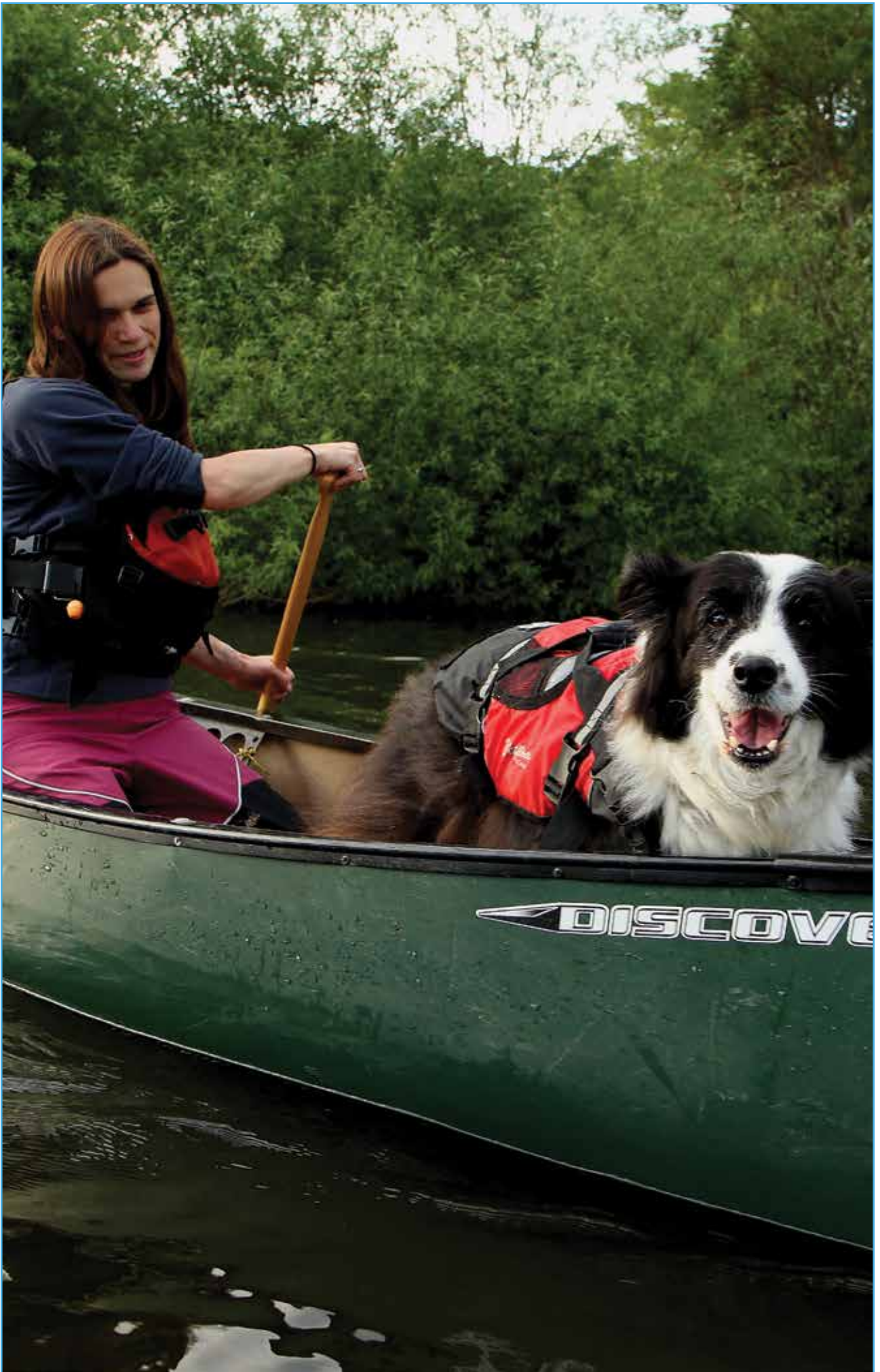




RIVER NENE REGIONAL PARK CIC
River Nene Integrated Catchment Management Plan - June 2014
Appendices - Version 1.0





Appendices - Table of Contents

6.	References/Bibliography	4
7.	Appendix 1: Background to the Nene Valley	6
	The river and its tributaries	6
	Landscape and Wildlife	7
	Heritage and archaeology	10
	Access and Recreation	12
	Boating	14
	Angling	14
	Walking and cycling	14
	Climate change	15
	Natural capital and ecosystem services	15
	Landscape scale and Green Infrastructure approach	16
	Climate	16
8.	Appendix 2: Planning policies	18
9.	Appendix 3: Details of projects in the database	22

List of Figures

Figure 13:	Wildlife	9
Figure 14:	Heritage	11
Figure 15:	Access and recreation	13
Figure 16:	Example projects from the database	23

List of Tables

Table A1.1:	Gradient of the River Nene	6
Table A1.2:	Average annual data for the period: 1981–2010 (www.metoffice.gov.uk)	16
Table A1.3:	Rainfall statistics	17

6 References/Bibliography

Title	Author	Year	Format
A better Place for all: River Nene Waterway Plan	Environment Agency	2006	Report
A brief record of some of the work 1931- 1951	Dallas, G River Nene Catchment Board	1951	Book
A guide for developers	Environment Agency	2006	Report
Adur and Ouse Catchment Management Plan	Adur and Ouse Partnership	2012	Report
An Inventory of the Historical Monuments in the County of Northamptonshire	British History Online	1975	Website
Anglian River Basin District River Basin Management Plan	Environment Agency	2010	Report
Backwaters and Backchannels of the River Nene	Wildlife trust for Bedfordshire, Cambridgeshire and Northamptonshire/ Environment Agency	2011	Report
Draft Northamptonshire Local Flood Risk Management Strategy	Northampton County Council	2012	Report
Enhancing the River Welland	The Welland Valley Partnership	2013	Report
Locations for Minerals Development. Supplementary Planning Document	Northamptonshire County Council	2011	Report
Midlands Water for Woodlands Project	Broadmeadow, S., Thomas, H. & Nisbet, T. Forest Research	2013	Report
National Planning Policy Framework	Department for Communities and Local Government	2012	Report
Nene Valley Strategic Plan	River Nene Regional Park	2010	Report
North Northamptonshire Core Spatial Strategy (Adopted)	North Northamptonshire Joint Planning Unit	2008	Report
North Northants Detailed Water Cycle Strategy	Halcrow	2009	Report
Northamptonshire Arc: A prosperity plan for Northamptonshire	Northamptonshire County Council	2011	Report
Northamptonshire Biodiversity Action Plan 2nd edition	Northamptonshire Biodiversity Partnership	2008	Report
Peterborough Flood and Water Management Supplementary Planning Document	Peterborough City Council	2012	Report
Peterborough Water Cycle Study—Detailed Strategy	Hyder Consulting	2010	Report

