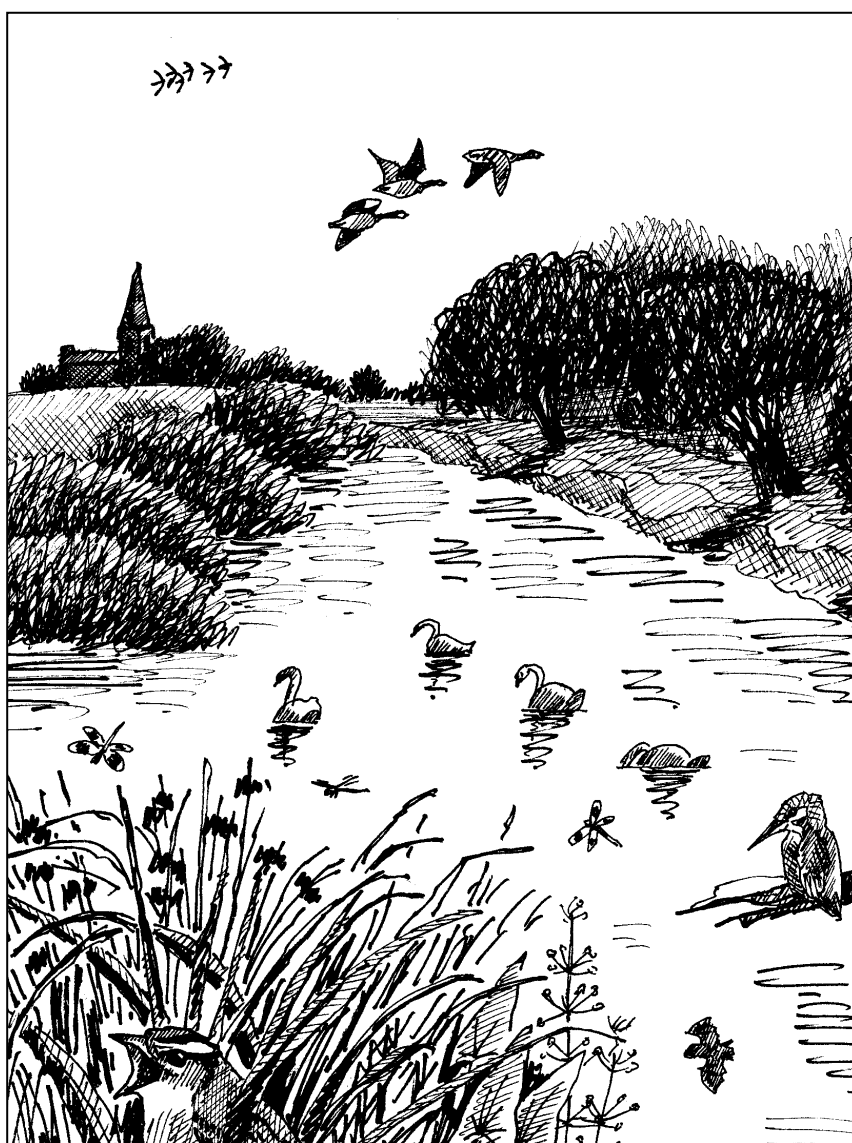


Waterways and Wetlands

Biodiversity Action Plan





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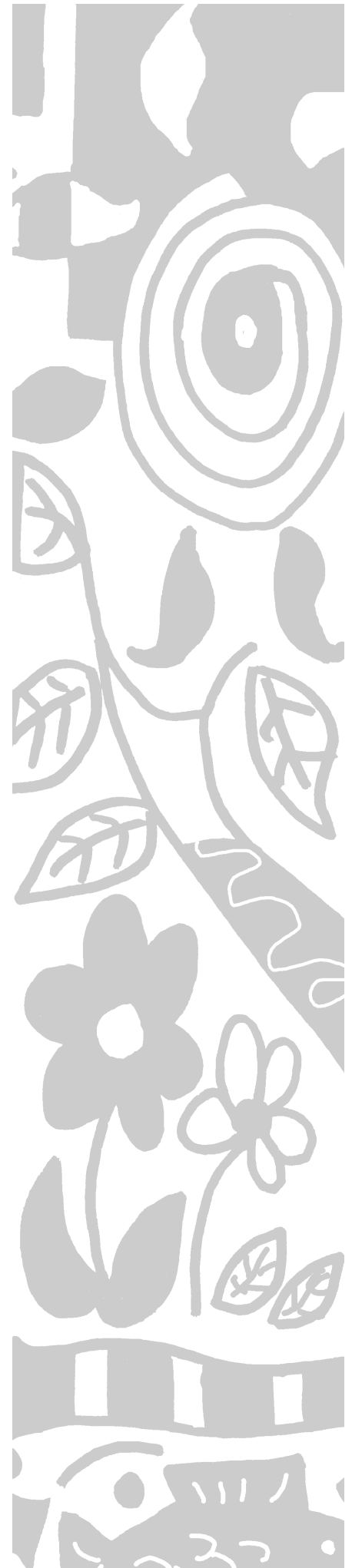
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This action plan was compiled and agreed by local representatives of :

