# Appendices

# **Appendix 1**

# Summary of Main Legislation Relevant to Nature Conservation and Inland Waterways

### International Legislation

### Purpose

Legistation	
The Convention on Wetlands of International Importance especially Waterfowl Habitats 1971 (The Ramsar Convention)	The UK ratified the Convention in 1976. It covers all aspects of wetland conservation and their wise use. The Convention has three main 'pillars' of activity: the designation of wetlands of international importance; the promotion of the wise-use of all wetlands in the territory of each country; and international co-operation with other countries to further the wise-use of wetlands and their resources. The UK has generally chosen to underpin the designation of its Ramsar sites through prior notification of these areas as Sites of Special Scientific Interest (SSSIs) (see WCA and Nature Conservation (Scotland) Acts below). Ramsar sites have the same level of protection as that afforded under the EC Birds and Habitats Directives (see below).
The Convention on the Conservation of European Wildlife and Natural Habitats 1979 (The Bern Convention)	This Convention was ratified by the UK in 1982. The principal aims of the Convention are to ensure conservation and protection of the wild plant and animal species and their natural habitats (listed in Appendices I and II of the Convention), to increase cooperation between contracting parties, and to afford special protection to the most vulnerable or threatened species (including migratory species) (listed in Appendix 3). To implement the Bern Convention in Europe, the European Community adopted the Birds Directive in 1979 and the Habitats Directive in 1992 (see below). The Convention was implemented in UK law by the Wildlife and Countryside Act (1981, as amended) (see WCA below).
The Bonn Convention on Migratory Species of Wild Animals 1983	The Convention arose in 1972 from a recommendation by the United Nations "Man and the Environment" conference in Stockholm, and entered into force in November 1983. The UK ratified the Convention in July 1985 and it entered into force in the UK on 1 October 1985.
(The Bonn Convention or CMS)	The Bonn Convention aims to improve the status of all threatened migratory species through national action and international Agreements between the range states of particular groups of species.
	Under the Convention, the Agreement on the Conservation of European Bats (EUROBATS) entered into force on 16 January 1994, with the UK a party to it. The Agreement aims to encourage co-operation within Europe to conserve all its 37 species of bats. Parties to the Agreement agree to work through legislation, education, conservation measures and international co-operation towards the conservation of bats in Europe. Of the Parties fundamental obligations, two are most relevant for the inland waterways:
	<ul> <li>to identify sites within its jurisdiction that are important to the conservation of bats and protect these sites from damage or disturbance;</li> </ul>
	• to promote research programs relating to the conservation and management of bats.
The Convention on Biological Diversity 1992 (The Biodiversity Convention or CBD)	The Convention entered into force in December 1993 and was ratified by the UK in 1994. This is the first treaty to provide a legal framework for biodiversity conservation. In 1994, as a result of this Convention, the UK Government launched the UK Biodiversity Action Plan (UK BAP), a national strategy which identified broad activities for conservation work over the next 20 years, and established fundamental principles for future biodiversity conservation. Subsequently, Biodiversity Action Plans (BAPs) and Local Biodiversity Action Plans (LBAPs) have been prepared for species and habitats.
EC Directive 79/409/EEC on the Conservation of Wild Birds (The Birds Directive)	The Directive provides a framework for the conservation and management of, and human interactions with, wild birds in Europe. The Directive requires the identification and classification of Special Protection Areas (SPAs) for rare or vulnerable species listed in its Annex I. In the UK, the provisions of the Directive are implemented through the Wildlife & Countryside Act 1981 (as amended) and the Conservation (Natural Habitats etc.) Regulations 1994 (as amended). It is generally policy in the UK that areas classified as SPAs are first notified as Sites of Special Scientific Interest (see WCA below). These are particularly relevant to estuarine waterways (which are not covered in this guide), but also include the Broads.

### International Legislation

### Purpose

EC Directive on the Conservation of Natural Habitats and the Wild flora and Fauna 92/43/EEC (The Habitats Directive)	The main aim of the EC Habitats Directive is to promote the maintenance of biodiversity by requiring Member States to take measures to maintain or restore natural habitats and wild species at a favourable conservation status, introducing robust protection for those habitats and species of European importance (listed in Annex I and II). In applying these measures Member States are required to take account of economic, social and cultural requirements and regional and local characteristics. This is the means by which the Community meets its obligations as a signatory of the Bern Convention (see above). Each Member States is required to prepare and propose a national list of sites for evaluation in order to form a European network of Sites of Community Importance (SCIs). Once adopted, these are designated by Member States as Special Areas of Conservation (SACs). The Habitats Directive introduces for the first time for protected areas, the precautionary principle; that is that projects can only be permitted having ascertained no adverse effect on the integrity of the site. Projects may still be permitted if there are no alternatives, and there are imperative reasons of overriding public interest. In such cases compensation measures will be necessary to ensure the overall integrity of network of sites. In the UK the Directive has been transposed into national laws by means of the Conservation (Natural Habitats etc.) Regulations 1994 (as amended) (see below). Most SACs on land or freshwater areas are underpinned by notification as Sites of Special Scientific Interest (SSSIs).
EC Directive with Regards to the Prevention and Remedying of Environmental Damage 2004/35/EC (The Environmental Liability Directive)	Seeks to prevent and remediate environmental damage, particularly to habitats and species protected under EC legislation. The Directive was adopted in 2004 and is now in force.
EC Freshwater Fish Directive 78/659/EEC	Establishes categories of (i) Salmonid waters and (ii) Cyprinid waters for the classification of inland freshwaters which require protection or improvement in order to support fish life and sets environmental quality standards for these waters. The Directive is implemented in the UK through regulations.
EC Directive establishing a framework for the Community action in the field of water policy 2000/60/EC [EU Water Framework Directive or WFD]	The purpose of the Directive is to establish a framework for the protection of inland surface waters (rivers and lakes), transitional waters (estuaries), coastal waters and groundwater. It will ensure all aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems and wetlands meet 'good status' by 2015. The Directive requires Member States to establish river basin districts and for each of these a river basin management plan. The Directive envisages a cyclical process where river basin management plans are prepared, implemented and reviewed every six years. There are four distinct elements to the river basin planning cycle: characterisation and assessment of impacts on river basin districts; environmental monitoring; the setting of environmental objectives; and the design and implementation of the programme of measures needed to achieve them.
EC Directive on Environmental Impact Assessments 85/337/EEC, as amended by 97/11/EC and 2003/35/EC	The purpose of the Directive is to ensure that environmental concerns are taken into account when new developments (built, infrastructure etc, including canals) are proposed. Developments are classed as Annex I (for which an EIA must be completed) and Annex II (for which an EIA may be needed). Common practice for non-Annex I projects is now to prepare a screening paper on which a decision can be made by the relevant authorities, whether an EIA is needed. All aspects of the environment need to be considered including nature conservation, recreation and socio-economic effects. The Directive has been implemented in UK law by a number of Regulations.
EC Directive on the assessment of the effects of certain plans and programmes on the environment 2001/42/EC	This Directive requires national, regional and local authorities in Member States to carry out strategic environmental assessments (SEAs) on certain plans and programmes that they promote. It has been introduced into UK law through Statutory Instruments 2004:1633 (England), 2004:1656 (Wales) and by the Environmental Assessment (Scotland) Act 2005 (Scotland)