Post-Anglian drainage reorganisation affecting the Nene and Welland	Langford, H. /n Nene Valley Field Langford, H. & Briant. R. (eds) Quaternary Research Association	2004	Book
River Nene Catchment Flood Management Plan	Environment Agency	2009	Report
SPA Standard Data Form,	Joint Nature Conservation Committee	2011	
Synthetic Survey of the Environmental Archaeological and Hydrological record for the River Nene from its source to Peterborough	Meadows, I., Boismier, W. & Chapman, A. English Heritage	2009	Report
Tackling our phosphate problem	Environment Agency /NFU	2012	Report
The East Midlands Regional Landscape Character Assessment	East Midlands Regional Assembly	2010	Report
The Nene Catchment Abstraction Management Strategy	Environment Agency	2013	Report
The River Nene: A guide for Rivers Users	Environment Agency	2007	Leaflet
The True Value of Nature: Natural England's Draft Policy on Ecosystems Approach	Natural England	2009	
Towards a Naturally Resilient Low Carbon Northamptonshire (Northamptonshire Arc)	Northamptonshire County Council	2011	Report
UK Climate Change Risk Assessment: Government Report	DEFRA	2012	Report
Valuing Ecosystem Services in the East of England	Glaves, P., Egan, D., Harrison, K. & Robinson, R East of England Environment Forum, East of England Regional Assembly and Government Office East England	2009	Report
Water Resources Management Plan 2014 (draft)	Anglian Water	2013	Report
West Northamptonshire Core Spatial Strategy (pre-submission)	West Northamptonshire Joint Planning Unit	2011	Report
West Northamptonshire Water Cycle Study; Pre- Submission Joint Core Strategy final detailed WCS report	Halcrow	2011	Report

Appendix 1 Background to the Nene Valley

The river and its tributaries

The River Nene is the 10th longest river in the UK and rises on the mainly clay soils of the Northampton Uplands at sources near Badby, Naseby and Yelvertoft and then crosses the gently undulating rural country to the flat plains of Peterborough. From here, the Nene is embanked across the low-lying land of the Fens, in its course to The Wash.

The principal watercourses in North Northamptonshire are: The River Nene and its main tributaries, the River Ise, Harpers Brook, Alledge Brook, Slade Brook and Willow Brook; there are also interactions between the Grand Union Canal and the River. The rural landscape is predominantly agriculture, comprised of mixed farming in Upper Nene, becoming increasingly arable from the Middle Nene through to the Wash. The two major settlements are the town of Northampton in the upper Nene, and the city of Peterborough in the middle Nene. The Rockingham Forest area, which is predominantly boulder clay is a significant landscape element of the north of the catchment.

Northampton lies at the confluence of the River Nene's main upper tributaries, which include the Kislingbury Branch, the Brampton Branch and Wootton Brook. Through Northampton, the river is defended and the Northampton Washlands and Upton flood attenuation area compensate for the effect of upstream development on flow downstream. The Washlands consist of an area of former gravel workings into which floodwaters are diverted and stored for controlled release as the flood waters subside.

As can be seen in Table A1.1 below, for most of its length the Nene has a very slight gradient. This means that under natural conditions the river would be very shallow, slow flowing and meander through a braided river channel.

Table A1.1: Gradient of the River Nene

Location	Height (m above OD)	Distance from source (km)	Gradient between contours	Gradient
Source at Staverton	160	0	N/A	
Weedon	80	9.5	8.42 m/km	1:119
Nether Heyford	70	11.9	4.16 m/km	1:241
Northampton	60	16.5	2.17 m/km	1:461
Cogenhoe	50	25.1	1.16 m/km	1:862
Irchester	40	36.2	0.90 m/km	1:111
Denford	30	52.9	0.60 m/km	1:167
Oundle	20	70.3	0.57 m/km	1:175
Wansford	10	89.1	0.53 m/km	1:189
Peterborough Town Bridge	6	106.2	0.23 m/km	1:435

The River Nene is an important source of raw water for both Pitsford and Rutland Water reservoirs for public water supply. There is no significant groundwater abstraction in the catchment, due to the absence of major aquifers. A number of large discharges are made to the Nene. These include treated effluent from sewage treatment works (STWs) and industrial sources and these are one of the major influences on the quality of the surface water within the catchment.

The river is also important for navigation and recreational uses. The navigation connects with the Grand Union Canal in Northampton and with the Middle Level River System at Stanground. The Nene Washes, which lie downstream of Peterborough, have been classified as a Special Protection Area (SPA) and Ramsar site. The area floods seasonally, providing an important flooded grassland habitat for a wide range of bird species. The catchment contains a diverse, and in many cases, prolific fish community. The main pressures affecting fisheries are low flows and associated problems such as poor dilution of treated effluent, barriers to fish movement and habitat degradation through flood defence and navigation works. With planned growth in the catchment these cumulative impacts will require action to ensure good ecological status is achieved and there is no deterioration of the water bodies.

Landscape and Wildlife

The River Nene and its valley developed at the end of the Anglian glaciation over 400,000 years ago and the landscape is an intricate mix of glacial deposits and gravels underlain in part by Jurassic limestone. The river rises to the west of Northampton and forms a broad gentle valley characterised by low lying farmland, typically arable farmland often extending to the river and grassland closer to watercourses. Hedgerows and woodland are relatively uncommon and not always under good management.

From Northampton downstream to Thrapston the river has been heavily modified by urban developments, mineral extraction, transport infrastructure and flood alleviations schemes. The Nene follows a winding and braided course through the floor of the floodplain, displaying the significant alterations of the natural river channel that have taken place. These interventions were undertaken to facilitate the movement of boats along the Nene, reduce the risk of flooding and to provide power to mills that were once numerous in the valley. Drainage ditches, embankments, weirs, sluices and locks are all features associated with the management of the watercourse and represent points of interest along the river. The guillotine locks along the Nene are particularly distinctive features although these are being progressively replaced by contemporary gate locks.

Land use varies significantly along this stretch of the Nene. In the west, the river flows through Northampton, close to the centre, so that the town significantly influences the character of the valley. Initially the river forms an important feature of parks and urban green spaces, before entering the Nene Whitewater Centre and hotel/business complex. Particular influences arise from the visual impact of the large riverside holiday resort at Billing Aquadrome, and also from the sewage works and pylons located in the floodplain. However, the width of the valley and proximity of the countryside marks a notable zone of transition to areas of more rural character. Beyond and to the east of Northampton, further urban influences exist in the vicinity of other towns that border the valley including Wellingborough and Irthlingborough. East of Higham Ferrers, the landscape displays a distinctly rural character although gravel extraction sites, major roads in the valley and Thrapston exert significant local influences.

The floor of the valley has seen significant change in the past century as a result of gravel extraction. Restored workings are a characteristic feature for the full length of the Middle Nene, with variations evident in the type of restoration undertaken and the maturity of the scheme. Open water has been the favoured form of restoration, and now a series of lakes occupies large areas of the valley floor. The remainder of the floodplain landscape displays a range of land uses. Wetter areas have retained some small areas of semi natural grasslands and marshes although, elsewhere, agricultural improvement and drainage have converted species rich grasslands to pasture fields for both sheep and cattle. Arable fields are also evident adjacent to the river and rising up the valley slopes, particularly where permeable solid or drift geology or drainage have made this viable.

