cotswold Water Park (Lake 12).

Pointed stonewort (*Nitella mucronata*) is widely distributed in Europe but in Britain it is very scattered to as far north as Lancaster and Sheffield. It is possibly increasing and was discovered in the Cotswold Water Park for the first time in 2004.

The other stonewort species present in the Cotswold Water Park are more frequently recorded in Britain but all stonewort species are still relatively uncommon due to enrichment of water bodies and habitat loss.

3 Habitat and Ecology

All Stoneworts

Many stoneworts are good colonisers of new water bodies, including lakes ponds and canals, with waterfowl being the usual agents of dispersal. They can also quickly exploit any new niches created by habitat disturbance, as their oospores remain viable for years when buried in sediments. In marl rich lakes they can become dominant in deeper water - but they can also be a major primary producer in the marginal zones of lakes. However, they are unable to tolerate significant levels of phosphates (levels above 20µg/l inhibit growth), and consequently are scarce in eutrophic lakes (Stewart NF & Church JM, 1992)

Lesser Bearded Stonewort (*Chara curta*)

This is a plant of calcareous water on peaty or sandy substrates. It frequently grows on sand upon shores and banks in fairly shallow water. It may become beached when water levels drop in summer. In this habitat it is probably a summer annual, spreading mainly by bulbils since it does not fruit freely. Lesser bearded stonewort particularly likes the open conditions resulting from wave disturbance around lakes as it is able to develop a network of rhizoids to anchor the plants. In other parts of Britain and Ireland it can sometimes form dense perennial beds in strongly marl-rich or slightly brackish lakes. In the Cotswold Water Park, this does not occur, either because they soon become too enriched leading to the deeper water quickly becoming dominated by vascular plants, or alternatively, they are not sufficiently marl-rich (Stewart NF, 1996 pers com) (Moore JA, 1986).

Starry Stonewort (*Nitellopsis obtusa*)

A lake species generally occurring between 1 and 6 metres deep. It is found in calcareous water that can sometimes have a trace of salinity. It can tolerate lower light intensities but is not too tolerant of wave action. It is usually a summer annual but in mild winters it does not die back completely. When spores are produced this is between July and September and may be controlled by light intensity. The main threats to this species are likely to be nutrient enrichment and disturbance from pleasure boats (Stewart NF & Church JM, 1992).

Pointed Stonewort (*Nitella mucronata*)

More tolerant of enrichment and turbidity than most stonewort species and found in lakes, ponds and canals. A slender form var. *gracillima* was first discovered at Wickwar, Gloucestershire and it is this variety that dominates recent records and an expansion in the distribution of this species across Britain.

4 Current factors affecting the species in the Cotswold Water Park

- Stoneworts are intolerant of nutrient-rich conditions and tend to be choked by other aquatic plants in eutrophic waters.
- Stoneworts can also be affected by other types of water pollution, apart from man-made eutrophication, such as the use of herbicides.
- The shading of shallow water by trees growing around the water's edges or the introduction of vigorous emergent plants species such as common reed *Phragmites australis* can stop stoneworts from thriving.
- Some stoneworts behave as annuals or short-lived perennials and so may die out through natural vegetation succession in the aquatic plant community.
- Disturbance from, for example, wave action, birds and light boat traffic can however arrest this succession and provide opportunities for a diversity of stoneworts to persist.
- Introduced vascular plants such as *Elodea nuttallii* can out-compete stoneworts if conditions favour their spread.

5 Action Plan for Stoneworts

Objectives

- To maintain the diversity of stonewort species in the Cotswold Water Park.
- To maintain and enhance distribution and abundance of all species of stonewort currently recorded in the Cotswold Water Park

See accompanying table for Actions and Targets.

Refer also to

Standing Open Water Habitat Action Plan
Canals Habitat Action Plan

For Further Information

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Stoneworts Species Action Plan

Stoneworts Species Action Plan 2007 – 2016

Objective 1: To maintain the diversity of stoneworts species in the Cotswold Water Park

Objective 2: To maintain and enhance distribution and abundance of all species of Stoneworts currently recorded in the CWP.

Action Plan	Target Code	Target Text	Target Year	Action Code	Action Text	Action Lead	Action Partners	Measure (units)
Stoneworts SAP	STO-T1	Establish base line of stonewort distribution & abundance across the CWP	Target: 2007	STO-A1	Through collation and review of historic and current data establish baseline of stonewort distribution across the CWP, detailing distribution and abundance of all stonewort species in the CWP.	Natural England	CWP BAP Team, Bristol University	Output report detailing historic and current data for stoneworts in the CWP, detailing their distribution and abundance per lake
Stoneworts SAP	STO-T2	Maintain and enhance baseline levels of stoneworts identified in Target 1 +/-10%	Target: 2016	STO-A2	Establish key stonewort sites (Locally Important Stonewort Areas, LISA's in the CWP, reflecting, for example, dominance of Chara curta or a varied Stonewort assemblage). To be established by 2012. Develop criteria to select such sites by 2010.	Natural England	CWP BAP Team, Bristol University, Plantlife	Publication of criteria for the selection of key sites.
Stoneworts SAP	STO-T2	Maintain and enhance baseline levels of stoneworts identified in Target 1 +/-10%	Target: 2016	STO-A3	Publish management plan for the maintenance and enhancement of each key site by 2012	Natural England	CWP BAP Team, Bristol University	Publication of list of key sites and accompanying management plans.