### National Purpose Legislation

### Nature Conservation

The Wildlife and Countryside Act (WCA) 1981 (as amended)	This Act consolidates and amends existing national legislation to implement international legislation on nature conservation (see above) and covers protection of wildlife (birds, and some animals and plants), the countryside, National Parks, and the designation of protected areas, and public rights of way. It forms the basis for habitat and species protection in the UK. Under this act, sites of particular nature conservation interest are notified as Site of Special Scientific Interest (SSSI). The WCA (and its subsequent amendments and variations to schedules) identifies species that, in the absence of a licence, are directly protected from killing and taking, or which have their habitat protected from disturbance and damage The release of non-native species into the wild is also prohibited.
The Conservation (Natural Habitats etc) Regulations 1994 (as amended)	These regulations transpose the Habitats Directive (see above) into national law, it provides for the designation and protection of 'European sites', the protection of 'European protected species', and the adaptation of planning and other controls for the protection of European Sites. Under the Regulations, competent authorities i.e. any Minister, government department, public body, or person holding public office, have a general duty, in the exercise of any of their functions, to have regard to the EC Habitats Directive. The Regulations also provide for the control of potentially damaging operations, whereby consent from the country agency may only be granted once it has been shown through appropriate assessment that the proposed operation will not adversely affect the integrity of the site. In instances where damage could occur, the appropriate Minister may, if necessary, make special nature conservation orders, prohibiting any person from carrying out the operation. However, an operation may proceed where it is or forms part of a plan or project with no alternative solutions, which must be carried out for reasons of overriding public interest.
The Countryside and Right of Way (CROW) Act 2000	This Act increases protection for Sites of Special Scientific Interest (SSSI) and strengthens wildlife enforcement legislation. IT also places a duty on UK Government Departments and the National Assembly for Wales to have regard for the conservation of biodiversity and maintain lists of species and habitats for which conservation steps should be taken or promoted, in accordance with the Convention on Biological Diversity. The Act changes WCA, amending SSSI notification procedures and providing increased powers for the protection and management of SSSIs, and strengthening the legal protection for threatened species. The provisions make certain offences 'arrestable', create a new offence of reckless disturbance, confer greater powers to police and wildlife inspectors for entering premises and obtaining wildlife tissue samples for DNA analysis, and enable heavier penalties on conviction of wildlife offences.
The Nature Conservation (Scotland) Act 2004	The Act places duties on public bodies in relation to the conservation of biodiversity, replaces the WCA and increases protection in relation to Sites of Special Scientific Interest (SSSIs), amends legislation on Nature Conservation Orders, provides for Land Management Orders for SSSIs and associated land, strengthens wildlife enforcement legislation, and requires the preparation of a Scottish Fossil Code. The Act is compliant with the provisions of the European Convention on Human Rights, requiring consultation where the rights of the individual may be affected by these measures.
Environmental Impact Assessment Regulations	Since originally introduced in 1989, a family of regulations have been introduced with different regulations applying to different sectors and in different countries of the UK. All are refinements of the basic premise that the environmental impacts of any significant development should be identified and assessed, and mitigation introduced to reduce the adverse impacts. The regulations are significant in introducing transparency and give interested parties (i.e. stakeholders) an opportunity to review proposals (i.e. stakeholders are routinely consulted).
Natural Environment and Rural Communities Act 2006	Given Royal Assent on 30th March 2006. Part 2 concerns nature conservation in the UK. It introduces a duty on every public authority to exercise its functions with due regard to conservation of biodiversity, prohibits possession of banned pesticides, regulates sales of invasive non-native species and modifies the offences in connection with SSSIs. Part 7 created IWAC from its predecessor body the Inland Waterways Amenity Advisory Council.