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Biggleswade and Hitchin Angling Club
British Canoe Union
British Waterways
Chilterns Management Board (Chiltern AONB)
Council for the Protection of Rural England
Country Landowners Association
Cranfield University
English Nature
Environment Agency
Farming and Wildlife Advisory Group
Forest of Marston Vale
Great Ouse Boating Association
Greensand Trust
Hanson Properties
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Ivel Valley Countryside Project
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Landscape 2000
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Luton Borough Council
Mid Bedfordshire District Council
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RMC Aggregates
RSPB
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Tarmac Quarry Products Ltd
The Wildlife Trust
University of Luton
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The Waterways and wetlands Biodiversity Action Plan will be taken forward by The Environment Agency. Convenor of the Waterways and wetlands group will be Conservation Officer, Environment Agency, Bromholme Lane, Brampton, Huntingdon, Cambs, PE18 8NE
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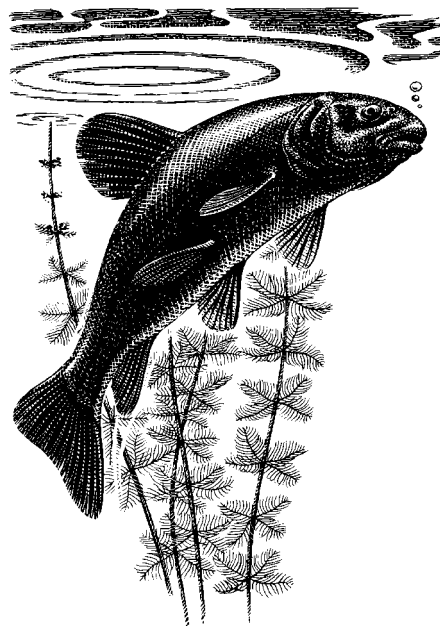
1. Vision

Waterways and wetlands in Bedfordshire and Luton are important in our landscape. Waterways and wetlands have many important functions. In addition to their importance for biodiversity they provide food, drinking water, power, transport, and leisure opportunities as well as functioning as a natural purifying system and flow regulator. The vision for the waterways and wetlands of Bedfordshire and Luton in fifty years time is set out below. This forms the context within which the rest of the plan operates.

Waterways and wetlands are valued not only for their wildlife importance but also as a dynamic natural system contributing to our quality of life. Water quality and quantity is managed to support diverse communities of flora and fauna and uses of waterways and wetlands are co-ordinated in a balanced and sustainable manner.

Existing waterway and wetland habitats are appropriately managed to conserve and enhance biodiversity for future generations and there is a greater awareness and understanding of the importance of the waterway and wetland resource. Opportunities for the further creation and restoration of waterway and wetland habitats and features are realised and appropriate interactions between habitats are established

This will be achieved by promoting a greater awareness and understanding of the importance of the waterway and wetland resource and managing all of the above elements in an integrated way.



2. Scope of the Waterways and Wetlands Biodiversity Action Plan

This action plan includes a number of habitats identified within the National Biodiversity Action Plan as priorities for conservation action. Habitats identified as important at a County level in the framework document Bedfordshire and Luton Biodiversity Action Plan A Way Forward are also included. For actions relating to ponds found on agricultural land refer to the Farmland BAP.

The County contains five habitat types identified nationally as priorities for conservation action which have been highlighted in bold in the list below. Therefore, the biodiversity action plan for Waterways and wetlands covers the following habitats:

- c **Fens**
- c **Reedbeds**
- c **Floodplain Grazing Marsh**
- c Standing Open Water and canals including:
 - Eutrophic standing waters** (Gravel Pits, reservoirs and lakes)
 - Ponds
 - Brick Pits
- c Rivers and Streams including:
 - Chalk Rivers**

Key species in Bedfordshire and Luton

The list below includes a wide variety of rare or threatened species that are found in Bedfordshire and Luton. The list has been extracted from the Bedfordshire Red Data Book. Species highlighted in bold have been identified as national priority species.

This action plan will be supported by a number of species action plans. Species that will have individual action plans have been selected according to a standard set of criteria and are listed in the complementary plans section.

Myotis daubentonii Daubenton's bat

***Lutra lutra* Otter**

Neomys fodiens Water shrew

***Arvicola terrestris* Water vole**

***Botaurus stellaris* Bittern**

Anas strepera Gadwall

Alcedo atthis Kingfisher

Charadrius dubius Little ringed plover

Anas acuta Pintail

Aythya ferina Pochard

Tringa totanus Redshank

***Emberiza schoeniclus* Reed bunting**

Charadrius hiaticula Ringed plover

Riparia riparia Sand martin

Anas clypeata Shoveler

Gallinago gallinago Snipe

Anas crecca Teal

Aythya fuligula Tufted duck

Rallus aquaticus Water rail

Anas penelope Wigeon

***Triturus cristatus* Great crested newt**

Natrix natrix Grass snake

Cottus gobio Bullhead

Continued.....