Cotswold Water Park Biodiversity Action Plan 2007 – 2016

Stoneworts SAP	STO-T2	Maintain and enhance baseline levels of stoneworts identified in Target 1 +/-10%	Target: 2016	STO-A4	Establish a monitoring programme: 72 lakes (50% of current total number of lakes in 2006) are surveyed by 2012 for all aquatic macrophytes. (These 72 lakes include LISA's).	Natural England	CWP BAP Team, Bristol University, Plantlife	Report annually on surveys undertaken and make available to relevant partners.
Stoneworts SAP	STO-T2	Maintain and enhance baseline levels of stoneworts identified in Target 1 +/-10%	Target: 2016	STO-A5	Review the Key Stonewort sites and the success of the management plans in maintaining and enhancing the stonewort diversity and abundance by 2014.	Natural England	CWP BAP Team, Bristol University	Report detailing any changes in status of Key Site
Stoneworts SAP	STO-T2	Maintain and enhance baseline levels of stoneworts identified in Target 1 +/-10%	Target: 2016	STO-A6	Maintain <i>Nitellopsis obtusa</i> and <i>Nitella mucronata</i> distribution and abundance by any means possible. These lakes should be included in the suite of Locally Important Stonewort Areas.	Natural England	CWP BAP Team, Bristol University, Lake owners, Plantlife	Presence and distribution of these species is maintained in the CWP.
Stoneworts SAP	STO-T2	Maintain and enhance baseline levels of stoneworts identified in Target 1 +/-10%	Target: 2016	STO-A7	4 lakes to be created with lake profiles suitable for stoneworts by 2016.	CWP BAP Team,	Natural England Mineral Companies	4 lakes created.
Stoneworts SAP	STO-T3	Best Practice Guidance for management of lakes for stoneworts developed and published	Target: 2016	STO-A8	To target improved restoration of mineral sites, improved management of existing and newly created lakes for stoneworts, for specific species and stonewort communities. To include guidance upon riparian woodland and reed bed management on lake edges.	Natural England	NCF	Publication of Best Practice Guidance.

Stoneworts SAP	STO- T4	Ensure national and international status of CWP as an important stonewort area is recognised	Target: 2010	STO- A9	Work with Plantlife and Natural England to ensure international and national recognition.	Natural England	Plantlife, NCF	National and International Recognition of the CWP as an Important Stonewort Area
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Species Action Plan for Water Vole

(Arvicola terrestris)

1 Conservation Priority

Status	Priority
National	UK BAP threatened/declining species: Short Listed.
Regional	SW Species of Conservation Concern SW species action plan
County	Gloucestershire county BAP Wiltshire county BAP

2 National and Local Status

The water vole is found throughout Britain, but is confined mainly to lowland areas near water. Once common and widespread, this species has suffered a significant decline in numbers and distribution. Nationwide systematic surveys carried out from 1989-1998 by the Vincent Wildlife Trust demonstrated that the water vole population has suffered a long term decline since 1900 (Strachan & Moorhouse, 2006). The River Thames catchment showed a dramatic regional decline in site occupancy from 1990 to 1995 of 72% to 23%.

The loss of wetland and the degradation of rivers through agricultural intensification, river channel engineering and other activities have led to a loss of suitable habitat for water vole. Water vole populations have been lost and become increasingly fragmented as water voles became more vulnerable, mink predation has become a serious threat to their continued existence in the UK. The water vole is being considered for addition to parts of Schedule 9 of the WCA 1981.

Locally, within the CWP, water voles are increasing their range, probably in response to the ongoing mink control in this area. Continued mink control and favourable habitat management should help water voles to continue to recover locally.

3 Habitat and Ecology

The water vole usually inhabits slow flowing ditches, streams, rivers and associated wetland habitats. They are a herbivorous animal feeding on aquatic and emergent vegetation, roots and the bark of willow and alder. They burrow in steep banks and create a network of tunnels and nest chambers, and when water levels are raised they will build nests between the stems of sedges and other wetland plants. They live in colonies, which expand into individual territories in the summer and contract in the winter. Water voles have 2-5 litters per year of up to 6 young and usually have linear territories along banks ranging up to 180m.

4 Current factors affecting the species in the UK and the Cotswold Water Park

In the UK, threats to this species can be classified as follows:

- Loss and fragmentation of habitats.
- Disturbance of riparian habitats.
- Predation by mink.
- Considerable work has been undertaken by Oxford University Wildlife Conservation Research Unit (WildCRU) and other research bodies, researching the water vole's ecological requirements

and interactions with American mink. This has proved that although water voles have numerous native predators American mink have a disproportionate impact. The Game Conservancy Trust has demonstrated the effectiveness of mink control on water vole conservation.

- Pollution of watercourses and accidental poisoning by rodenticides.
- Fluctuating water levels

This is supported by work undertaken in the CWP, suggesting that loss and fragmentation of habitats followed by the arrival of mink are the key threats to water voles in the CWP.