Landscapes around urban areas display typical urban fringe land uses, such as rough pasture grazed by horses, and areas of amenity grasslands. To the east of Thrapston towards Peterborough, the Nene flows through a rural landscape punctuated by a series of small stone built villages and farms. It is rich in historic features, although modern influences are also apparent, both in the presence of urban development at the fringes of the valley and through agricultural intensification. The juxtaposition of old and new is echoed in the fact that the valley marks the boundary of the ancient wooded landscapes of Rockingham Forest to the west and the post war arable fieldscapes of the farmed claylands to the east.

Near Peterborough the Nene enters the Cambridgeshire Fens, flat, open and intensively managed farm and peat lands with extensive vistas. As such, the stretch of the Nene to Wansford represents the last section of the Nene valley with an identifiable valley form. Agricultural land use in this area is a mixture of arable and pasture, with cereal cultivation tending to be located away from the floodplain on the gently sloping valley sides. The flat floodplain is predominantly given over to permanent pasture although formerly it would have been characterised by species rich seasonally flooded wet meadows. Polytunnels are also a feature of the flat fertile floodplain landscapes to the north of Oundle. Whilst these are incongruous to the otherwise pastoral riverine scene, they are clear evidence of diversification and intensification of agricultural practices.

Despite modern intervention, some wet grasslands and marshes are retained in the valley, in particular Wadenhoe Marsh and Achurch Meadow, which is the most important grassland habitat for breeding wader birds in the county.

The Nene Valley is located in an area of the country which has seen one of the highest rates of species extinctions and has the least amount of land formally designated for nature conservation in the UK. As a result of the separation of the river from its floodplain diverse habitats have been lost along with the ecosystems services they provide. This is set against the backdrop of the UK's second highest growth target, with large scale development and unprecedented climate change creating considerable pressure.

However, although the landscape has been heavily altered the area still contains significant wildlife. Figure 13 shows the statutory wildlife sites within the catchment. Many of the SSSI sites are ancient woodland associated with Rockingham Forest to the north whilst the Local Nature Reserves (LNRs) are smaller urban sites. Some of the changes to the Nene have had real benefit for wildlife, in particular mineral extraction has created a large number of wetland habitats, together with flood retention areas this has provided habitat for birds in particular. The Upper Nene Valley Gravel Pits Special Protection Area was designated in 2011 this site is used by internationally significant numbers of over-wintering golden plover, gadwall and bittern. In total it supports nationally significant over-wintering numbers of 12 waterfowl species, and a significant breeding bird assemblage².

The Priority Habitat Inventory for England has identified over 15,500 ha of significant habitat within the catchment area. Over 75% of this is deciduous woodland, mostly within the Rockingham Forest area. Other habitat is generally very fragmented, though there are larger areas of grazing marsh and fenland nearer to Peterborough.

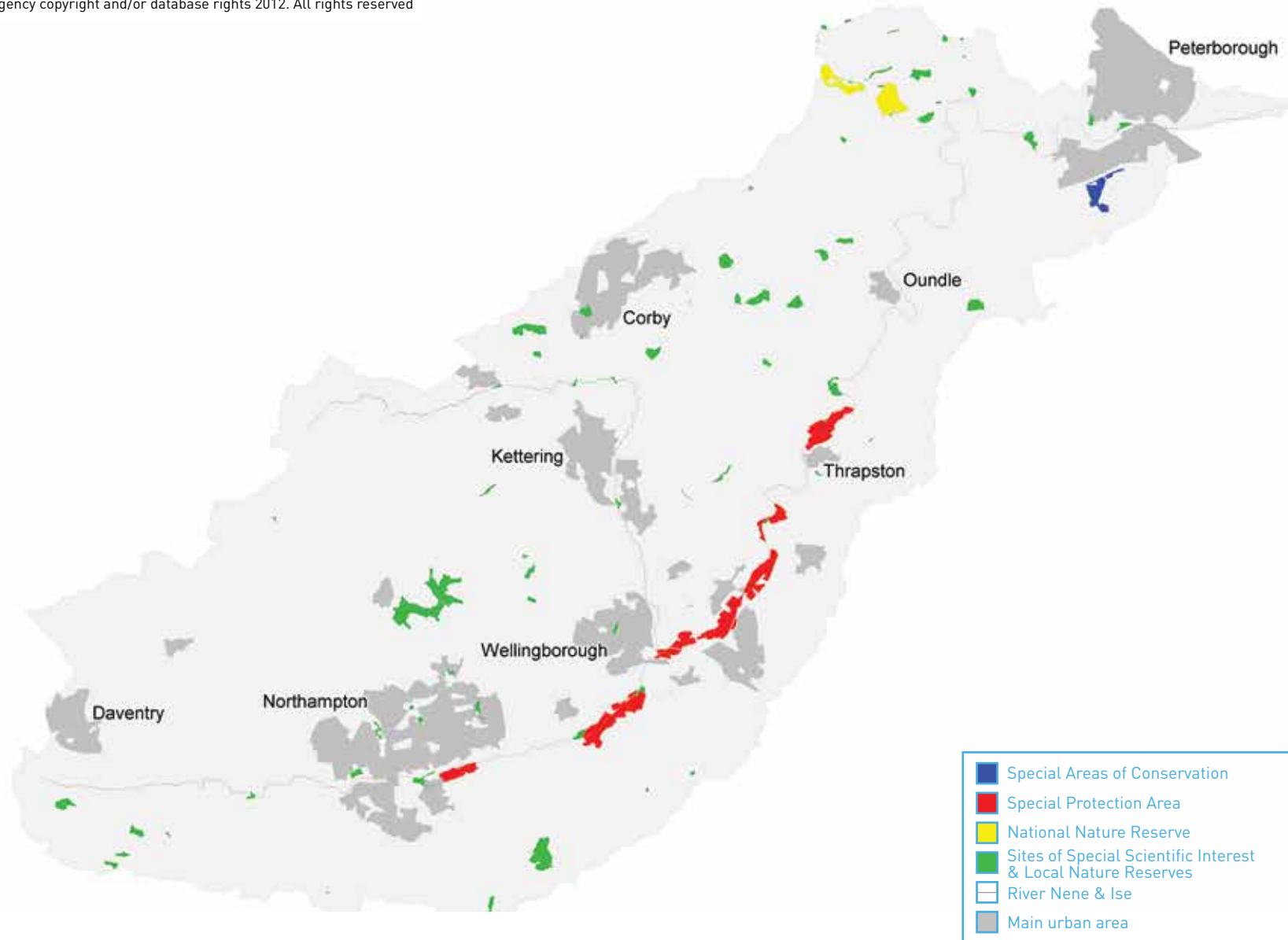


Figure 13: Wildlife

The main Biodiversity Action Plan (BAP) habitats found in the Nene Valley are rivers, lowland meadow, floodplain grazing marsh, lowland fen, reedbed, wet woodland and eutrophic standing water. Fragments of species-rich grassland and wetland habitats remain within areas recognised as Sites of Special Scientific Interest (SSSI) or Local Wildlife Sites (LWS). Generally sites within the Nene valley have not been as intensively surveyed for biodiversity as wetland sites elsewhere in the region. However work such as the “Backwaters and Backchannels of the River Nene (2012)” study have shown that there is a rich and varied invertebrate fauna with many species of conservation significance. Such studies also highlight the importance of retaining a variety of different features in the river and surrounding floodplain, these can be provided by habitat enhancement projects using well known techniques.