Cobitis taenia Spined loach

Biblopectus tenebrosus a beetle

Brachytron pratense Hairy dragonfly

Ischnura pumilio Scarce blue tailed damselfly

Platycnemis pennipes White legged damselfly

Austropotamobius pallipes White-clawed crayfish

Pisidium tenuilineatum Freshwater pea mussel

Cuscuta europaea Greater dodder

Sium latifloium Greater water-parsnip

Limosella aquatica Mudwort

Oenanthe fluviatilis River water-dropwort

Myriophyllum verticillatum Whorled water-milfoil

3. Current status of Waterway and wetland habitats

Fens

Fens are peatlands which receive water and nutrients from the soil, rock and ground water as well as rainwater. Fens can be subdivided according to the direction of water movement and the acidity of the water.

Topogenous fens are those where the water movement is generally vertical such as floodplain fen. Soligenous fens are those where the water movement is generally lateral such as springs and flushes. Poor fens are developed on base poor rocks and are characterised by short vegetation and acid water of pH5 or less. Rich fens are fed by mineral enriched calcareous waters of pH5 or more.

Current National status

Nationally, fens are widespread but scattered. Only a few large continuous areas of fenland remain, many are small, fragmented and isolated. Fen habitats support a diverse range of plant and animal communities including one third of UK's native plants and up to half of UK's native species of dragonflies as well as other insects including water beetles.

Current Local status

Bedfordshire once supported more extensive areas of fen associated with its rivers and watercourses, as well as other areas with waterlogged conditions and spring outfalls. Only 37 ha of swamp/fen and mire remain in the County representing 0.03% of the total land area. Flitwick Moor Site of Special Scientific Interest (SSSI) is the largest and most important wetland site supporting valley fen and acidic mire communities. It is an important site for species of bog moss and invertebrates. There are other wet flushes associated with the varying geology but many have been drained and lost. Remaining sites vary in size and quality, and are vulnerable to changes in hydrology. Of particular interest are those associated with the Greensand Ridge and River Flit.

Reedbeds

Reedbeds are wetlands dominated by stands of the common reed wherein the water table is at or above ground level for most of the year.

Current National status

The reedbeds in the UK are of geographical importance in a global context. It is a nationally scarce habitat supporting characteristic communities. The area of reedbed has declined 5 and 10% between 1979 and 1993 due to drainage and lack of management. Reedbeds can be found scattered across the UK although most are concentrated in SE England. The UK has approx. 5,000 ha of reedbed in total. Of the 900 or so sites contributing to this total only 50 are greater than 20 ha in size. Dominated by common reed *Phragmites australis*, reedbeds support a distinctive breeding bird assemblage including 6 nationally rare Red Data Book birds, the bittern, marsh harrier, crane, Cetti's warbler, Savi's warbler and bearded tit. Reedbeds also provide roosting and feeding sites for migratory birds and have five Red Data Book invertebrates closely associated with them.

Current Local status

Reedbed in Bedfordshire can be found in ditches, along the margins of rivers, around ponds, lakes and the numerous flooded brick and gravel pits. Most areas of reedbed are very small and the river margin reedbeds may cumulatively be the largest area of reed in the county. The creation of new wetland habitats in the Marston Vale will increase the area of reedbed in the County and provide an opportunity to highlight its importance for wildlife.

Floodplain grazing marsh and marshy grassland

Grazing marsh is defined as periodically inundated pasture or meadow with ditches.

Sites may contain ponds and seasonally water filled hollows with swamp communities but not extensive areas of tall fen communities.

The majority of sites are grazed although some are cut for hay or silage.

Marshy grassland generally consists of waterlogged neutral fields used for hay production and grazing

Current National status

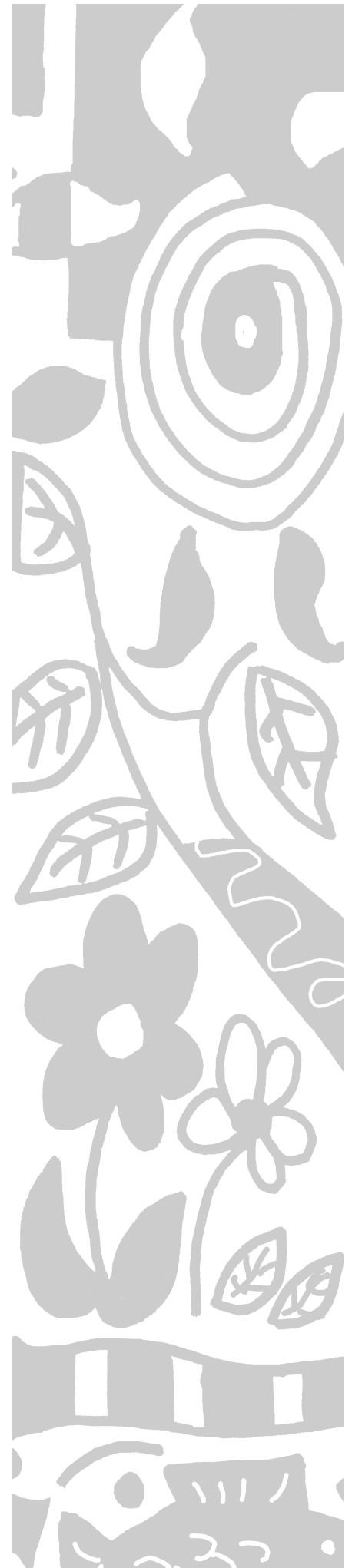
Floodplain grazing marsh. The exact extent of this habitat type in the UK is not known but significant losses are thought to have occurred in the last 60 years. It is estimated that there is around 300,000 ha left in the UK. Only a small percentage of this is semi-natural supporting a high diversity of native plant species. Marshes are very important for breeding waders such as snipe, lapwing and curlew. Remaining sites are very sensitive to nutrient levels.