5 Current Action in the Cotswold Water Park

- Previously known water vole sites were re-surveyed in the CWP in 1997. 8 of 16 previously occupied sites in 1978 were still occupied in 1997; Strongholds on River Coln, River Churn and Ampney Brook.
- MSc theses by G. Harris and J. Worden (Cranfield University, Silsoe) in 2001/2002 regarding the impact of American mink upon Water vole and breeding waterbirds in the Cotswold Water Park. This work included baseline surveys for water voles, American mink and otter within the study area (sections of the Thames, Swill Brook, Churn and selected ditches). This baseline data formed the basis for more detailed studies in following years.
- CWP Mink Control Project (October 2002 to date), as part of the North Wiltshire Water Vole Recovery Project, in partnership with Wiltshire Wildlife Trust and jointly funded by Wiltshire Wildlife Trust, BASC, Environment Agency and English Nature. The Project was hugely successful resulting in the effective targeted removal of mink from several sections of rivers (and some lakes) by a team of volunteers across the CWP, but focussing upon the sections of rivers studied by Harris & Worden in 2001/2002. As a consequence of this work, water voles increased their range on the Thames and Swill Brook by 2004. This work is now ongoing.
- Water vole surveys are conducted periodically on selected rivers and lakes in the CWP, by volunteers.
- Advice has been provided to several landowners to improve sections of rivers for water voles:
 - Contributing to agri-environment schemes; Manor Farm Kempford, Manor Farm, Castle Eaton, Old Mill Farm, Somerford Keynes, Milton End Farm, Fairford,
 - Lower Mill Estate: extensive advice provided as part of demonstration project for other developers. Two river restoration schemes will lead directly to an increase in and improvement of water vole habitat on the Swill and Flagham Brooks.
 - Water vole included in Whelford Pools SSSI management plan, in partnership with Gloucestershire Wildlife Trust.
- Water vole habitat created at:
 - Shorncote Reedbed (Lakes 84/85) in partnership with Thames Water and Hills Minerals & Waste Ltd; water voles confirmed using this site in winter 2002/2003.
 - Village Lake (Lake 99) in partnership with Hanson plc as part of restoration plan for this small scale wetland site (2004).
- Three lake owners advised regarding use of rodenticides by lakes.
- Workshops conducted in partnership with Gloucestershire FWAG for Water vole and Otter Conservation at Milton End Farm Fairford (2004) and Manor Farm Castle Eaton (2; 2003 and 2004). CWPSoc attended Agrifocus 2003 providing advice upon riparian mammal conservation, in partnership with Green Agronomy Ltd.
- Publications: numerous publications produced regarding Water vole SAP, mink control, and volunteer newsletters. See further information at end of this section.

6 Action Plan for Water Vole

Objective

To halt the decline and ensure the recovery of water voles in the Cotswold Water Park.

See accompanying table for Targets and Actions.

Refer also to

Rivers and Streams Habitat Action Plan.

Otters Species Statement

For further information

Harris G. (2002). An Analysis of Water vole Distribution & Habitat in the Cotswold Water Park: Implications for species Management. MSc Thesis 2002. Cranfield University, Silsoe.

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Worden J. (2002); The Distribution and diet of American Mink *Mustela vison* in the Cotswold Water Park: Possible consequences for breeding waterbirds. MSc Thesis 2002. Cranfield University, Silsoe.

Water Vole Species Action Plan

Species Action Plan 2007 – 2016

Objective 1: To halt the decline and ensure the recovery of Water Voles in the Cotswold Water Park

Action Plan	Target Code	Target Text	Target Year	Action Code	Action Text	Action Lead	Action Partners	Measure (units)
Water Vole SAP	WV-T1	Maintain and then restore water vole populations to all rivers in the CWP	Target : 2016	WV-A1	Undertake baseline/updated surveys of Water Vole colonies on all rivers of the CWP, including the Thames, Churn, Swill, Flagham, Ampney Brook, Marston Meysey Brook, River Coln, River Leach etc by 2010	CWP BAP Team	Director of Conservation Policy GWT, Biodiversity Manager WWT, Volunteers, Landowners,	Updated maps produced and BRCs updated with records.
Water Vole SAP	WV-T1	Maintain and then restore water vole populations to all rivers in the CWP	Target : 2016	WV-A2	Establish monitoring programme for all river sections as outlined above, to monitor success of water vole recovery.	CWP BAP Team	Director of Conservation Policy GWT, Biodiversity Manager WWT, Volunteers, Landowners,	Water vole distribution monitored every 4 years and, if possible, status of all colonies assessed.
Water Vole SAP	WV-T1	Maintain and then restore water vole populations to all rivers in the CWP	Target : 2016	WV-A3	Maintain and expand Mink Control programme to include all key rivers in the CWP (Thames, Coln, Churn, Swill Brook, Ampney Brook, Marston Meysey Brook and Leach) and other relevant water	CWP BAP Team	Director of Conservation Policy GWT, Biodiversity Manager WWT, Volunteers, Landowners,	Number of volunteer trappers; numbers of traps and rafts deployed; lengths of watercourses/number s of waterbodies being trapped/monitored; number of annual

					courses and waterbodies.			trapping days, numbers of mink caught. Assess % of CWP and % of year considered Mink-free using GCT mink rafts.
Water Vole SAP	WV-T1	Maintain and then restore water vole populations to all rivers in the CWP	Target : 2016	WV-A4	Encourage and facilitate water vole conservation by local land owners and lake owners, through advice, support and agri-environment schemes.	CWP BAP Team	Director of Conservation Policy GWT, Biodiversity Manager WWT, Landowners,	Number of advisory visits, letters, workshops. agri-environment scheme applications involved with successful agri-environment scheme applications. Lengths of rivers/numbers of waterbodies advised upon.
Water Vole SAP	WV-T1	Maintain and then restore water vole populations to all rivers in the CWP	Target : 2016	WV-A5	Safeguard and support water voles and their habitat (whether occupied or not) from development, river engineering works, watercourse management (including roadside ditches). Seek an overall biodiversity gain from development mitigation works.	CWP BAP Team,	NCF, LA (Planning & Development), Environment Agency, Natural England, Landowners,	Number of permitted developments where Natural England/Environment Agency have identified an issue with likely potential for a significant adverse effect on the conservation status of water voles.
Water Vole SAP	WV-T1	Maintain and then restore water vole populations to all rivers in	Target : 2016	WV-A6	Direct improvement of riparian habitat for water voles through river restoration projects at varying scales, minor	CWP BAP Team	Director of Conservation Policy GWT, Biodiversity Manager WWT, Developers, Landowners, Lake Owners, Mineral	Number of projects, lengths of rivers/number of waterbodies improved, recovery of

		the CWP			habitat improvements, amended management.		Companies, LA (Management of Land/Buildings/Highways) , LA's (Planning & Development) Environment Agency, Natural England, FWAG,	water voles
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Species Statement for White-clawed Crayfish (*Austropotamobius pallipes*)

The white-clawed crayfish is classed as globally threatened by IUCN/WCMC and an endangered species in Europe. It is included in the UK BAP as a priority species and a Species Action Plan has been prepared. This species is listed in Appendix III of the Bern Convention and Annexes II and V of the EC Habitats Directive (Annex II requires the designation of Special Areas of Conservation of key sites for these species). It is protected under Schedule 5 of the Wildlife and Countryside Act (1981) (as amended) in respect of taking from the wild and sale. There is a Species Action Plan for white-clawed crayfish within the South West Regional BAP and within the Gloucestershire BAP.