Heritage and archaeology

The River Nene provides a richly textured heritage landscape, with a significant concentration of historic buildings, parks and scheduled ancient monuments. The diversity and wealth of these heritage sites are key to the unique landscape character of the river. Figure 14 shows the archaeological and heritage sites with national designations within the catchment. Many, such as Castle Ashby and Boughton House, are Grade 1 and are significant visitor attractions for the area as well as being historically important. There are a large number of additional sites that are important such as Listed Buildings and Conservation Areas and some nationally important heritage sites which are undesignated for various reasons.

There have been extensive archaeological investigations associated with mineral extractions and the Nene is perhaps the best understood river valley in the country. There is archaeological evidence that the valley has been occupied since Neolithic times with mineral investigations and extraction providing the opportunity to record the development of the valley from the earliest times. By the Iron Age much of the woodland had been cleared from higher ground further from the river. The Romans transformed and intensified this landscape with extensive agriculture including vines and a large urban development at Durobrivae, south of Castor. Two of the major transport routes, the Watling Street and Ermine Street (at Durobrivae) cross the Nene. The river itself was probably not used for transport and would have been a relatively natural system at this time (Meadows, I., Boismier, W. & Chapman, A 2009). However more recent investigations from the Northamptonshire Terrestrial Minerals Resource Assessment suggest that development in the Roman period included the river.

Agricultural and land use changes have intensified since Roman occupation and the river has been highly modified with the installation of numerous water mills and later by navigation and flood management works. The Rockingham Forest, extending along a long length of the River Nene, was created as a royal hunting ground for William the Conqueror and extended by Charles I. There are still several hunting lodges that exist today and the North East part of the catchment around Corby and Kettering still features large areas of woodland.

Following a number of schemes initially started in the 16th century the navigation upstream to Northampton was completed in 1761. However by the mid 19th century the navigation was no longer being maintained, leading to extensive flooding arising from a restrictive bridge at Wisbech and the Mill owners upstream of Northampton..

As a matter of interest, the Nene Valley was considered to be one of the unhealthiest places in the country due to malaria (though the actual transmission mechanism was unknown until 1897). Following detailed investigation and consultation a large scale drainage project was implemented in 1852. (See Page 12)

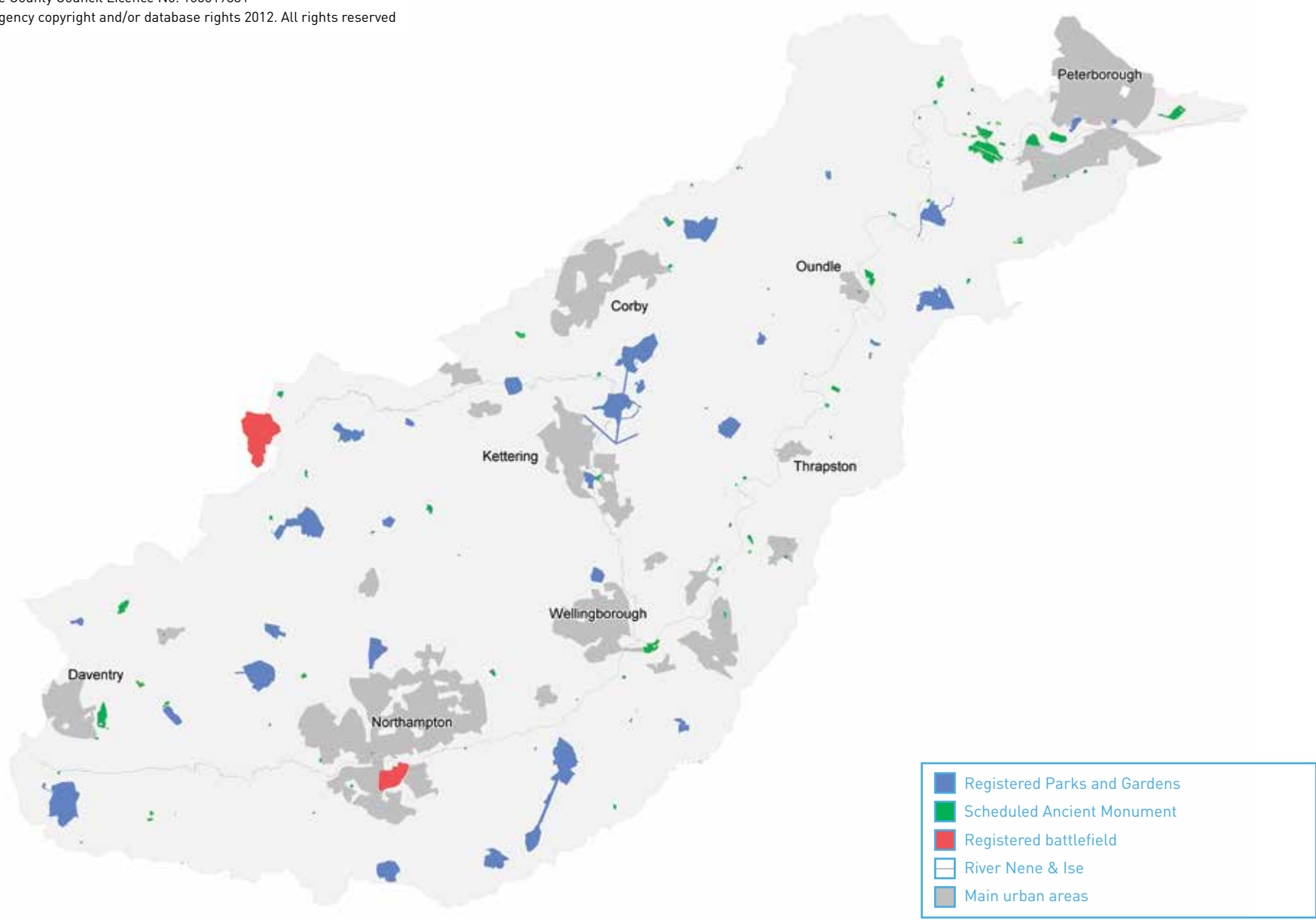


Figure 14: Heritage

"I am very sorry that I have been unable to return an earlier answer to the questions you put to me respecting the influence which the overflowing of the river Nene and the frequently flooded state of the meadows, contiguous with its course, are likely to exert upon the health of this district. Even now, in taking up my pen on the subject I am compelled to write briefly, from want of time.

There cannot be a doubt that the influence of these floods upon the health of towns, villages and places near the course of the river, is greatly prejudicial. When the waters subside, the meadows and low grounds adjacent to the river not only remain saturated with water, but are covered with mud, slime and various animal and vegetable matters, in a state of decomposition. These exhale a vapour, not only offensive to the sense of smell, but likely to be pernicious to the health of those who live within the scourge of their influence. The influence is not confined to only to the low grounds on the margin of the river. The malaria, or noxious exhalations (denominated in the local language miasmata), rise in the atmosphere due to its lightness, and impinge against the neighbouring sites, thus affecting the health of places high above the level of the river.