Marshy grassland is clearly declining in extent and quality but no figures are available on the current rate of decline.

Current Local status

Floodplain grazing marsh. More extensive areas of floodplain grassland in the Ouse, Ivel, Ouzel and Flit valleys. Whilst some areas, particularly in the Ivel valley are of County Wildlife Site status most are now improved grasslands. Fenlake Meadow Local Nature Reserve in Bedford is a good example of floodplain grazing grassland which also contains some areas of marshy grassland.

Marshy grassland habitat is rare and threatened, accounting for 0.09 % of land area in the County (113 ha). Typically found in river valleys on poorly drained and waterlogged soils, and along spring/seepage lines they support a wide range of plants for example cuckooflower, meadowsweet, ragged Robin, marsh orchids and various rushes. The remaining areas in Bedfordshire are small, isolated and under threat from lack of management, water table changes and pollution.





Standing open water and canals

This habitat classification includes lakes, meres and pools as well as man made waters such as reservoirs, canals, ponds and gravel pits. It includes open water, water fringe vegetation and adjacent wetland habitats. Ditches with open water for the majority of the year should also be included. Three national priority habitats have been identified within this broad habitat type. These are neutral and nutrient rich standing waters and aquifer fed naturally fluctuating water bodies.

Current National status

There are no accurate estimates of the amount of standing water in Great Britain, but figures suggest that there is approx. 657 km² in England, 125km² in Wales and 1604km² in Scotland.

Ponds were traditionally used as watering holes for livestock and are important for their landscape and biodiversity value, attracting a wide range of wildlife including rare species. Over the last century it is estimated that 75% of ponds have been lost in Britain. Losses can be attributed to a number of factors including neglect, pollution, deliberate infilling, lack of management, water abstraction and drainage or natural succession to scrub or woodland.

The majority of canals were constructed between 1750 and 1830 linking the main areas of industrial activity. Many local canals were also constructed at this time. Canals are valuable to wildlife and can support diverse plant and animal communities including nationally scarce species. Tow paths, margins, tunnels, bridges and other boundary features provide valuable habitats for many species.

Current Local status

Bedfordshire has many standing water features. These include a stretch of the Grand Union Canal at Linslade, chalk lakes, gravel pits, sand pits, clay pits, ornamental lakes, flood balancing ponds, irrigation reservoirs and farm ponds. Many of these features have become established in the last 100 years as a result of mineral extraction and built development.

There has been considerable extraction of the widespread gravel deposits in Bedfordshire. There are now extensive flooded gravel pit complexes along the Ouse and Ivel valleys. A limited number of these pits have been designed for a nature conservation after-use but in most wildlife value has developed beside other activities. At Warren Villas near Sandy part of a pit complex is managed as a nature reserve and Felmersham Gravel Pits SSSI has been a nature reserve since the 1960 s. Whilst being worked the gravel pits form appropriate habitat for species such as little ringed plover, sand martin and common tern. Later as sites flood and mature they become of importance for a wide variety of wildfowl. Harrold and Priory Country Parks are very important for wintering wildfowl and bring the public into close contact with wildlife. Dragonflies and a wide range of wildfowl such as gadwall and tufted duck have benefited from the variety of habitats provided by flooded pits.

Brick making has been based on and around the lower Oxford clay deposits of the Marston Vale for over a century. Over 700 ha of land have already been excavated. Past excavations have developed rich and varied wildfowl and wading bird populations and have become some of the last refuges for breeding wading birds such as snipe and redshank in Bedfordshire. Waste disposal and deep flooding has meant that some of these sites have lost this interest but the deep lakes can become at least of regional importance for wintering wildfowl.

Excavations elsewhere for chalk and building sand have in some cases been allowed to flood and have produced unusual and very rich wildlife habitat.

Examples include Double Arches quarry near Heath and Reach and the SSSI chalk pits around Luton and Dunstable.

Ponds have been fairly well documented in the county. Countywide there had been a pond loss of approximately 27%. The data also suggested that the rate at which ponds in Bedfordshire were disappearing was increasing. In 1991 a field survey was undertaken to gather information on pond condition. This confirmed that not only the number of ponds had declined in the past 15 years but also the condition of the surviving ponds had deteriorated. Between 1976 and 1991 24% of ponds had deteriorated in quality. The restoration of old and the creation of new ponds has served only to slow the decline in number and quality of small ponds. Winter storage, irrigation reservoirs and balancing ponds can benefit wildlife, although not specifically designed to do so. They should not be viewed as a substitute for wildlife ponds.