The white-clawed crayfish was formerly widespread in streams, rivers and lakes in England and Wales. Many populations have been lost since the 1970s with an estimated decline of 25-49% in numbers/range in the UK in the last 25 years. The UK is thought to support up to 24% of the world population of white-clawed crayfish.

The white-clawed crayfish is the only species of freshwater crayfish native to the UK. Its distribution is generally limited to unpolluted, mineral rich waters with pH 7-9 and calcium greater than 5mg/l (which is required for the hardening of its exoskeleton). In order for native crayfish to thrive, the habitat should be well oxygenated without too much fine sediment. Structural habitat diversity is key as they require refuges created by large cobbles, tree and plant root systems and overhanging banks to avoid predation. The white-clawed crayfish will occupy a range of still and flowing water bodies. White-clawed crayfish are omnivores feeding on plants, snails, insect larvae and fish.

A crayfish survey of lakes and rivers in the Cotswold Water Park was undertaken on behalf of the Environment Agency (Land Use Consultants, 1999). From anecdotal evidence it is clear that white-clawed crayfish were once abundant in the Cotswold Water Park. However, signal crayfish (*Pacifastus leniusculus*) are now relatively abundant in the rivers in the Cotswold Water Park. No white-clawed crayfish were recorded during the river survey. Signal crayfish were recorded from 26 lakes whilst white-clawed crayfish were only caught from six lakes (16, 23a, 43, 65, 117 and 120). In 2004, crayfish surveys of six lakes within the Cotswold Water Park found signal crayfish (but no white-clawed crayfish) present in the connected Lakes 43 and 65 and therefore concluded that the population of white-clawed crayfish had been lost from these lakes (J Ford, unpublished data).

Crayfish plague is a key factor affecting the distribution of white-clawed crayfish, a disease caused by the fungus *Aphanomyces astaci*, which is carried by the signal crayfish (which is resistant to the disease). Spores from this fungus can also be transmitted by a variety of other means, including water, fish and damp angling equipment. The dramatic decline of native crayfish in the UK has largely been attributed to crayfish plague. Other key factors also include direct competition from non-native crayfish species for food and habitat (particularly signal crayfish), pollution of watercourses (sedimentation, pesticides and sewage), drought/low flows because of abstraction and habitat modifications and river management resulting in direct loss of habitat (eg river engineering).

In the Cotswold Water Park, the consented introduction of signal crayfish into several lakes for the purpose of commercial harvest since the 1980s is likely to be the major factor behind the dramatic decline of white-clawed crayfish. There is also some anecdotal information that signal crayfish have been deliberately introduced into carp fisheries to increase the growth rate of specimen fish. Signal crayfish are extremely mobile and will have escaped from these initial introduction sites to form rapidly expanding populations in adjacent rivers and lakes.

It is therefore clear that the white-clawed crayfish population in the Cotswold Water Park has undergone dramatic decline in recent years. In light of the limited distribution of white-clawed crayfish (now confined to 4 known lakes) and the prevalence of signal crayfish, the future for native crayfish in the Cotswold Water Park does not look optimistic.

Refer also to

Boundary and linear features HAP (including hedges, walls, ditches and verges, ancient or species-rich hedgerows, flower-rich verges, ditches, canals)
Rivers and Streams HAP
Standing Open Water HAP
Canals HAP
Non native invasive species SAP

For further information

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Species Action Plan for Wintering Waterbirds

The term 'waterfowl' has been used in the past to cover species from 33 families of birds which are ecologically dependent on wetlands. 'Waterbirds' is now the more widely used term synonymous with waterfowl, but includes a number of additional water dependent species. This SAP covers the species listed below:

Mute Swan <i>Cygnus olor</i>	Red-Crested Pochard <i>Netta rufina</i>
Great Crested Grebe <i>Podiceps cristatus</i>	Pochard <i>Aythya ferina</i>
Wigeon <i>Anas penelope</i>	Tufted Duck <i>Aythya fuligula</i>
Mallard <i>Anas platyrhynchos</i>	Goldeneye <i>Bucephala clangula</i>
Gadwall <i>Anas strepera</i>	Smew <i>Mergellus albellus</i>
Eurasian Teal <i>Anas crecca</i>	Goosander <i>Mergus merganser</i>
Shoveler <i>Anas clypeata</i>	Common Coot <i>Fulica atra</i>

1 Conservation Priority

Status	Priority
National/European	UK BAP Long List (Pochard, Tufted Duck, Gadwall, Shoveler, Teal, Mallard, Mute Swan) (but this reflects importance of wintering populations) Amber Listed (Birds of Conservation Concern, 2002-2007), including Gadwall, Teal, Shoveler, Pochard, Mute Swan. SPEC 2 (species concentrated in Europe with unfavourable conservation status): Pochard SPEC 3 (species not concentrated in Europe with unfavourable conservation status): Shoveler, Tufted Duck, Gadwall SPEC status reflects breeding and wintering populations.
Regional	SW Species of Conservation Concern (Pochard, Gadwall, Shoveler, Teal)
County	Pochard, Tufted Duck and Gadwall previously included individually on CWP BAP 1997-2007.