Upon the whole, there cannot be a doubt that the opening of the outfall of the Nene sea-ward, by lessening the extent and frequencies of its overflowing, would be greatly beneficial to the health, as well as to the economy, of this district".

Dr A Robertson Northampton 8th December 1848 (excerpts)

Many locations alongside the River Nene provide places of enjoyment for local people and visitors. There are notable landscaped gardens as well as Registered Battlefields at Northampton (War of the Roses) and part of Naseby (Civil War). Together with numerous smaller sites and extensive features such as Ridge and Furrow the Nene contains significant heritage which requires sensitive conservation. Promoting the enjoyment of these areas and sites will form a key component of encouraging greater access to the river.

Access and Recreation

There is an extensive network of routes and sites within the area (see Figure 15). Many are closely associated with the river, but Forestry Commission woodland to the south (Salcey) and North (Fineshade) are on the borders of the catchment. The valley provides a range of opportunities for both formal and informal recreation and local authorities such as Northampton have well developed strategies for developing areas with zones for different types and levels of activity.

The River Nene and the Northampton Arm of the Grand Union Canal are integral to the cultural life of the area – they provide breathing spaces and are crucial to the successful functioning of urban areas. People pass by the river and canal, walk and cycle along them on the way to work or the shops, or enjoy them as a recreational addition. The waterways offer places to relax and enjoy the natural environment away from the stresses of everyday life. In addition they host a range of events and festivals on both a small and large scale, which attract local and regional audiences.

Leisure and tourism activities have significant implications for the environment, economy and social fabric of the River Nene corridor. This is especially apparent within major settlements along the River Nene itself such as Northampton, Wellingborough, Oundle, Peterborough and Wisbech. It is a tourism and leisure resource that supports a wide range of activities and facilities, including camp sites and caravan parks, powered and non-powered boating for sport and recreation, walking, observing wildlife, cycling and angling. However, these varied uses put pressure on the river and its surroundings.

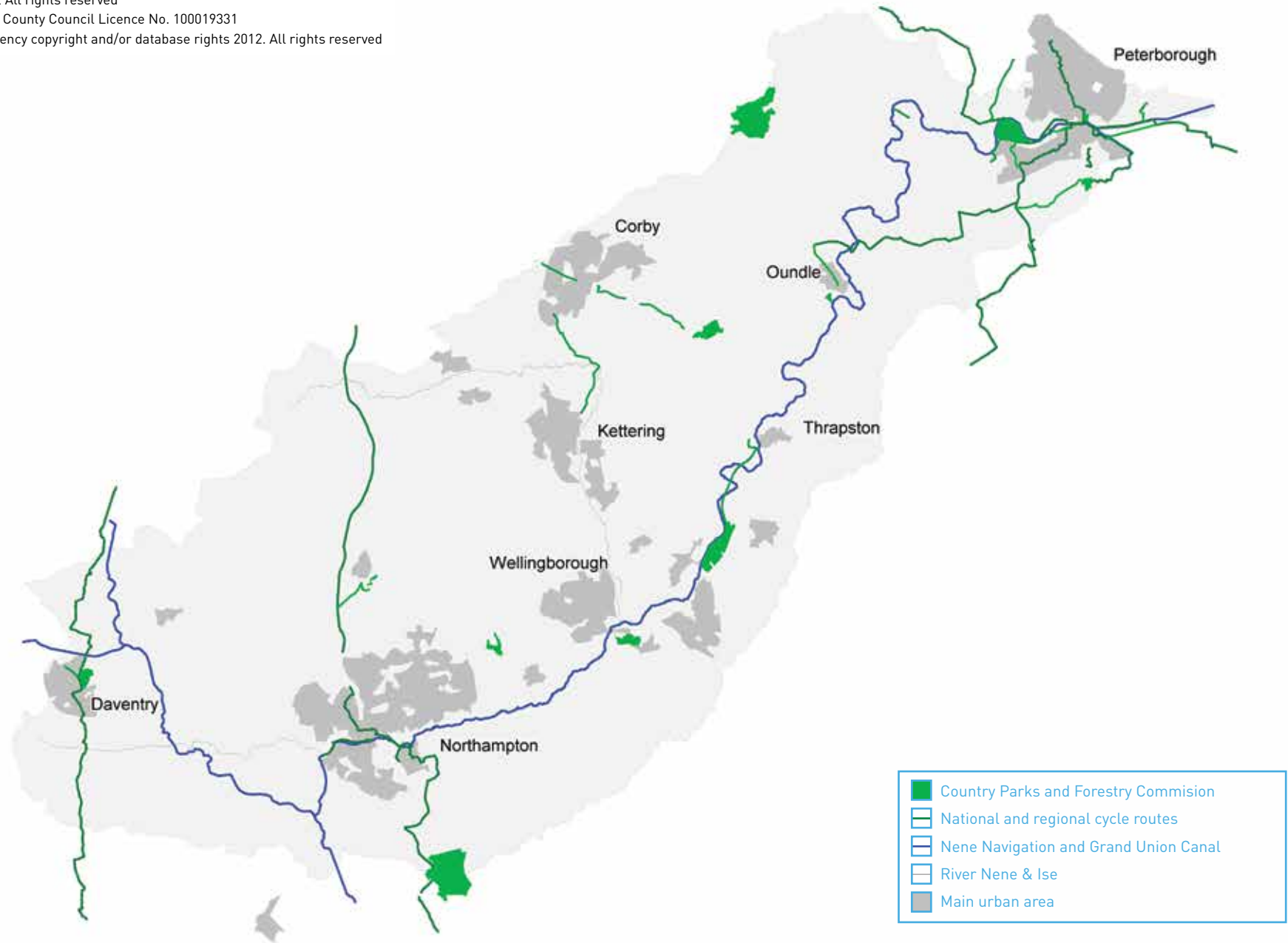


Figure 15: Access and recreation

Nene Park west of Peterborough provides a regionally significant recreational facility. With a landholding of 700ha, Nene Park attracts over 1.5 million visits per annum, with Ferry Meadows Country Park receiving over a million of those visits, making it the most visited Country Park nationally. Nene Park trust are delivering an exciting programme of projects to further improve the landscape, recreational and community offer at Nene Park

Stanwick Lakes near Thrapston provides a honey-pot site, a unique 750 acre countryside attraction and nature reserve in the heart of the Nene Valley. The Stanwick Lakes site links into a wider network of routes and is a good example of how recreation can be integrated with wildlife and landscape. The site receives over 250,000 visitors a year.

In Northampton Nene Valley Whitewater Centre provides an artificial pumped whitewater course and features a range of sporting activities focussing on canoeing. The aim is to provide a varied range of sporting activities both on and off site, including the provision adventurous activities for schools and colleges.

Boating

The Nene provides considerable opportunities for narrow boats and a range of other water based activities. It is part of the national network with a link to the Grand Union Canal at Northampton and the Ouse and Middle Levels at Peterborough. In 2005 the Environment Agency produced a River Nene Waterway Plan providing background information and a list of projects to help access and recreation develop sustainably. It has also produced a guide for river users providing helpful information for navigating the river.