Rivers and streams

This includes all flowing water systems except canals (dealt with as standing water) and occasionally wet agricultural ditches (dealt with in the Farmland Action Plan). Some streams may now be difficult to distinguish from field drainage ditches.

Current National status

In a natural state rivers and streams are dynamic continually changing the environment and creating new habitats. Flood defence structures and canalisation have reduced this capability. There are few rivers in the UK that have not been physically altered by man. The mosaic of habitats associated with rivers and streams can support a diverse range of plants and animals and provide a link between other fragmented and isolated habitats. Pollution, water abstraction, flood defence works and invasive species have affected this valuable resource.

Current Local status

Almost all rivers in Bedfordshire flow slowly over clay and alluvial substrates. The river Ouse is substantially larger than other rivers in the County and is navigable up to Bedford. The Ivel and Ivel navigation were formerly navigable to Shefford. Dredging for navigation and locks and weirs have had a considerable influence on the ecology of these larger rivers. Part of the Ivel is embanked to prevent flooding. Management to reduce flood risk has been a major influence on rivers and streams of all sizes in the County.

Much of the length of the rivers Ivel and Ouse are of good (grade a & b) biological quality. Some of the smaller rivers such as the Flit, Hiz and Campton brook contain stretches classified as grades c & d and a tributary of the Ivel at Biggleswade is classed as the poorest grade e. The Ivel is a good class A fishery. The Ouse is mainly a healthy class B fishery with a diverse range of fish species and important populations of species such as barbel and spined loach. Fisheries on streams such as the Flit and Campton brook are described as poor.

The margins of the larger rivers in the County support a particularly diverse range of plants including a range of large sedge species, reed, canary grass and river water dropwort. Otter has now returned to some stretches of river but water vole appears to be in rapid decline.

Bedfordshire's river valleys form corridors of semi-natural habitat across an intensively managed farmland landscapes linking the floodplain and areas of swamp, marsh, alder and willow carr and flood meadow. This makes a significant contribution to the biodiversity of the riparian habitat allowing the movement of one species from one area to another.





Chalk rivers

This is a national priority form of river. Chalk rivers are fed from groundwater aquifers producing clear waters and a generally stable flow. Many have stretches in their headwaters which run dry in summer.

Current National status

There are approximately 35 chalk rivers and major tributaries located in south and east England. They have characteristic plant communities and support a rich diversity of invertebrate life. Most have periods when they run dry or partially dry in late summer due to the lack of rainfall. Water abstraction, physical modification, pollution and changes in the catchment land use are current factors affecting the habitat and associated species.

Current Local status

In Bedfordshire very few chalk rivers exist. A small number arise from chalk springs emerging from the junction between the permeable chalk of the Chilterns and impermeable clay below. Spring waters flow into the rivers Ivel, Lea, Hiz, Hit, Flit and Ouzel. The river Lea is classified as a chalk river by the Environment Agency. Chalk streams and rivers are important habitats for species of caddisfly, mayfly and blackfly, freshwater crayfish and freshwater shrimp.

4. Current factors affecting Waterways and wetlands

- c Lack of centralised/ accessible data source
- c Promotion and awareness raising of waterways and wetland habitat
- c Eutrophication across catchments
- c Embanked sections of river in the Ivel valley and deposits of dredgings reducing flooding opportunities
- c Fragmentation of riparian habitats across catchments and habitat fragmentation between water body and surrounding habitat
- c Poor in-channel habitat diversity and structure as a result of engineering and management practices on all types of watercourse
- c Neglect/non-management of some watercourses and wetlands
- c Problem species and their detrimental impact on biodiversity across catchments
- c Introduction of water-based diseases which impact on biodiversity across catchments (e.g. crayfish plague on contaminated tackle, equipment, clothing)
- c Low flows particularly in respect of rivers and canals
- c Development pressures in general and in particular on the floodplain including specifically control of runoff and drainage
- c Management of existing bankside willow trees across catchments
- c Impact of recreational activities on biodiversity across catchments including:- Conflict of commercial/conservation interest and Impact of recreation activity on biodiversity of existing lakes
- c Sewage treatment works discharge, including stripping of nutrients, across catchments and the impact on rivers, streams and canals
- c Water abstraction from agriculture and new development and the consequent result on water levels affecting all wet habitats across catchments
- c Decline of priority species across catchments and future conservation of those species
- c Self-sustainability of fish stocks in rivers stream and canals
- c Lack of overall strategy for the restoration/ after use of mineral and waste sites
- c MAFF policy of restoring high grade agricultural land to agriculture post mineral extraction

- c Cormorant predation on fish stocks in open water habitat
- c Decline of small ponds and lack of appreciation of value to biodiversity
- c Inappropriate management of fenland and marshy grassland habitat
- c Drainage of marshy grassland and creation of ponds in marshy areas
- c Lack of fen, reedbed and grazing marsh habitat
- c Lack of maintenance of structures (e.g. mills, weirs and bridges) on rivers and streams
- c Climate change

5. Current action

It is recognised that in recent years significant improvements in our rivers and wetlands have occurred, evidence of which can be seen by the return of the otter. This is in part due to the hard work of the Countryside Management Projects, Community Forest, Wildlife Trust and drainage organisations such as The Environment Agency and Internal Drainage Board whose working practices have changed to further local biodiversity.