2 National and Local Status

The status of wintering waterbirds in the UK, as well as the national/international thresholds for site designation used in this SAP, are determined from Wetland Bird Survey (WeBS) data (Cranswick *et al* 2005). This monitoring programme is run by the British Trust for Ornithology, the Wildfowl & Wetlands Trust, the RSPB, and the Joint Nature Conservation Committee. It should be noted that for larger waterbird populations, 1% or more of the total Great Britain population is used (using the 5 year mean peak count) to identify sites of international and national importance. For example, the CWP is internationally important for Lesser Black Backed Gull and nationally important for Pochard, Great Crested Grebe and others. For smaller populations, where 1% of the Great Britain population is less than 50 birds, the sites are not listed as nationally important (although they are listed in current WeBS reports). In the CWP, this is relevant to populations of Smew, where the national population is comparatively small.

Cotswold Water Park Biodiversity Action Plan 2007 – 2016

	GB Population (10 yr Mean)	GB 1% threshold	International Threshold	GB Long Term Trend	GB Short Term Trend	CWP population (5 year Peak Mean, winter 2001/2002 to 2005/2006)		Status of CWP for species (West or East CWP)	CWP Long Term Trend	CWP Short Term Trend
						CWP West	CWP East			
Mute Swan <i>Cygnus olor</i>	20,953	375	380	-	-	269	80		157	16
Great Crested Grebe <i>Podiceps cristatus</i>	9,193	159	4,800	54	1	298	133	National importance (West)	31	9
Wigeon <i>Anas penelope</i>	376,743	406 0	15,000	70	11	1150	715		416	-2
Mallard <i>Anas platyrhynchos</i>	140,112	3,520	20,000	-31	-7	618	426		-8	15
Gadwall <i>Anas strepera</i>	15,639	171	600	400	10	360	83	National importance (West)	900	28
Eurasian Teal <i>Anas crecca</i>	157,875	1,920	4,000	61	8	1,121	168		60	21
Shoveler <i>Anas clypeata</i>	11,141	148	400	59	19	137	49	See ²	293	31
Red-crested Pochard <i>Netta rufina</i>	175	--	500	-	-	93	53	CWP W supports >1% of national population ¹	1,038	86
Pochard <i>Aythya ferina</i>	30,535	595	3,500	-26	-19	539	552	See ²²	-53	-33
Tufted Duck <i>Aythya fuligula</i>	56,338	901	12,000	17	5	1,024	537	National importance (West)	18	21
Goldeneye <i>Bucephala clangula</i>	12,946	249	4,000	-13	21	122	45		109	-8
Smew <i>Mergellus albellus</i>	170	50	400	-	-	27	-	CWP W supports >1% of national population ¹	1,920	7
Goosander <i>Mergus merganser</i>	2,650	160	2,700	8	-21	58	4		-17	-5
Common Coot <i>Fulica atra</i>	190,032	173 0	17,500	18	-1	4,207	2,238	National importance (East) National importance (West)	216	2

Key Wintering Waterbird populations in the Cotswold Water Park within a national context (based upon Wetland Bird Survey data, Winter 2001/2002 to Winter 2005/2006)

¹ Where 1% of national population is less than 50 birds, sites are not listed as nationally important.

² Due to low counts within the 5 year calculated Mean period, CWP does not currently meet criteria for national importance but is likely to in future; CWP E and CWP W were nationally important for Pochard in winter 2004/2005; CWP W was also nationally important for Shoveler in winter 2004/2005. Short term trend for Shoveler suggest numbers will increase. For both species, low counts are reducing the 5 year Mean.

3 Habitat and Ecology

Wintering waterbirds require suitable wetland habitats on arrival, during the mid-winter period, and prior to departure. Habitats are utilised for feeding, roosting, refuge, loafing, and social interaction and must provide appropriate resources for these functions. Despite a wide range of population and ecological research, habitat use and dietary requirements at different times of the winter period remain extremely poorly understood. Ongoing research at the CWP suggests that winter distribution is a function of food availability and quality, linked to competition and the presence of different types of disturbance (O'Connell *et al* 2006). It is also known that waterbirds will feed throughout the day if disturbance is low, and can 'switch' habitats and diets within a winter period. 'Dabbling' waterbirds utilise lakeside or terrestrial peripheral habitats, whilst 'diving' species utilise submerged aquatic resources. The bathymetry, substrate, and edge profile of a lake are therefore important in determining its value to the different waterbird groups.

4 Current factors affecting the species in the UK and the Cotswold Water Park

See Standing Open Water HAP for actions on habitats of wintering waterbirds.

5 Current Action in the Cotswold Water Park

A number of collaborative research projects are currently under way in the CWP to address key knowledge gaps in relation to the protection and management of wintering waterbirds and their habitats:

- The Wetland Bird Survey (WeBS), is undertaken each winter on all lakes in the Cotswold Water Park by a dedicated team of 20 observers. Detailed data is available by lake number for all wetland birds in the CWP. The Cotswold Water Park Society plays an active role in assisting the local WeBS coordinator with logistics and landowner liaison. The WeBS data is crucial in the CWP, as it comprises of data which demonstrates the value of individual lakes for wintering waterbirds and thereby helps to guide development control in the CWP.
- An ongoing collaboration between CWPS, Bath University, WWT, Natural England, Bristol University and CEH, is researching a number of waterbird issues within the Cotswold Water Park. These include research on the distribution of wintering waterbirds in relation to the availability and quality of food resources, different types of disturbance, and the physical and chemical characteristics of lakes. This work will support the development of user-relevant information and tools for stakeholders.
- Ecological Monitoring, including for wintering waterbirds, is undertaken at several sites, often under contract by lake owners such as Lower Mill Estate and Four Pillars Hotel (Lake 6). Such monitoring work is often a requirement of planning and/or Section 106 planning agreements linked to a development and is undertaken to monitor the impact of such developments upon numbers and distribution of wintering waterbirds.
- Cleveland Lakes Project; the Cotswold Water Park Society has purchased this 110ha site to the south and east of Ashton Keynes (comprising Lakes 74, 68a, 68b, 68c, 68d). The Society is planning to use this site to demonstrate that nature conservation and sports recreation can be integrated with careful thought and compromise. Lake 74 will be maintained as a nature reserve, maintaining its value for wintering waterbirds, aquatic plants and breeding waterbirds. Furthermore 12ha of wader scrape, reedbed and duck marsh will also be created adjacent to the paddle sports lakes. Target sports will be Dragon boating, rowing and canoeing.

6 Action Plan for Wintering waterbirds

Objectives

- 1 Maintain numbers of wintering waterbirds (species listed in section 1 above) at or above the Baseline 10 year mean of 1986-96.
- 2 Increase numbers of wintering waterbirds (species listed in section 1 above) by 0.5% by 2016 relative to 10 year mean for 1986-96.

See accompanying table for Targets and Actions.

Refer also to

Fen, Marsh and Reed swamp Habitat Action Plan.

Standing Open Water HAP

Active Quarries HAP

Breeding Waterbirds SAP

References

Cranswick, P.A., J. Worden, R.M. Ward, H.E. Rowell, C. Hall, A.J. Musgrove, R.D. Hearn, S.J. Holloway, A.N. Banks, G.E. Austin, L.R. Griffin, B. Hughes, M. Kershaw, M.J. O'Connell, M.S Pollitt, E.C. Rees & L.E. Smith. 2005. *The Wetland Bird Survey 2001/02 & 2002/03: Wildfowl & Wader Counts*. BTO/WWT/RSPB/ JNCC, Slimbridge.

O'Connell, M.J., Ward, R.M., Onoufriou, C., Winfield, I.J., Harris, G., Jones R., Yallop, M.L. & Brown, A.F. (2007). Integrating multi-scale data to model the relationship between food resources, waterbird distribution and human activities in freshwater systems: preliminary findings and potential uses. *Ibis*.149 (Suppl. 1), 65-72.

More details about these data and WeBS in general can be found at:

<http://www.bto.org/survey/webs/index.htm>.

Wintering Watergroup Species Action Plan

Wintering Waterbird Group Species Action Plan 2007 – 2016

Objective 1: Maintain nationally and internationally important numbers of wintering waterbirds at 2006 levels

Action Plan	Target Code	Target Text	Target Year	Action Code	Action Text	Action Lead	Action Partners	Measure (units)
Wintering Waterbird Group SAP	WW-T1	Maintain numbers of wintering waterbirds (species listed above) at or above the Baseline 10 year mean of 1996-2006 and inline with national trends.	Target: 2007 ongoing	WW-A1	Develop strategy that identifies areas (zones) where positive management of Standing Open Water would bring greatest conservation gains. This will involve the appropriate zoning of development, mineral restoration and habitat creation and enhancement, thereby fully integrating and balancing the needs of agriculture, industry, local communities, sports & recreation groups, visitors and nature conservation.	CWP BAP Team	NCF	Production and implementation of strategy. <i>Link to Objective 3, Standing Open Water HAP</i>
Wintering Waterbird Group SAP	WW-T1	Maintain numbers of wintering waterbirds (species listed above) at or above the Baseline 10 year mean of 1996-2006, and inline with national trends.	Target: 2007 ongoing	WW-A2	Create and maintain a variety of habitats for wintering water birds, including large areas of standing open water, shallow water wetland, reed bed and vegetated shorelines. Targets as per Standing Open Water HAP	CWP BAP Team,	Mineral Companies, Landowners, lake owners, NCF, LA's (Planning & Development)	<i>Link to Standing Open Water HAP, targets for Objective 2 habitat creation.</i>
Standing Open	SOW-T1	All standing open water habitat with	2010	SOW-A1	Develop criteria for selection of key sites and identify areas of	CWP BAP Team	Director of Conservation	Selection Criteria

Water HAP		existing nature conservation value in 2006 to be recorded, assessed.			Standing Open Water of nature conservation value for BAP species and other species of conservation concern by end 2007. Target habitats should include: Deep Water, wader scrapes, duck marsh, lakes (waterbodies >1ha), Ponds (waterbodies <1ha), shingle islands, vegetated islands, shingle shorelines, fringing reed shorelines.		Policy GWT, Biodiversity Manager WWT	agreed. Reports of current nature conservation value of key standing open water habitats produced every 5 years from 2007. Refer also to Breeding Waterbird SAP, Wintering Waterbird SAP, Great Crested Newt SAP.
Standing Open Water HAP	SOW-11	Promote habitat creation and management for nature conservation, especially wintering water birds, that is compatible with policies of the Birdstrike Working Group.	Target: 2006 ongoing	SOW-A14	Liaise with the Birdstrike Working Group to promote mineral restoration policies compatible with and balancing the risk of bird strike at RAF Fairford.	CWP BAP Team	Birdstrike Working Group, LAs (Minerals),	Production of mineral restoration plans (or reviews of existing plans) that balance habitat creation targets,