### National Legislation

### Pollution Control and Water Management

Purpose

Environmental Protection Act 1990	This Act and many related amendments give powerful controls over companies that produce waste. The main issue for navigation authorities is the definition of waste, and although dredged material is usually exempt, it has to be chemically analysed to obtain an exemption certificate from the Environment Agency (EA). If there are contaminants above certain levels, then the "waste" will have to go to an appropriate tip. Under the Act a Local Authority could place notice on a navigation authority if land in their ownership is found to be contaminated.
Waste Management Licensing Regulations 1994	These regulations and many amendments seek to control waste and especially the movement and disposal of waste. Waste should be securely contained in such a state as to avoid it escaping into the environment. Waste must be transferred only to an authorised site by an authorised carrier and must be accompanied by an appropriate written description (transfer note).
	Waste management licences are required for dredging tips. Competent managers as recognised by the Regulations are required for licensed sites. Exemptions are available for activities such as:
	dredging to banks;
	<ul> <li>beneficial re-use by spreading on agricultural land;</li> </ul>
	• land reclamation;
	• reuse and recycling.
	Exemptions must be registered with EA/Scottish Environment Protection Agency (SEPA) in advance of the works.
Environment Act 1995	Establishes Environment Agency and Scottish Environment Protection Agency, who assume pre-existing duties from the National Rivers Authority, River Purification Boards, Local Authorities, Waste Regulation Authorities, HMIP and HMIPI, together with specified new duties under the 1995 Act. Provides for the development of national air quality strategy for England, Wales and Scotland. Establishes a national waste strategy for Scotland, England and Wales and a system of producer responsibility for waste together with amendments of Scottish Statutory Nuisance Law and Scottish Water Pollution Legislation. Establishes the Sandford Principle for national parks.
Water Resources Act	The Acts are to protect and control the use of water resources. This covers:
1991	<ul> <li>water pollution and effluent discharge control;</li> </ul>
Water Environment	• water resource management including control of abstractions;
(Scotland) Act 2003	• flood defence.
	Canals are controlled waters, and the water quality is monitored by the EA and SEPA.
	The acts include offences of causing knowingly permitting polluting matter to enter controlled waters, including silt.
	The Water Environment and Water Services (Scotland) Act 2003 also makes provision for implementation of the EC Water Framework Directive in Scotland.

National Legislation	Purpose		
Water Act 2003	<ul> <li>This Act applies mainly to England and Wales (with some sections applying to Scotland (i.e. section 73 (Border Rivers)). There are four broad aims:</li> <li>the sustainable use of water resources;</li> <li>strengthening the voice of consumers;</li> <li>a measured increase in competition;</li> <li>the promotion of water conservation.</li> </ul>		
	Many water abstractions that before were exempt now will require Environment Agency licences or consents. Some exceptions still remain.		
The Salmon and Freshwater Fisheries Act 1975	The Act protects freshwater fisheries. Key provisions are that it is an offence to pollute any waters that are fisheries and section 30 requires a licence for the movement or introduction of fish to inland waters. NAs cannot introduce fish or spawn without prior approval of the EA.		
Salmon and Freshwater Fisheries (Scotland) Act 2003	Consolidates previous legislation relating to salmon and freshwater fisheries in Scotland and essentially make provision for offences of polluting waters containing fish.		
The Surface Waters (Fish Life) (Classification) Regulations 1997 and The Surface Waters (Fish Life) (Classification) (Scotland) Regulations 1997	These regulations implement the EC Freshwater Fish Directive. Waters classified under the Regulations require to be sampled and analysed in accordance with provisions set out in the Regulations. Specific provisions relating to sampling are covered. If the quality standard is failed for any reason, then the navigation authority may have to be involved in managing improvements.		
The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003	These regulations make provision for implementation of the EC Water Framework Directive in England and Wales.		
Land Drainage Act 1991	Gives powers to the Environment Agency, local authorities and Internal drainage Boards to manage and carry out works for flood prevention works in England and Wales. There are requirements for navigation authorities not to block or obstruct any watercourses necessary for the drainage without consent, and also NAs have a duty to keep all ditches on their property clear where they drain adjacent land. Any works in a watercourse that is registered as "main river" have to be consented by the Environment Agency.		
Flood Prevention and Land Drainage (Scotland) 1991 (and related acts)	These Acts regulate a regime for the carrying out of works to alleviate or prevent flooding and for flood warning in Scotland.		
Key information sou Countryside Council Defra (www.defra.gov	rces: for Wales (www.ccw.gov.uk) /.uk) Scottish Environment Protection Agency		

Environment Agency (www.environment-agency.gov.uk) Joint Nature Conservation Committee (www.jncc.gov.uk) Scottish Environment Protection Agency (www.sepa.org.uk) Scottish Government (www.scotland.gov.uk) Scottish Natural Heritage (www.snh.org.uk)

# **Appendix 2**

# Important Protected Species and Habitats Associated with Navigable Waterways

### Latin name

### English name Legislation/Status

### **Comment/location**

Vascular plants			
Leersia oryzoides	Cut Grass	Wildlife and Countryside Act (WCA), Biodiversity Action Plan (BAP)	Bridgwater and Taunton Canal, Basingstoke Canal.
Luronium natans	Floating Water- Plantain	Bern Convention, Habitats Directive, WCA, BAP	Significant populations in a number of canals e.g. Rochdale Canal, Montgomery canal.
Potamogeton compressus	Grass-Wrack Pondweed	ВАР	A significant proportion of the remaining UK population is located in canals e.g. Montgomery and Grantham.
Potamogeton acutifolius	Sharp Leaved Pondweed	ВАР	Mainly in south-east England.
<b>Stoneworts</b> Chara baltica	Baltic Stonewort	ВАР	Upper Thurne Broads, mainly Martham Broad.
Chara connivens	Convergent Stonewort	ВАР	Upper Thurne Broads, mainly Martham Broad.
Chara intermedia	Intermediate Stonewort	BAP	Upper Thurne Broads, mainly Martham Broad.
Nitellopsis obtusa	Starry Stonewort	ВАР	Upper Thurne Broads, mainly Martham Broad.
Invertebrates Austropotamobius pallipes	White- Clawed Crayfish	Bern Convention, Habitats Directive, WCA, BAP	Populations in a number of canals.
Bidessus minutissimus	Water Beetle	ВАР	Occurs in the Wye.
Donacia bicolora	A Reed Beetle	ВАР	Generally, Donacia bicolora is associated with branched bur-reed growing along the margins of rivers, and sometimes ponds, lakes and canals. Occurs on the River Wey navigation.
Pisidium tenuilineatum	Fine-Lined Pea Mussel	ВАР	Canals and lowland rivers north to Yorks.
Pseudanodonta complanata	Depressed River Mussel	ВАР	Occurs (at least) in the rivers Ouse, Waveney, Yare, Derwent (Yorkshire), Wye, Brue, Arun and various canals and drains.
Vertigo moulinsiana	Desmoulin's Whorl Snail	Habitats Directive, BAP	Occurs in dense reedswamp vegetation alongside watercourses and in fens. Occurs on River Kennet and in Norfolk Broads.