Policy and legislation

- c The Marston Vale Water Group is established to develop an integrated and co-ordinated approach to water management within the vale.
- c All main rivers are identified as CWS and Bedford Borough Council include a river protection zone within the policies of the Borough Plan.
- c Local Environment Agency Plans (LEAPS) outline initiatives and responsibilities re water resources, quality, conservation and habitat creation, sympathetic flood defence and integrated river basin management.

Site safeguard and management

- c The Internal Drainage Boards and Environment Agency have produced Water Level Management Plans for a number of wetland sites. These sites are all Sites of Special Scientific Interest and are protected under the provisions of the Wildlife and Countryside Act (as amended)
- c Much of Flitwick Moor, one of the largest and most significant wetland sites in the County is owned and managed by the Wildlife Trust and County Council. The Trust also manages a number of other sites with wetland elements.
- c More than 25% of all SSSIs in the County are wetlands or contain important elements of wetland
- c There are four Countryside Management Projects currently developing projects in the county, The Greensand Trust, Ivel Valley Countryside Project, North Chilterns Trust and Landscape 2000. The Forest of Marston Vale one of twelve Community Forests in the Country is also developing wetland projects for example the Marston Vale millennium wetland. The Greensand Trust are developing the Leighton/Linslade waterside heritage project.
- c Fish stocking is carried out widely by Angling clubs and the Environment Agency

Advisory

- c The organisations mentioned above and the Wildlife Trust offer advice on a wide range of wetland management issues and are working to facilitate greater understanding and dialogue amongst a wide range of waterway and wetland users
- c The Environment Agency carries out a wide range of advisory work in the areas of fisheries, flood control, pollution and conservation





Research and monitoring

- c The Environment Agency carries out regular surveys of fish populations, invertebrate populations, priority species and water quality. They also carry out Water Level Surveys, River Corridor Surveys, River Habitat Surveys and Macrophyte surveys.
- c English Nature, RSPB and the minerals industry have produced guides to best practice in the field of mineral restoration to wetland habitat.

6. Action plan objectives and targets

The objectives in the action plan are broad, cover habitat conservation, restoration and expansion, and underpin the Vision.

The targets should be measurable and specific to enable the monitoring of the proposed actions. The development of more far reaching targets depends on further investigation, a key element of the action plan programme.

Objectives

- A. Maintain or enhance the quality of existing habitats;
- B. Ensure water quality and quantity is sufficient to benefit biodiversity;
- C. Create new habitats and links between habitats where appropriate;
- D. Restore or repair damaged and degraded habitats;
- E. Survey and monitor key habitats and species to determine the success of the biodiversity action plan;
- F. Increase populations of national and local priority species;
- G. Promote public understanding, awareness and involvement in the conservation of waterways and wetlands;
- H. Promote and improve relationships and understanding between all those who use waterways and wetlands.

Targets

- A. Survey the extent, quality and management status of areas of fen, carr, marsh and reedbed and surrounding areas and produce a plan for maintenance or restoration of key sites by 2003. Establish and begin implementation of the plan by 2005
- B. Create a total of 80 ha of fen, carr, marsh, swamp and reedbed in Bedfordshire and Luton by 2010
- C. Survey the extent, quality and management of all chalk rivers and streams and produce a plan for maintenance or restoration of key sites by 2005
- D. Establish appropriate management regimes on all waterway and wetland Sites of Special Scientific Interest by 2005
- E. To have 50% of floodplain grazing marsh County Wildlife Sites managed in accordance with agreed plans by 2006
- F. To plant 50 native black poplar from local stock at strategic points within the river valleys by 2005
- G. Establish self sustaining river fisheries by 2010
- H. Maintain the biological quality of the Ivel and Great Ouse at grades a and b and elevate the biological quality of the Ouzel, Flit and Hiz to at least grade b by 2010
- I. Re-establish a pollarding regime in 50% of riverside willows by 2010
- J. Survey the extent of populations of all national priority species dependent on waterway and wetland habitats in Bedfordshire and Luton. Where appropriate complete species action plans and begin implementation by 2005
- K. Establish 3 working wetland projects to demonstrate integration of public use, biodiversity enhancement and revenue generation by 2010.