								mineral restoration and potential for bird strike on 2 sites in the Eastern and Central CWP. <i>Refer also to Wintering Waterbird SAP</i>
Wintering Waterbird Group SAP	WW-T2	Obtain a greater understanding of the distribution and abundance of wintering waterfowl in the CWP	Target: 2006 ongoing	WW-A3	Promote and facilitate analysis and interpretation of waterbird data collected in the CWP, including data collected by and for developers and consultants, and provide clear pathways for initiating action and mitigations when declines in winter waterbird numbers are flagged up. Is it possible to learn from the WeBS Alerts systems?	LA's (Planning & Development)	NCF, Wildfowl & Wetlands Trust, Slimbridge, CWP BAP Team	Greater clarity in ecological consultants reports for proposed developments. A clear and definitive pathway for initiating action and mitigation.
Wintering Waterbird Species Action Plan	WW-T2	Obtain a greater understanding of the distribution and abundance of wintering waterfowl in the CWP	Target: 2006 ongoing	WW-A4	Promote the study of lake ecosystems and utilisation by wintering waterbirds, in relation to types and quantities of disturbance, quality of feeding grounds, seasonality and other relationships. Explore weekend and weekday counts and the	Wildfowl & Wetlands Trust, Slimbridge & Bristol University	CWP BAP Team, Natural England	Studentships (PhD, MSc, BSc) and research posts. Fieldwork, surveys, scientific

					impact of disturbance from built developments.			publications and output of findings and conclusions. Refer also to Standing Open Water HAP
Wintering Waterbird Species Action Plan	WW-T2	Obtain a greater understanding of the distribution and abundance of wintering waterfowl in the CWP	Target: 2006 ongoing	WW-A5	Implement a workshop to facilitate the development of user relevant tools from results of the above research.	Wildfowl & Wetlands Trust, Slimbridge & Bristol University	CWP BAP Team	Workshop held at CWP

Species Action Plan for Non-native invasive species

Local biodiversity action plans are generally targeted towards habitats and their native species. It needs, however, to be recognised that non-native species can have significant impact on both habitat and species targeted in local biodiversity action plans. While these issues are dealt with in individual action plans it is important to raise the general issues surrounding non-native and invasive species. This has led to the development of this non-native species action plan.

1 Introduction

A wide variety of non-native species may be found throughout the UK in nearly all habitats of the UK. This includes terrestrial and aquatic plants; cultivars from parks and gardens that have naturalised in the wild (eg rhododendron, Himalayan balsam, Australian swamp stonecrop etc) ; vertebrates such as Canada geese, ruddy duck, red crested pochard, little owl, various species of parrot and parakeet, Sika deer, fallow deer, American mink, red eared terrapin and Alpine newt. Numerous invertebrates have also been introduced and include the New Zealand flatworm and American signal crayfish as well as a host of other species.

The majority of non-native species introduced to the UK over the millennia have caused no or little significant harm. In fact, many contribute to economic and social well-being through their use in certain sectors such as agriculture, forestry, horticulture and the pet sector. In suitable conditions however, some non-native species find themselves un-checked and able to dominate native species, transform ecosystems or cause general environmental harm. These are classed to be invasive species.

The UK BAP website presents an extensive list of non-native and invasive species present in the UK at present (Understanding the impacts of introduced species: highlighting the status and threats posed by non-native species; see web link

www.ukbap.org.uk/library/brag/InvasiveSpeciesEConference.doc

Non-native invasive species should not be confused with:

- Species colonising the UK naturally, possibly in response to climate change; for example the collared dove, little egret, red veined darter, small red eyed damselfly. These are species naturally expanding their range in response to improving environmental conditions and perhaps in response to climate change.
- Native species reintroduced to the UK or parts thereof, under IUCN guidelines, for example pool frog, European beaver, great crested newt, red kite, white tailed sea eagle.

2 Legal Status

It is an offence under the Wildlife & Countryside Act 1981 (as amended) to release certain non-native species into the wild in the UK. Note that the interpretation of "wild" in the Wildlife & Countryside Act 1981 includes private gardens from which escape is possible, for example, in the case of American Bullfrogs.

Section 14 (Introduction of new species etc) of the Wildlife & Countryside Act 1981 states that it is illegal to allow any animal which is not ordinarily resident in Great Britain, or is listed on Schedule 9 to the Wildlife and Countryside Act 1981, to escape into the wild, or to release it into the wild without a licence. It is also illegal to plant or otherwise cause to grow in the wild any plant listed on Schedule 9 of the Act. Offences carry penalties of up to £5,000 fine and/or 2 years imprisonment. For further information, please consult the DEFRA website (<http://www.defra.gov.uk/wildlife-countryside/non-native/legal-guidance.htm>).

Species listed on Schedule 9 include the Japanese Knotweed, Giant Hogweed, American Mink and a series of other species. For a complete list, please see the Wildlife & Countryside Act 1981 on the JNCC website (<http://www.jncc.gov.uk/page-3614>).

It should be noted that once species such as Canada Goose, American Mink and Signal Crayfish have been caught, it is illegal to re-release them back into the wild and they should be humanely euthanized.

3 National & Local Status; the impact of non-native invasive species upon UK BAP species and habitats

Many non-native invasive species are presumed to have a benign impact upon UK BAP species and habitats. For example, little owl *Athene noctua*, Collared Dove *Streptopelia decaocto*, and sycamore *Acer pseudoplatanus*.

Many invasive and non-native species however are clearly of conservation and economic concern, for example, American mink *Mustela vison* (due to its impact on the water vole and native breeding waterbirds), Canada geese *Branta canadensis* (due to their impact on arable crops, birdstrike risk, public health and hygiene) and Australian swamp stonecrop *Crassula helmsii* (due to its ability to rapidly choke waterbodies and to colonise new sites).