Latin name	English Name	Legislation/Status	Comment/location
Perileptus areolatus Bembidion testaceum Lionychus quadrillum Hydrochus nitidicollis Thinobius newberyi Meotica anglica	River Shingle Beetles	ВАР	Exposed riverine sediments, which support this species group, occurs on some navigable rivers e.g. Wye, Soar.
<b>Amphibians</b> Triturus cristatus	Great Crested Newt	Habitats Directive, WCA, BAP	Occurs in a number of canals and fenland waterways.
Fish Alosa fallax	Twaite Shad	Bern Convention, Habitats Directive	Rivers which still have spawning stocks include the Wye and Severn.
Anguilla anguilla	Eel	ВАР	Occurs widely in freshwater.
Cobitis taenia	Spined Loach	Bern Convention, Habitats Directive	Trent and Great Ouse catchments, some small rivers and drains in Lincolnshire and East Anglia and a small number of canals (Grantham, Grand Union, Trent and Mersey).
Cottus gobio	Bullhead	Habitats Directive	Study showing competition between bullhead and signal crayfish done in Great Ouse (Guan and Wiles 1997).
Lampetra fluviatilis	River Lamprey	Bern Convention, Habitats Directive	Rivers Ouse/Ure, Derwent, Dee and Wye.
Lampetra planeri	Brook Lamprey	Bern Convention, Habitats Directive	River Ouse/Ure.
Petromyzon marinus	Sea Lamprey	Bern Convention, Habitats Directive	Occurs in some navigations (e.g. Rivers Derwent, Avon, Dee, and Wye).
Salmo salar	Atlantic Salmon	Bern Convention, Habitats Directive	Occurs in navigations (e.g. Rivers Wye, Avon and Dee).
<b>Mammals</b> Arvicola terrestris	Water Vole	WCA, BAP	Occurs on canals and river navigations.
Lutra lutra	Otter	Habitats Directive, WCA, BAP	Occurs on canals and river navigations.
Neomys fodiens	Water Shrew	ВАР	Found in habitats close to water, including the banks of streams, rivers, ponds and drainage ditches, as well as reed-beds and fens.

### Latin name

### English name Legislation/Status

### **Comment/location**

Barbastella barbastellus	Barbastelle	Bonn Convention, Habitats Directive, WCA, BAP	An uncommon bat that sometimes feeds over water.
Myotis bechsteinii	Bechstein's Bat	Bonn Convention, Habitats Directive, WCA, BAP	Ancient woodland species.
Myotis daubentonii	Daubenton's Bat	Bonn Convention, Habitats Directive, WCA	Occurs throughout Britain and feeds over rivers, lakes, ponds and canals.
Myotis mystacinus/brandtii	Whiskered/Br andt's Bat	Bonn Convention, Habitats Directive, WCA	These two species, which are difficult to separate, occur widely in England, Wales. Sometimes feeds over water.
Myotis nattereri	Natterer's Bat	Bonn Convention, Habitats Directive, WCA	A scarce species found throughout Britain that sometimes feeds over water and roosts in bridges, trees, aqueducts and tunnels.
Nyctalus noctula	Noctule	Bonn Convention, Habitats Directive, WCA	A bat that occurs widely in England, Wales and south-west Scotland; sometimes feeds over water.
Pipistrellus nathusii	Nathusius' Pipistrelle	Bonn Convention, Habitats Directive, WCA	Very rare, perhaps under-recorded, bat. In southwest England found over lakes and rivers.
Pipistrellus pipistrellus	Pipistrelle 45 kHz	Bonn Convention, Habitats Directive, WCA, BAP	Common bat on canals and rivers (see Lancaster Canal case study in Appendix 5).
Pipistrellus pygmaeus	Pipistrelle 55 kHz	Bonn Convention, Habitats Directive, WCA, BAP	Common bat on canals and rivers (see Lancaster Canal case study in Appendix 5).
Plecotus auritus	Brown Long- eared Bat	WCA, BAP, Bonn Convention, Habitats Directive	Roosts in canal tunnels.
Rhinolophus ferrumequinum	Greater Horseshoe Bat	Bonn Convention, Habitats Directive, WCA, BAP	A rare species found in South-West England and South Wales that sometimes feeds over water.
Rhinolophus hipposideros	Lesser Horseshoe Bat	Bonn Convention, Habitats Directive, WCA, BAP	A rare species which occurs in Wales and the west of England that sometimes feeds over water.

Latin name	English name	Legislation/Status	Comment/location
<b>Birds</b> Alcedo atthis	Kingfisher	WCA	Widespread on canals and navigable rivers.
Habitats Hard oligo- mesotrophic waters with benthic vegetation of Chara spp.	Norfolk Broads	Habitats Directive, BAP (mesotrophic and eutrophic lakes)	The Broads is the richest area for charophytes in Britain (Stewart 1996).
Water courses with the Ranunculion fluitantis and Callitricho- Batrachion vegetation	Rivers with water crowfoot plant communities	Habitats Directive, BAP (chalk rivers)	Some navigations fall into this category (e.g. River Derwent).

### Notes on species selection

The list includes a selection of species and habitats associated with navigable waterways taken from the following:

- UK Biodiversity Action Plan Priority Species and Habitats.
- Natural habitat types and species listed in Annexes 1, 2 or 5 of the Habitats Directive.
- Species listed in the Bern Convention.
- Species listed in the Bonn Convention.
- Species listed on Schedules 5 and 8 of the Wildlife and Countryside Act 1981, and subsequent revisions.

The list includes water-dependent species and species which are associated with channel margin water-dependent habitats (e.g. reed beetles, Donacia spp., which occur on emergent macrophytes that commonly border canal or river channels). It also includes mammals such as bats which make extensive use of linear water habitats for foraging and/or shelter. The lists do not cover Red Data Book species or species with other conservation designations (e.g. identified as nationally or regionally scarce), unless they fall into one of the categories listed above.