There is considerable potential for increasing tourism and activities based on the river and projects, such as the opening of an 80 berth marina at Northampton in 2012, to provide infrastructure and help regeneration are to be anticipated in the future. The Nene also forms part of an ambitious project opening 240 km of linked water ways, the Fens Waterways Link. This would include a new link from the Nene at Peterborough to the Welland, creating a network between navigations in Lincolnshire and the Ouse and Middle Levels in Cambridgeshire.

Angling

There are numerous angling clubs along the rivers in the catchment, some of them well-established with rights to much of the river and nearby lakes. There are also numerous commercial fisheries based at lakes and gravel pits. There is a good variety of coarse fish, including barbel, bleak, bream, carp, chub, dace, gudgeon, roach, rudd, perch, pike and tench, with some large specimens of each.

The variety of clubs provides an opportunity for more effective coordination to improve the opportunities for angling in the area and to address some of the issues which are causing concern. These include the impact of river management, particularly dredging, possible conflict with cormorants, otters and other predators and ignorance of club rules by some anglers.

Walking and cycling

The Nene Way (not shown on Fig 13, but closely following the river) stretches for some 110 km from the source west of Northampton through the county. It provides a secure walking route supported by a series of leaflets and information. Additionally, there are a number of National Cycle Routes crossing the valley and there are extensive cycle routes in urban areas, especially Peterborough.

Associated with the river and lakes there are a number of Country Parks providing opportunities for a variety of activities. Ferry Meadows Country Park in Peterborough is the recreational hub of Nene Park offering watersports, golfing, miniature railway, horse-riding, angling boat trips, wildlife watching and conservation volunteering opportunities.

Climate Change

There is a great deal of uncertainty regarding climate change though it is generally accepted that increasing temperatures are caused by human activity and that we are now unavoidably faced with further increases. The actual impact on the Nene catchment is unclear but guidance has been produced by central government and other bodies. The main issues relevant to the catchment plan include:

- Increased summer temperatures with longer periods of drought.
- Greater variation in weather with more chance of increased rainfall in short periods leading to increased possibility of flooding.
- Potential for reduced river flow with increased concentration of pollution from agriculture and sewage damaging freshwater ecosystems.
- Increased competition for water resources in the summer and the need to address unsustainable abstraction.
- Increasing issues with invasive non-native species, gains and losses in biodiversity from changes in range.
- Potential for environmental improvements arising from new flood defences and reservoirs.

There is little specific understanding of how to address climate change issues within the Nene catchment but there is recognition of a variety of general approaches for mitigation and adaptation. Increasing resilience by ensuring ecosystems are in good condition and being effectively managed is one requirement. Creating and maintain large areas of wildlife habitat with good connectivity is also important and river corridors provide a key part of this network.

Natural capital and ecosystem services

It is recognised that natural ecosystems provide a wide range of essential benefits without which our lifestyle would no longer be sustainable. These include direct benefits such as clean drinking water, reduction of air pollution and food as well as less tangible ones such as attractive landscapes and wildlife in our gardens. More recently attempts to place a financial value on these services are being attempted with a variety of different approaches. Locally a study is also being undertaken by Northampton University regarding the services provided by the Nene Valley NIA. A study has been undertaken which looks in detail at 5 areas in the east of England (Glaves, P., Egan, D., Harrison, K. and Robinson, R., 2009), Valuing Ecosystem Services in the East of England) which have similarities with the Nene. The study highlights the wide range of services from flood control to tourism which are directly related to rivers and associated habitats and the complexities of attempting to value these in cost terms.

In their Draft Policy on the Ecosystems Approach (2009a), Natural England stated that

'The value of the natural environment is not adequately recognised by society and it is crucial that people understand the links between their own well-being and the value of services provided by the natural environment.'

The Ecosystem Approach is essential for decision-makers and sustainable development generally. Within the Nene Valley we should prioritise work to identify the services and ensure that they are maintained. Equally it should be recognised that it will not be possible to place financial values on all services and that the approach is just one of a range which need to be employed.

As part of the Nature Improvement Area project Northampton University has produced draft maps for 10 different ecosystem services within the catchment including water purification, carbon storage and accessible nature sites.

Landscape scale and Green Infrastructure approach

The network of green spaces, wildlife habitats and recreational routes provide a vital resource for people, but also for the economy and environment. Green Infrastructure provides multiple benefits both locally but also wider and longer term such as attenuating flood waters and moderating effects of climate change.

In partnership with a wide range of partners and stakeholders the River Nene Regional Park produced a comprehensive Green Infrastructure study of the Nene Valley and wider area, available at <http://www.rnrpenvironmentalcharacter.org.uk/> to download as an interactive plan, text and picture based programme. The information has been integrated into Core Spatial Strategy policies. The Environmental Character Assessment and Green Infrastructure (ECA&GI) suite has established a Green Infrastructure network (an interconnected network of green spaces) that takes into account the natural corridors formed by the river and its tributaries, and therefore overlies the water bodies in the Integrated Catchment Plan. The development and delivery of the Integrated Catchment Plan is therefore an integral part of the Green Infrastructure network, which was seen as an integral part of the planned growth and development that is to take place in Northamptonshire. The work should help planning authorities to:

adopt an holistic approach to environmental planning and will ensure that new development is sustainable and follows the principles of Green Infrastructure by providing environmental, social and economic gains whilst, at the same time, enhancing environmental character and quality and maximising opportunities for landscape scale connectivity.

The approach should ensure that both direct and indirect benefits that deliver WFD objectives are embedded into planning policy, and will therefore be considered at the earliest possible stage as both spatial and site based plans are taken forward. This also includes site allocation through the investigations into environmental sensitivity as part of Specific Housing and Land Allocation Assessment (SHLAA)

Climate

There is information from 2 climate stations within the catchment, Moulton Park (Northampton) and RAF Wittering (Peterborough). Rainfall is low, compared to other parts of the UK (Table A1.2) though it is relatively consistent through the year with February being the driest and October the wettest months.

	Max. Temp (°C)	Min. temp(°C)	Days of air frost (days)	Sunshine (hours)	Rainfall (mm)
Northampton	13.7	5.9	47.3	1498.9	638.1
Wittering	13.7	6.1	46.8	1596.0	608.9
Midlands	13.4	5.6	51.7	1438.2	798.3
S England	14.0	6.2	46.0	1554.3	793.9
UK	12.4	5.3	54.6	1372.8	1154.0

Pitsford School in Northampton maintains a weather station and provides historical records for the county illustrating the extremes of weather and more recent trends associated with climate change. Table A1.3 provides a summary of the range of rainfall which has been recorded.