Action against non-native invasive species should be focussed upon species which are clearly of acute conservation and economic concern, and for the purposes of a Biodiversity Action Plan any action should be further focussed upon supporting UK SAPs and HAPs

4 Current status and action in the Cotswold Water Park

A source of great concern is the potential for colonisation of aquatic plants in lakes and ponds. There have already been several instances of non-native plants being found in some of the lakes, for example water hyacinth *Eichhornnia crassipes* in Cokes Pit LNR (Lake 34) in 2004 and *Crassula helmsii* in Jubilee Pond, Ashton Keynes in 2005. In both cases, it is likely that colonisation was a consequence of deliberate introduction in blissful ignorance of the impact of these actions.

In a similar fashion, red eared terrapins *Trachemys scripta elegans* have been seen in at least 2 lakes. This species has seen introduction to large number of sites across the UK, following the release of unwanted pets. The numbers of individuals involved and the overall distribution in the CWP is unknown. At one location the species was eradicated when the lake was drained for other reasons; clearly such drastic measures are not always desirable or possible. A means of removing this species from lakes should be explored. Its ecological impact can be great.

Himalayan balsam *Impatiens glandulifera* colonised the River Churn in Cirencester several years ago and has colonised its banks in many areas, notably at Cerney Wick, including the canal. At present little or no coordinated control is undertaken here other than ad hoc attempts by local home owners. Concern has been expressed of the potential threat of this species to the floral composition of North Meadow NNR. Furthermore, concerns have also been raised over the suboptimal habitat for water voles that Himalayan Balsam creates in terms of the reduced complexity and variety of vegetation.

Japanese Knotweed *Fallopia japonica* has been accidentally introduced to a small number of sites in the CWP, in some cases through the introduction of contaminated backfill during quarry restoration works. Successful eradication has been undertaken at several sites.

5 Action Plan for Non-native invasive species

Objectives

- 1 Increase public awareness of non-native invasive species impacting upon habitats and species of the CWP.
- 2 Promote control and/or eradication of non-native invasive species impacting upon habitats and species of the CWP.

See accompanying table for Targets and Actions.

Refer also to

Rivers & Streams HAP

Standing Open Water HAP

White-clawed crayfish Species Statement

For Further Information

Defra website: <http://www.defra.gov.uk>

JNCC website: <http://www.jncc.gov.uk>

Centre for Aquatic Plant Management (at the Centre for Ecology and Hydrology)

<http://www.ceh.ac.uk/sections/wq/CAPM1.htm>

Non-Native Invasive Species Species Action Plan

Non-native invasive species Species Action Plan 2007 – 2016

Objective 1: Increase public awareness of non-native invasive species impacting upon habitats and species of the CWP.

Objective 2: Promote control and/or eradication of non-native invasive species impacting upon habitats and species of the CWP.

Action Plan	Target Code	Target Text	Target Year	Action Code	Action Text	Action Lead	Action Partners	Measure (units)
Non-native invasive species SAP	NNS-T1	Eradicate non-native, invasive species from 100% of identified sites	2016	NNS-A1	Collate data and establish distribution of priority non-native invasive species of conservation and economic concern; target American Mink, Signal Crayfish, Crassula helmsii, Japanese Knotweed and other species considered to have a negative conservation or economic impact in the CWP.	CWP BAP Team	Environment Agency, Natural England, Landowners,	Data and distribution maps reported and circulated.
Non-native invasive species SAP	NNS-T1	Eradicate non-native, invasive species from 100% of identified sites		NNS-A2	Where required and where identified above, initiate control and eradication where possible.	CWP BAP Team	Environment Agency, Natural England, Landowners,	Log all incidents, actions and outcomes; reported upon.
Non-native invasive species SAP	NNS-T2	Reduce Canada Goose population to 20% of 2005 population [based upon WeBS data]	2016	NNS-A3	Promote, support and undertake humane control of Canada Geese through egg dipping and round-ups of moulting flocks in order to reduce birdstrike risks and impact on native waterbird populations	MOD	CWP BAP Team, NCF Landowners	Population reduced to 20% of 2005 population

Non-native invasive species SAP	NNS-T3	Establish distribution of native White-clawed crayfish and American Signal crayfish in the CWP	2010	NNS-A4	Establish distribution of crayfish species in the CWP, with a view to establishing safe reserves to reintroduce native crayfish.	CWP BAP Team	Environment Agency, Natural England	Distribution map and report produced of crayfish distribution in CWP. [See White-clawed crayfish Species Statement for detail].
Non-native invasive species SAP	NNS-T4	Increase awareness of non-native invasive species and their impact	2016	NNS-A5	Undertake 2 workshops raising awareness of non-native invasive species for local developers, lake owners and householders	CWP BAP Team	Environment Agency, Natural England	2 workshops undertaken
Non-native invasive species SAP	NNS-T4	Increase awareness of non-native invasive species and their impact		NNS-A6	Develop action plans and contingency plans for the discovery of certain invasive plants in the CWP, clearly indicate responsibility by partner organisations as well as funding sources.	CWP BAP Team	Environment Agency, Natural England	Contingency plans developed and in place
Water Vole SAP	WV-T1	Maintain and then restore water vole populations to all rivers in the CWP	Target: 2016	WV-A3	Maintain and expand Mink Control programme to include all key rivers in the CWP (Thames, Coln, Churn, Swill Brook, Ampney Brook, Marston Meysey Brook and Leach) and other relevant water courses and waterbodies.	CWP BAP Team	Director of Conservation Policy GWT, Biodiversity Manager WWT, Volunteers, Landowners,	Number of trappers, traps, rafts, lengths of watercourse/ water bodies trapped/monitored, annual trapping days, mink caught. Assess % of CWP and % of year considered Mink free