# **Appendix 3**

# Guidance on Waterway Management for Important Species and Habitats

### **Species name**

### Relevant legislation and status

### Ecological requirements

Aquatic plants		
Floating water-plantain (Luronium natans)	Bern Convention Habitats Directive Wildlife and Countryside Act (WCA) Biodiversity Action Plan (BAP)	Floating water-plantain is found in clear-water, usually mesotrophic canals, lakes, ponds and a few slow-moving rivers, where it may need periodic dredging and/or disturbance to provide the open, bare-mud situations which it favours. Luronium grows in a number of aquatic habitats: in shallow water with floating oval leaves, in deep water with submerged rosettes of narrow leaves and on exposed mud where water levels fluctuate. The plant thrives best in open situations with a moderate degree of disturbance, where growth of competing emergent vegetation is held in check.
Grass-wrack pondweed (Potamogeton compressus)	BAP Nationally Scarce (it would be rare if not for several large canal populations)	Grass-wrack pondweed is a submerged plant species of little-polluted, still or slow flowing, calcareous, mesotrophic waterbodies, including rivers, canals, drainage ditches and lowland lakes. In canals it typically grows in clear, moderately deep water, often in aqueducts or other areas where the flow is slightly accelerated. Populations are known to be declining significantly in rivers, and canal populations are of significant importance.
Aquatic invertibrates		
A reed beetle (Donacia bicolora)	ВАР	Donacia aquatica is usually found on aquatic vegetation dominated by sedges, such as Carex acutiformis. Adults are active during May and June. The larvae feed on submerged parts of emergent vegetation.
Depressed River Mussel (Pseudanodonta complanata)	ВАР	The depressed river mussel lives in the bottom sediment of rivers near the banks. Unlike the other mussel species, it usually buries completely into the mud, and leaves its foot out to anchor itself into the substrate. It is restricted to larger rivers and various canals and drains. It may prefer rivers with high flow and high algal content. It can live for between 8 and 18 years, and may reach more than 10cm in length. Its larvae parasitise fish, probably perch and sticklebacks.
Fine-lined Pea mussel (Pisidium tenuilineatum)	BAP Red List	A little known species recorded from rivers, canals and lakes, where it favours fine silty or muddy substrates in clean hard unpolluted water.

### Threats

### Consideration in waterway restoration or operation

Canal populations may be threatened by opening little-used waterways to motorised traffic, which stirs up the mud, decreasing the light penetrating to submerged populations and may physically erode marginal populations. Its habitat in rivers has been reduced by channel-straightening, dredging and pollution, especially in the lowlands. There is also a potential threat from eutrophication due to agricultural intensification or development in the canal corridor. Paradoxically, there is also a threat from neglect of the canal system: particularly occasional dredging which helps to prevent ecological succession in which closed communities of emergent plants replace the open communities supporting floating water-plantain.	Populations of Floating Water-plantain can be maintained by (i) ensuring good water clarity in the channel and (ii) preventing overgrowth by emergent plants. Careful periodic dredging or draining to expose sediments is beneficial, especially if canals are part dredged to ensure retention of a portion of the seed bank. In the short term Luronium may get some protection from adverse conditions, such as muddy water and disturbance, within in- channel refugia (e.g. behind piling). However, these areas quickly grow over with tall emergents and their long-term sustainability, even with regular management, is unknown. The plant is successfully being conserved in on-line reserves on the Rochdale Canal (see Appendix 5). Creation of off-line refugia (e.g. Montgomery restoration ponds) may be effective where there is good water quality and periodic disturbance from dredging to create bare areas and keep the waterbodies in early to mid succession. If managed appropriately, such refugia should work in principle. However in practice, their long-term value is currently unknown.
The main threats to grass-wrack pondweed are enrichment (eutrophication) and increased turbidity in its aquatic habitats. Increases in volume of pleasure boat traffic and associated disturbance are a threat in canals as are disuse and drying out.	Channel management requirements for grass-wrack pondweed are similar to floating water-plantain: i.e. maintain clean water with good clarity in the channel and ensure periodic dredging. Off-line reserves have been created beside the Montgomery Canal for this and other species. However, their value and long-term sustainability are not yet clear.
Loss of suitable habitat due to water abstraction, disturbance of marginal vegetation and eutrophication.	Identify populations and ensure their habitat is appropriately managed, particularly in maintaining water quality and water levels.
The threats to this species are not fully known, but are likely to include water pollution and physical disturbance of river banks and channels. River management has serious consequences for mussel populations: mussels may be deposited on the river banks, where they will die; they may be moved into the mid-channel where flow may be too high and they may be washed away; they may be killed when their shells are broken; and mussels downstream of the dredging may be smothered by the extra sediment suspended during the dredging operation.	Avoid activities which could cause pollution. Recent studies of the effect of river dredging in the River Brue in Somerset found that dredging removed over 20% of the mussel population, including large numbers of the depressed river mussel, Pseudanodonta complanata. After the winter floods, very few mussels were left in the river as much of the remaining substrate had been washed away. This demonstrates how dredging operations can be catastrophic for mussel populations. This is a particular problem for the depressed river mussel, which occurs along short stretches of river at high density. If these stretches are dredged, whole populations of the depressed river mussel can be lost.
The reasons for both the rarity and recent decline are unknown, but are likely to include a decline in water quality and possibly inappropriate channel management.	From what little is known of the threats to this species, it appears to be important to maintain water quality. Other recommendations will need to await a greater understanding of its habitat requirements and the reasons for population declines.