7. Proposed action

Representatives from the organisations listed below have signed up to undertake work that will help contribute to the actions put forward by the Waterways and wetlands BAP Group

Abbreviations

BBC	Bedford Borough Council
BCC	Bedfordshire County Council
BNHS	Bedfordshire Natural History Society
CU	Cranfield University
EA	Environment Agency
EN	English Nature
FMV	Forest of the Marston Vale
FWAG	Farming and Wildlife Advisory Group
GST	Greensand Trust
IDB	Bedfordshire & River Ivel and Ouzel Internal Drainage Boards
IPA	Ivel Protection Association
IVCP	Ivel Valley Countryside Project
LAC	Luton Angling Club
LBC	Luton Borough Council
LR	Lafarge-Redland Aggregates Ltd.
NCT	North Chilterns Trust
RSPB	RSPB
RMC	RMC Aggregates (eastern Counties) Ltd
T	Tarmac Quarry Products Ltd
WT	Wildlife Trust for Beds, Cambs, Northants & Peterborough

Action

Implemented by

Action	Implemented by
a) Planning of water supply and disposal in future developments to prevent over abstraction and changes to water regime damaging to biodiversity	EA
b) Ensure all licences are metered and monitor all licences and enforce against over-abstraction.	EA
c) Develop integrated river basin management to manage development pressures including control of runoff and drainage	EA, IDB
d) Local planning authorities to apply policies to protect and enhance the floodplain	BBC, BCC, IDB,
e) Strict legislative controls and public education on the issue of problem species	EA, EN
f) Review management practices in respect of embanked sections of river.	EA
g) Lobby MAFF for review of the policy of restoring high grade agricultural land to agriculture	WT
h) Lobby for appropriate targeting of agri-environment schemes in the county to benefit wet habitats.	RSPB

Action	Implemented by
Site safeguard and management	
a) Using asset survey by EA inform restoration/management options of structures e.g. mills, weirs and bridges	EA, IDB
b) Explore development mineral/waste site restoration/ after use opportunities to create fen, reedbed and grazing marsh habitat	BCC, CU, FMV, GST, IDB, IVCP, NCT, WT,
c) Work with owners to restore and manage ponds	EN, GST, IVCP, NCT, WT
d) Work with mineral planning authority, mineral companies, landowners and conservation agencies to ensure strategic approach to mineral site restoration planning to maximise opportunities to improve biodiversity.	BBC, BCC, CU, EN, FMV, GST, IDB, IVCP, NCT, RMC, WT
e) Implement practical measures to improve fish habitat to enable self sustainability of fish stocks including creation of fish refuges off river.	BBC, EA, IPA IVCP
f) Continue to obtain cuttings of black poplar and propagate from existing trees in order to incorporate locally derived black poplar in bank side planting schemes	BBC, BCC, GST, IVCP
g) Ensure that developments, especially road and rail, incorporate appropriate mitigation measures for rare and priority species.	BCC, EN, IVCP, NCT, WT
h) Ensure development proposals do not affect the integrity of existing and proposed wetlands	BCC, EN, NCT
i) Initiate management measures, such as codes of good practice to tackle any disturbance issues arising from conflict between commercial, recreational and conservation interests.	BBC, GST, IVCP, NCT
j) Seek close liaison between EA, IDB, planners, developers and landowners to maximise biodiversity value of flood relief/ water storage improvements.	BBC, BCC, EA, FMV, GST, IDB, IVCP, NCT, WT
k) Monitor low flows and take early and effective action	EA, IPA
l) Where appropriate maintain watercourse structures such as mills and weirs in all watercourses and repair river control structures at Lavendon, Turvey and Harrold by 2005	EA, IDB
m) Owners and managers to ensure appropriate management for maximum biodiversity of main rivers, IDB adopted watercourses and unadopted watercourses.	BBC, EA, IDB, LAC, WT,

Action	Implemented by
n) Undertake wildlife improvements as part of a maintenance/ capital works programme of chalk streams, non main river courses and ditches across the catchments.	IDB, NCT
o) Assess and identify opportunities to improve in-channel features to improve biodiversity in main rivers and undertake improvements as part of a maintenance/capital works programme.	EA, IVCP, NCT, WT
p) Undertake practical measures (e.g. appropriate siting of buffer strips, reed beds) to reduce nutrient levels in watercourses and water bodies and maintain optimal water quality for biodiversity.	EA, NCT
q) Create new wetland habitat on land currently of low biodiversity value	FMV, NCT
r) Implement recommendations in the Water Level Management Plans for Felmersham pits, Stevington marsh, Fancott meadows, Flitwick moor and Tebworth marsh by 2005, and review plans annually.	BCC, EA, EN GST, IDB, WT
s) Reduce eutrophication of river waters by introducing phosphorous stripping at DETR designated sewage treatment works at Clifton, Biggleswade, Sandy, Flitwick, Poppy hill, Dunstable and Leighton Linlade	EA
t) Commence a programme of control of invasive, non-indigenous plants (such as Japanese knotweed and giant hogweed) as part of routine watercourse maintenance	EA, LAC
u) Produce and implement species action plans for national priority species (if required) and commence implementation	BCC, BNHS, EA, WT
v) Commence a programme of willow pollarding along river corridors as part of routine watercourse maintenance	BBC, EA, GST, IVCP, LAC, WCP