Table A1.3: Rainfall statistics

Maximum monthly total in Northampton (since 1880)	186.9 mm in July 1880
Minimum monthly total in Northampton (since 1880)	0.5 mm in June 1925
Maximum monthly total at Pitsford School (since 1998)	176.1 mm in June 2007
Minimum monthly total in Pitsford School (since 1998)	1.6 mm in April 2007
Maximum in a day at Pitsford School (since 1998)	68.8 mm on 14th June 2007



8 Appendix 2: planning policies

A selection of relevant policies indicating how the Catchment Plan can help contribute towards meeting objectives

North Northamptonshire Joint Core Strategy 2011-2031 Emerging Draft August 2012	
The strategy includes 10 outcomes and over 30 associated policies with the aim of creating “a showpiece for modern green living and well managed sustainable development”.	
Development plan notes	Catchment Plan notes
Draft Policy 1 - Historic Environment	
The policy seeks to preserve and heritage significance and setting of historic assets in the area and identifies a number of individual sites which are particularly important for North Northamptonshire.	Heritage is one of the key themes for the catchment Plan and it is recognised that conserving and enhancing features is essential for the future of the Nene. The plan includes proposals for identifying and safeguarding sites and undertaking further survey work. A number of the proposed projects have potential implications for heritage assets and it will be a priority the Catchment Partnership.
Draft Policy 3 – Biodiversity and Geodiversity	
The policy identifies the importance of maintaining and enhancing biodiversity especially in the Nature Improvement Area. Improving water quality, reducing habitat fragmentation and meeting Biodiversity Action Plan targets are priorities. The possible tension between increased access and wildlife is recognised, particularly in the Special Protection Area.	Improving the quality of the environment in the catchment will bring significant improvements for biodiversity. The majority of the proposed projects in the catchment are directly or indirectly beneficial to biodiversity. Although most focus on river and wetland habitats the creation of woodlands, tree belts (Rockingham Forest for Life project) and wildflower meadows extend benefits across the whole catchment.
Draft Policy 4 - Water Environment and Flood Risk Management	
Development proposals must contribute towards reducing risk of flooding and to the improvement of the quality of the water environment by meeting a number of criteria. These include upstream flood storage measures and natural flood attenuation on the Nene.	Re-naturalising rivers is recognised as an effective means of addressing flood and environmental issues. The plan includes a number of projects which provide natural flood attenuation or slowing water projects on tributaries of the Nene. The Environment Agency is involved at all stages and discussions are on-going to explore solutions.
Draft Policy 20 - The Nene and Ise Valleys	
The Nene and Ise Valleys will be priorities for investment in green infrastructure to strengthen biodiversity and landscape character, support a prosperous rural economy, provide leisure and recreational opportunities and support the revitalisation of towns and their surrounding countryside.	Within North Northamptonshire the plan includes groups of projects focusing on towns such as Wellingborough and Oundle which provide multiple benefits including new infrastructure for tourism and improved access with links to town centres together with biodiversity and environmental improvement. Project could be delivered individually but the plan can provide coordination to ensure that overall greater benefits are achieved.

Peterborough Core Strategy Development Plan Document

The plan includes 29 different objectives and 22 core policies with a firm commitment to sustainable growth and an improved quality of life. The Planning Policies Development Plan Document features 20 policies to deliver the objectives and core policies

Development plan notes

Catchment Plan notes

Objective 2: Environment Capital

To develop a distinctive identity as the UK's Environment Capital.

Sustainable management of water is essential if Peterborough is to achieve its ambitions. The Catchment Management Plan provides a key part of this, involving all the relevant stakeholders in an effective partnership.

Objective 20: Sites of Environmental Importance

To enhance and protect from inappropriate or harmful development all Peterborough's environmental assets, including the Green Grid, River Nene, Fen Waterways, European Sites of Importance (Orton Pit, Barnack Hills and Holes and Nene Washes), district open spaces, valued local landscapes, strategic views, ancient woodlands, ancient and veteran trees and other areas of biodiversity value.

The plan covers a significant part of the city and includes The River Nene and Orton Pit SAC (established for Great Crested Newt). The plan promotes a strategic approach to ensuring that biodiversity is enhanced, particularly associated with water.

Objective 27: Utilities infrastructure

To secure in advance the funding and delivery of sufficient infrastructural capacity to accommodate and support the levels of growth planned for the district up to 2026, in particular through increased sewage treatment network capacity and ensuring sufficient water security to accommodate new development. To reduce pressure on the area's utilities by adopting measures to manage and reduce existing and future resource demand.

Maintaining the quality of water and the flow in rivers is a key requirement of the Water Framework Directive and the plan will help ensure that water treatment works are sufficient whilst overall water-use is reduced.

Objective 29: Flood risk

To reduce the impacts of flooding and climate change on Peterborough by ensuring that all new development as a minimum complies with PPS25 and wherever possible that development is directed away from areas at risk of flooding, and by ensuring the adoption of SuDS wherever practicable in new development.

Effective flood risk management upstream of Peterborough is critical and provides opportunities for the creation of Washlands and other landscape features.

Policy CS10 Environment Capital

The policy requires that developments contribute towards improving the environment in Peterborough, over and above the contribution required by national regulations. Examples include water efficiency schemes and projects to promote biodiversity.

Northampton University has produced draft maps of ecosystem services for the area and work is being undertaken to link this directly with the GIS database of projects to provide a new way of identifying priorities, improving project delivery and locating gaps.

Policy CS18; Culture, Leisure and Tourism

The policy promotes cultural, leisure and tourism resources for local people and to increase the number of visitors. One objective is the improvement of navigation facilities on the Nene.

Promoting navigation on the Nene and the connections to the wider waterway network is an element of the plan. Peterborough can play a major role in developing opportunities.

Policy CS19: Open Space and Green Infrastructure

The policy promotes publically accessible Open Space and the development of an integrated Green Infrastructure network permeating the city and linking to surrounding areas. The River Nene is identified as a critical asset with opportunities to promote biodiversity, access, landscape and navigation.

West Northamptonshire joint core strategy (Including Proposed major changes)

Development plan notes

Catchment Plan notes

Policy S10: Sustainable development principles

The policy requires a range of features in new developments to promote sustainability. In particular water efficiency and SuDS are highlighted and reducing pollution from run-off. Green Infrastructure and biodiversity are also mentioned together with reducing habitat fragmentation.

The two water bodies on poor condition within the catchment fall within the area and the plan identifies a series of projects to address the issue. Reducing pollution from run-off will be a priority.

Policy BN1 - Green Infrastructure connections

The policy identifies a network of sub-regional and local corridors including the River Nene and the canals. Developer contributions are sought to create the network which will be to a high quality with biodiversity benefits. The Green Infrastructure network will also mitigate climate change issues, particularly flooding.

The plan provides a strategic approach to Green Infrastructure in the catchment and will promote both small scale improvements and large scale initiatives which balance needs effectively. Many of the project improve habitat connectivity and include new access routes to link existing infrastructure. Within West Northamptonshire this includes a series of linked projects on the Brampton Arm of the Nene and along the Nene west of Northampton.

Policy BN3 - Woodland enhancement and creation

The policy supports the creation of new woodland but extensions or links for ancient woodland in particular. Veteran trees within the landscape are also highlighted.

The role of woodland in increasing water quality and improving flood control is well established. The plan recognises the relative lack of woodland in the area and includes projects to encourage greater planting.

Policy BN4 – Upper Nene Valley Gravel Pits Potential Special Protection Area

The policy identifies a range of possible adverse impacts on the Northampton Washlands, part of the Special Protection Area. These include development close to the site but also the potential impact of water abstraction or pollution from other developments. The impact of the loss of arable and pasture land used for foraging is also highlighted.