Species name	Relevant legislation and status	Ecological requirements
Water beetle (Bidessus minutissimus)	BAP Red List	Bidessus minutissimus occurs in the lower reaches of rivers, typically in association with sand or fine gravel banks. Fine silt at edge of rivers often associated with plant roots. The life-cycle is unknown and the immature stages have not been described. In Great Britain this species is confined to the west and includes recent records from the Dee and Wye.
White-clawed Crayfish (Austropotamobius pallipes)	Bern Convention Habitats Directive WCA BAP	The white-clawed crayfish occurs in a wide range of environments (canals, streams, rivers, lakes, ponds), especially those with relatively hard water. Crayfish generally prefer hard substrates to soft, but adult crayfish may dig numerous burrows in the soft mud of banks especially in winter. Key factors associated with the presence of native crayfish are: (i) overhanging bank-side vegetation which is a key resource providing shade, food and cover (ii) steep, preferably vertical, banks (iii) overhanging trees with tree root systems projecting into the water (iv) submerged vegetation and (v) unpolluted well oxygenated water. In favourable habitat areas crayfish typically live under rocks in crevices, under logs among tree roots, algae and submerged plants. Juveniles may also be found under detritus such as leaf litter, and dead leaves may also provide an important source of food to supplement the crayfish's largely carnivorous diet.
Amphibians		
Great Crested Newt (Triturus cristatus)	BAP WCA	Although the Great Crested Newt is usually associated with pond habitats, they can also be found in standing water areas of other waterbody types including canals. Great Crested Newts need to be able to move between aquatic and terrestrial habitat. Aquatic habitat needs to provide both open and vegetated areas, minimal predation from fish and dragonfly larvae, and other amphibians and invertebrates for food. Nearby terrestrial habitat such as grassland, scrub and woodland is needed for dispersal, foraging for invertebrates and refuge including underground crevices for hibernation.
Fish		
Migratory Fish associated with navigable waterways	Various (see Appendix 2)	The ecological requirements of migratory fish include: (i) a clear migration pathway with suitable river flows, (ii) suitable clean gravel spawning areas, (iii) suitable nursery sites, and (iv) clean water.
Spined Loach	Bern Convention	Requires fine, well-oxygenated sediments for filter feeding,
(Cobitis taenia)	Habitats Directive	patchy cover of submerged land possibly emergent) plants for spawning, and sandy and silty substrate for juvenile fish to bury themselves.
Mammals		
Bats associated with navigable waterways	12 species listed under WCA are associated with navigable waterways; 5 of these are BAP species, 4 are species whose conservation requires the designation of Special Areas of Conservation. All bats are protected under the Habitats Directive (the directive's Annex IV gives a full listing).	Waterways are used by bats as sources of insect prey and as flyways. Bankside trees, bridges and tunnels are used as roosts and for hibernation. Daubentons bat is especially associated with waterways and its activities have been demonstrated to be greatest in areas with high insect activity which in turn is indicative of good water quality. It is particularly associated with slow flowing areas of rivers edged with trees and emergent vegetation.

### Threats

### Consideration in waterway restoration or operation

Current factors causing loss or decline include (i) impoundment, bank strengthening, canalisation and other forms of river regulation (ii) point source pollution of lower parts of rivers from sewage outfalls (iii) diffuse pollution resulting in algal blooms and loss of clean gravel sites in rivers (iv) intensive use by anglers, pleasure craft and other amenity use.	Ensure that the habitat requirements of this species are taken into account in relevant development policies, plans and proposals, particularly in relation to river engineering. Requires clean river gravel and is susceptible to excessive algal growth from additional nutrients (diffuse pollutants).
North American signal crayfish and some other US species, carry the highly virulent and lethal crayfish plague (the fungus Aphanomyces astaci), which has decimated populations of our native species across the UK. Where plague is not present, the three non-native crayfish species now breeding in the wild also out-compete white-clawed crayfish for food and shelter. Native crayfish populations are also damaged by pollution including biocides, silage and cattle slurry. Individuals do not tolerate high turbidity; their delicate gills are easily clogged by sediment, which causes physio-pathological changes in the long term.	Where native populations are known or suspected, it is recommended that anglers (and others using the aquatic environment) are made aware of the risks of spreading crayfish plague on equipment (spores are easily transferred by water, on fish and damp fishing equipment and mud on boots) and of the legislative controls on release of non-native species. To protect the species, maintain key habitat requirements including overhanging vegetation. Avoid work likely to lead to the destruction of refuges and banks e.g. channelisation. Where bank maintenance or other works are critical in areas where native crayfish may occur, ensure surveys are carried out at appropriate times of year to establish if a population is present. Use crayfish-friendly designs for bank reinforcement. Minimise the length of time taken for construction operations or take other precautions to prevent excessive water turbidity. Translocation of populations has often proved successful. There appears to be low genetic variability across the UK, which reduces problems associated with issues of crayfish movements and re-introductions.
The major threats to Great Crested Newt populations are loss of aquatic and terrestrial habitat, introduction of fish to previously fish-free waterbodies and chemical pollution including eutrophication.	Where Great Crested Newt populations are suspected their use of the habitat should be assessed before restoration or operational changes, or any activities which may entail disturbance of Great Crested Newt habitat.
	Further information can be found in the Great Crested Newt Conservation Handbook (Langton et al. 2001).
Threats to migration include man-made obstacles such as weirs or dams and fluctuating water levels due to water abstraction or land drainage. The long distances travelled make migratory fish vulnerable to belts of pollution	Channels should be managed to ensure access along migratory pathways, clean water and availability of suitable areas of gravels, silt or sand for spawning and nursery areas. Channelisation, siltation and variation to flow dynamics should be avoided.
Spawning gravels and nursery silts are vulnerable to destruction by channelisation, to damage from flooding associated with fluctuating water levels resulting from water abstraction or land drainage, and to smothering by algae and siltation.	NB Consideration should be taken of which species are present as there may different management needs for different species types e.g. lampreys and salmonids.
Habitat requirements mean this species is vulnerable to dredging and weed-cutting operations, but this is not well understood.	Where populations are known the potential impact of planned restoration or operation on vegetation and substrate used by the Spined Loach should be taken into account.
Loss of foraging areas because of reduction in insect prey numbers and diversity due to inappropriate management or pollution of waterways.	Waterway management should aim to maintain a structurally diverse wide corridor of bankside vegetation including open and wooded banks
Loss of habitat used for roosting or hibernation through, for example, repair work to bridges, aqueducts, tunnels and tree works, which removes gaps used for roosts. Timber treatment can be poisonous to bats.	If vegetation removal, bankside cutting or tree management is necessary it should be planned to minimise the impact on insect populations and bat flyways e.g. vegetation removal or cutting in small areas at a time, one bank per year, rotational pollarding / coppicing instead of clear-felling.
	An assessment should be made of bat use of the waterway before any restoration or operational changes are made.
	Where bats are affected by repair work on tunnels and bridges, artificial bat brick roosts should be installed as part of the repair programme.