Action Implemented by

Action	Implemented by
Advisory	
a) Disseminate government for advice and guidance on cormorant predation of fish stocks	EA
b) Provide advice and promote agri-environment schemes for the management of fen, reedbed and wet grasslands and for the linkage of important habitat.	BCC/FWAG EN, FMV, GST, NCT, IVCP, WT
c) Provide advice targeted at minimising eutrophication	EA
d) Identify areas where habitat fragmentation is a problem and target advice on habitat creation opportunities and the need for wildlife corridors (e.g. buffer strips, arable reversion, bankside planting).	CU, GST, IVCP, NCT, WT,
e) Advise on best practice for irrigation opportunities on farms	BCC/FWAG
f) Work with lake users and owners to produce management plans which aim to integrate recreation and conservation interests to maintain and enhance biodiversity.	FMV, GST, IDB, IVCP, WT
g) Promote sensitive management of farm ditches and non-adopted watercourses.	BCC/FWAG, IDB, IVCP, NCT, WT
h) Identify isolated water bodies and promote opportunities to link water bodies with adjoining habitats to create wildlife corridors	IVCP, WT
Future research and monitoring	
a) Support the development of the Biodiversity Recording and Monitoring Centre (BRMC)	BBC, BCC, BNHS, IDB, WT,
b) Undertake River Habitat Surveys (RHS) to determine sustainability of fish stocks and implement results.	BBC, BCC, EA, IPA, IDB, WT,
c) Identify existing mature native black poplar trees	BBC, BCC, GST, IVCP
d) Review sewage treatment work discharge consents and define optimal water quality levels to maintain and enhance biodiversity.	EA
e) Undertake baseline survey of existing willow stock and provide advice and promote management grants on the basis of findings.	BBC, GST, IVCP
f) Define extent of problem for each problem species across catchments, in terms of impact on biodiversity and target action on the basis of findings.	BNHS, WT
g) Review management practices of drainage operators	BCC, EN, IDB, WT,
h) Identify chalk streams, non-main river courses and ditches that are ecologically sensitive and liaise with IDB and riparian owners over findings.	BNHS, IDB IVCP, WT
i) Review flood protection requirements and opportunities for re-establishing links with floodplain in areas where rivers are embanked (i.e. by dragging floodbanks back to edge of floodplain or removing floodbanks, allowing bankside planting) and restore where appropriate. Implement recommendations for improvements for biodiversity.	EA, IDB
j) Complete survey of the extent and management state of field pond habitat in the Ivel valley by 2004	IVCP
k) Investigate all possible resources for continued maintenance of wet habitats.	
l) Assess water quality across catchments and define rivers/ streams with poor water quality (i.e. high phosphate levels).	EA

Action		Implemented by
Communication and publicity		
a)	Establish a mechanism for gauging the degree of public awareness of the importance of waterways and wetlands	
b)	Establish dialogue between different users of waterways and wetlands to avoid disturbance to sensitive species and habitats.	GST, IPA, IVCP, NCT, WT
c)	Promote awareness among river users of the danger of introduction of water borne diseases and encourage cleaning of all tackle, equipment and clothing after use.	EA, IPA, IVCP, LAC, WT,
d)	Ensure public awareness and responsibility for appropriate disposal of problem species	EA
e)	Promote sustainable and responsible use of water resources.	NCT
f)	Raise awareness of the need for river maintenance operations as part of an integrated river management	EA, IDB
g)	Develop and implement a programme to raise public awareness about the importance of water and wetland habitats for biodiversity using all possible media.	EA, FMV, GST, IPA, IVCP, NCT, WT





8. Monitoring the Action Plan

Monitoring the action is important in order to measure progress. It is proposed that the Biodiversity Recording and Monitoring Centre will be used as a mechanism to collect and collate information.

The Waterways and wetlands Biodiversity Action Group plan to meet annually to review progress and update the annual work programme. They may also meet to consider particular issues in depth, to plan new initiatives and to improve understanding and awareness of the issues affecting waterways and wetlands.

9. Complementary plans

Upper Ouse Local Environment Agency Plan (LEAP) Sept 1998
The Bedford Ouse (lower reaches) Local Environment Agency Plan (LEAP)
Draft Feb. 1999.

Water level management plans for:

- Felmersham Gravel Pits
- Stevington Marsh
- Flitwick Moor
- Fancot Woods and meadows
- Nares Gladley Marsh
- Tebworth Marsh

Biodiversity action plans exist for wetland habitats in all neighbouring counties. A biodiversity action plan exists for wetlands dependent on the Greensand aquifer written by The Greensand Trust.

This Action Plan has close links with Bedfordshire and Luton action plans for farmland, woodland and urban habitats. Plans for Lowland calcareous grassland, Heathland, Lowland acid grassland, Community involvement and public awareness and Data and monitoring are available.

Wetland species that will be the subject of individual species action plans are:

Water vole
European otter
Scarce blue tailed damselfly
White-clawed crayfish
Spined loach

Proposals for future species plans include: beetles of Flitwick moor, great crested newt, gadwall, kingfisher, shoveler, pochard, reed bunting, reed warbler, bullhead, scarce chaser dragonfly, wetland molluscs and black poplar.

10. Acknowledgements

Illustrations courtesy of S Halton and English Nature