The plan includes a range of projects which benefit the whole of the SPA, promoting community awareness and access issues and identifying opportunities for habitat creation.

Policy BN7a - Water supply, quality and wastewater Infrastructure

The policy requires that new development provides sufficient infrastructure for water supply and treatment of wastewater to ensure there is no deterioration in water quality. It promotes the use of SuDS wherever practicable.

Implementing SuDS effectively is one of the key mechanisms for improving water quality and promoting biodiversity, West Northamptonshire has model development at Upton. SuDS should feature in all new developments and the plan includes a number of proposed SuDS projects in the area including improvement to the Brampton Arm of the Nene.

Policy BN7b - Flood risk

The policy controls development in areas of flood risk establishing a range of measures which must be adopted by proposed developments, including the use of SuDS.

Policy BN8 - The River Nene Strategic River Corridor

The policy recognises the significance of the River Nene and its tributaries and its contribution to Green Infrastructure, landscape, economy and history of the area. Developments should enhance the corridor and its biodiversity both locally and more widely.

The main objective of the plan is the maintenance and enhancement of the Nene Valley. By helping to coordinate the wide range of stakeholders involved and establishing priorities a variety of improvements will be delivered.

Policy BN9 - Planning for pollution control

The policy addresses the issue of pollution requiring that health and environmental standards be maintained. The protection and improvement of surface and groundwater is highlighted.

This is one of the priorities for delivering the Water Framework Directive. The Urban Studies projects in Northampton and Peterborough have identified many pollution issues and solutions have been proposed.



Appendix 3: Details of projects in the database

Example projects from the database. Figure 16 is a thematic map using the measure code field.

Id	Measure code	Waterbody ID	NGR	Description	Elements improved	Est cost	Annual Cost	Partners
1	5.4.1	GB105032045050	SP 7551 5976 for 200m	Bare vertical brick banks on both sides in this urban location need to be “greened up” with planted floating islands or coir rolls.	Fish, diatoms, Phosphate	£50k	£1k	EA, NIA, RNRP, N’ton BC
2	5.4.1	GB105032045050	SP 7582 6002 for 300m	Bare vertical brick banks on LHB needs to be “greened up” with planted floating islands or coir rolls.	Fish, diatoms, Phosphate	£40k	£1k	EA, NIA, RNRP, N’ton BC
3a	5.1.1	GB105032045050	SP 7582 5995	Fish passage in this section of the river is hindered due to barriers on the various channels: a weir (SP 7582 5995), . Eel-passes could be added to one or both sluices, and / or a multi-species rock-ramp or Larinier fish pass over the weir.	Fish, MM	£40k - £100k	£2k	EA, NIA, RNRP, N’ton BC, Avon

Notes on database fields

Id	Identification code for project
Measure code	Environment Agency code identifying main objective of the projects.
Waterbody ID	Unique waterbody code
NGR	Grid reference
Description	Description of project (Note MapInfo restricts the amount of information and the description may be truncated in GIS)
Elements improved	Water Framework Directive objectives met
Est cost	Estimated capital cost
Annual Cost	Estimated annual maintenance cost
Partners	Partners involved in delivering and maintaining the project

© Crown copyright All rights reserved
Northamptonshire County Council Licence No. 100019331
© Environment Agency copyright and/or database rights 2012. All rights reserved

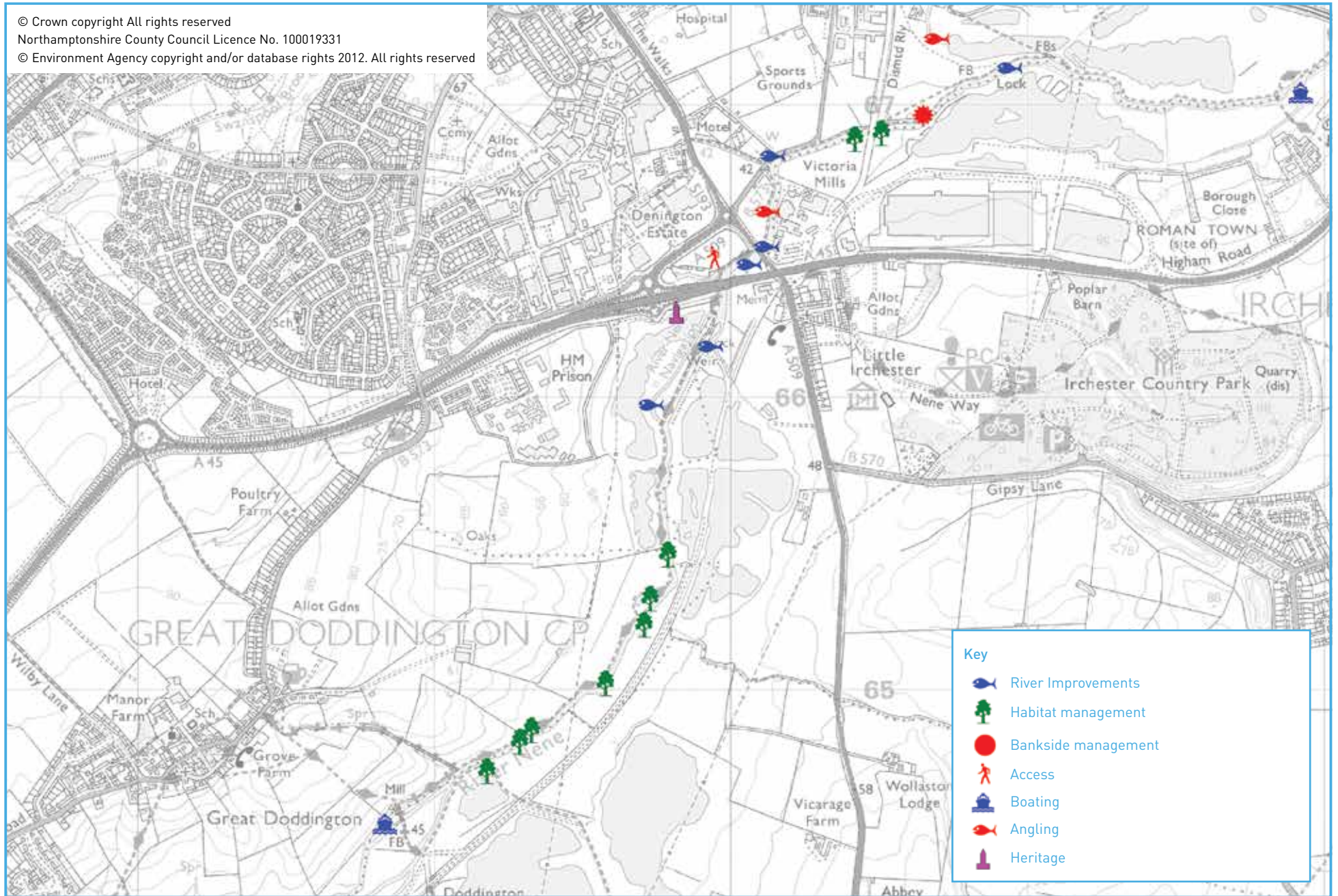


Figure 16: Example projects from the database