### Species name

### Relevant legislation and status

### **Ecological requirements**

Otter (Lutra lutra)	Bern Convention Habitats Directive WCA BAP	Otters occur in a wide range of habitat. Inland populations utilise a range of running and standing freshwaters with an abundant supply of food (normally associated with high water quality). Otter ranges can be extensive (often 10-15 km stream or river length), and this is typically combined with the presence of other habitats required for foraging, breeding and resting including ditches and dykes, mature broad-leaved woodland with good understorey cover; scrub and other tall bankside vegetation, reed beds, sedge beds and willow carr; lakes, ponds and canals. Navigable canals are mainly used by otter as part of the range of wetlands they used for feeding, rather than as breeding sites. Otters feed on whatever fish are most available including stickleback, trout, roach, perch or eels. Frogs can become an important part of the diet during the breeding and hibernating seasons. Other prey include crayfish, water birds and more rarely small mammals, particularly rabbit. Otter holts are typically dug into the earth of stream, river or lake banks often in cavities among tree roots. They sometimes use piles of rock, wood or debris. The holt entrance is often below water level.
Water vole (Arvicola terrestris)	WCA BAP	Water voles are predominantly found along the densely vegetated banks of slow flowing permanent water habitats such as rivers, canals, ditches, ponds, lakes and marshes. They are herbivores, feeding on a wide variety of waterside vegetation. Surveys of canal and river sites show that water voles are strongly associated with (i) earth banks into which they can burrow, (ii) dense bank-side vegetation that comprises tall grasses, sedges, reeds and herbaceous plants, in conjunction with (iii) a steep bank profile and (iv) nearby wetlands such as ditches or ponds. Water voles typically avoid sites with dense tree and shrub cover, or banks that are trampled by cattle or reinforced by stone, wood or metal piling. However they may use banks in poor repair where there are gaps in stonework or rotten wooden piles that allow water voles access to the earth bank behind.
Birds		
Kingfisher (Alcedo atthis)	WCA	Kingfishers are usually associated with lowland still and slow flowing waters. Overhanging branches are used for perches from which they catch small fish. Nests are made in riverbanks and consist of vertical tunnels into sandy substrates.

#### Threats

The aquatic habitats of otters are vulnerable to man-made changes. Canalisation of rivers, removal of bank side vegetation, dam construction, draining of wetlands, aquaculture activities and associated man-made impacts on aquatic systems are all unfavourable to otter populations. Specific threats include (i) lack of suitable riverside lying up and holt sites, hollows in large riverside tree roots, scrub patches, reedbeds, (ii) loss of wetlands within the floodplain, (iii) lack of large undisturbed areas suitable for breeding, (iv) lack of sustainable fish stocks limiting food availability to otters, (v) accidental mortality, e.g. road casualties (vi) direct effects of watercourse contaminants, e.g. PCBs and heavy metals, particularly mercury.

Water vole populations have been in decline for many decades. A national survey in 1996-1998 showed that they had been lost from 94% of sites and had vanished from entire catchments in northeast Scotland, North Yorkshire and Oxfordshire. The reasons for this decline are complex but involve: (i) habitat loss and degradation due to river and canal engineering, bank protection and maintenance works (such as desilting and reprofiling operations) which directly damage water vole habitat and removes vegetation cover (ii) fluctuations in water levels, (iii) pollution, (iv) predation (especially by mink), or (v) indirect persecution through use of rodenticides in rat control operations. Banks can also be made unsuitable for the species by excessive trampling and poaching by heavy animals such as cattle or ponies. This is a particular problem along sections of river and canal where the banks are not protected by fences.

Lack of availability of food caused by poor water quality.

Loss of nesting habitat due to canalisation, flood alleviation schemes, damage from livestock / agricultural activity.

Damage to nest site from removal of bankside vegetation. Increased exposure of nest site due to over-abstraction resulting in increased predation of eggs and young.

#### Consideration in waterway restoration or operation

Following large declines in the last century, otters are currently expanding their range, at least in England. Unsympathetic river management and wetland drainage during the last century means that many areas remain sub-optimal for otters so there are many opportunities for enhancement. This includes, improving water quality, river habitat enhancement work to help improve fish populations and improving river corridors with tree and shrub planting schemes to create sites where otters can hide and breed. Artificial holts are not a substitute for good habitat but may help to encourage otters into an area by providing immediate extra security in otherwise poor habitat. They can often be constructed easily when other work is being done next to a watercourse. Factors that will enhance use of canals include: improving water quality (and hence fish stocks) and keeping one undisturbed natural bank to provide easy access points in and out of the water. This is particularly important in areas adjacent to small tributaries which can allow otters to move easily between watercourses. Where river or canal works or adjacent development are proposed in areas likely to be used by otters, this needs to be considered in early stages of the planning process. There are often opportunities for habitat enhancement (creation of natural river corridors for example) as part of development work. This is valuable whether otters are present in the area or not to ensure that conditions are suitable as otter populations expand in future years. In planning developments with otters in mind, particular care should be taken to avoid increases in disturbance, especially from people and dogs. For example, where new riverside paths are proposed, routes can be planned so they divert from the water's edge at intervals to provide undisturbed riverbank areas. Opening up previously un-visited stretches to angling should be avoided, as should significant increases in water-based recreational activity. New development close to waterways needs to ensure that otter resting sites are protected and that changes in traffic patterns are considered, since they may increase the risk of otters being killed whilst crossing roads.

Where water vole are known from canal and river sites, routine management operations e.g. dredging and cutting should be sensitive to their habitat requirements. Specifically: water margins dominated by reeds, sedges and stands of emergent plants together with tall grasses and herbs on the banks should be retained, and mid-channel dredging or clearance should seek to maintain a minimum of 1m reed margin on each bank. Management of the margin vegetation is best achieved through a late summer cut of the bankside vegetation. Where development or bank maintenance work is planned, watercourses should be surveyed to establish if populations are present. Damage to known vole habitats (e.g. through bank-side development, extension of moorings, bank re-profiling) must (legally) be avoided. Good practice in bank maintenance includes using appropriate natural materials for erosion control (i.e. use of willow spiling, hazel hurdles and coir fibre rolls instead of stone, brick and metal/wood piling). Pesticides should be used selectively and in accordance with codes of best practice. There are also many opportunities in canal and river management to enhance existing bank habitats for water voles. Such restoration has an important role to play because of the importance of dispersal corridors to population viability. Enhancement can include: (i) increasing vegetation abundance through sympathetic management or creation of volefriendly bank edges (e.g. use of coir fibre rolls), (ii) pollarding, coppicing and clearance of scrub overhanging the channel and (iii) work with local land mangers to enhance adjacent areas e.g. fencing from stock, creation of wetland (reedbeds, ditches, ponds etc.) and introduction of buffer strips. Targeted Mink control is suggested in the BAP as an experimental conservation tool, and should be considered where voles are under greatest threat: the preferred option is to encourage specific landowners to undertake the trapping

Management should be aimed at maintaining good water quality and conditions that ensure suitable populations of fish prey, and areas of wooded banks. Where nests occur it is important to avoid damage to banks and over-abstraction. Opportunities should be sought to create new suitable nesting areas in waterways which are otherwise suitable for Kingfishers.

# **Appendix 4**

## Consensus Building Techniques -Supporting Information

### 1. Overview

Consensus building appears to be the 'label' currently applied to a process of conflict resolution that has been used, in various forms, since the dawn of civilisation. Indeed, resolving conflicts through means other than by physical struggle could be seen as the mark of a civilised society. In more recent times, a chronology of consensus building in relation to recreational activities would probably focus more on conflicts between the rights of the public to gain access to land and water, and the rights of landowners for exclusive use of the resource. The history of the developments in this long-running struggle is explained in detail by Shoard (1999).

Bishop (1996) traces its recent origins to the USA in the 1960s, with emphasis on that country's interest in participative local democracy, and their reaction to activities of large corporations. Because of the imbalance of power, for example the ability of large corporations to appoint expert legal advisers, the emphasis was on non-adversarial forms of consensus building. Woods (undated) sets the issue of conflicts in the context of canal restoration and sees the best conflict avoidance strategy is to undertake an environmental assessment of the proposals, along with a 'do nothing' option against which it can be compared.

# 2. Consensus on management measures to reduce adverse environmental effects

## 2.1 Awareness raising in situ – information and interpretation

Communicating messages on good practice often includes raising awareness, for example through the use of signs, leaflets and information boards. Various methods can be used which work in situ, as opposed to imparting knowledge before a visit:

- talking to people when on site;
- leaflets distributed through outlets such as Tourist Information Centres, visitor centres, moorings;
- signs directional, informative, regulatory;
- entries in guide books;
- interpretation boards (perhaps with a theme as at Bugsworth Basin; see photo alongside).



(Taken from Access-Nature Conservation Good Practice Handbook, Taylor et al).

There is a wealth of literature on interpretation and no attempt has been made to review this. However, a short summary of interpretation 'ground rules' (Past Forward Ltd 1988), in relation to proposed developments in the Peak Forest Canal area, is worth highlighting:

- preserve the sense of place;
- tell the stories which are appropriate to the location;
- edit the story ruthlessly;
- remember that you are telling a story;
- personalise stories where possible;
- respect the visitors.

### 2.2 Zoning - sharing the resource (in time and in space)

One of the commonly used methods for reaching consensus over competing interests is through sharing of the resource in question, either in time and/or in space. Most typically, the sharing has been between two types of recreational interest, such as canoeists and anglers. However, the tactic has been employed when competing interests are recreation participants and those protecting nature conservation interests. The advantages of this approach are:

- sensitive areas can be protected whilst less sensitive areas continue to be used;
- recreational use can be reduced at times when wildlife is most sensitive (e.g. nesting times);
- competing recreational activities can be kept apart.

Good examples of resource sharing are use of Llandegfedd Reservoir (SportsScotland 1997) and Bassenthwaite Lake (Crowe and Mulder 2005).

### 2.3 Steering

A technique commonly used in managing public access so as to avoid conflict is "steering" (see, for example, Countryside Agency 2005; Taylor et al in prep). It works on the basic premise that most people are willing to be led along particular routes and will tend to follow clearly marked routes. So, good way marking and signage, clear route alignment and the provision of access furniture at key locations will serve to reduce straying off-route to manageable proportions. It is a technique less applicable to canal boating but may have relevance in mooring areas.

### 2.4 Presence on the ground

Research has shown that maintaining a presence 'on-theground', such as in the form or wardens, rangers and bailiffs, is likely to encourage adherence of participants to codes of good practice (e.g. Taylor et al 2005, in relation to control of dogs and based on responses from a number of managers of nature reserves). Various studies have been found that discuss the potential role for rangers and wardens for managing land-based activities (e.g. Elwyn Owen and Holdaway 2002; SNH 1997). The main point made is that rangers and wardens should not be seen as a 'police force', but as agents of increased mutual understanding between differing interests. The individuals who provide the presence can be either employed staff or volunteers.

An alternative is for voluntary agreements and self regulation. Such arrangements are generally only successful where:

- the activity is controlled by a national governing body and participation is dependent on membership (SportsScotland 1997); and
- when the rationale is clear and well justified, with specific messages and alternatives in place to allow recreational use to continue at other locations (Crowe and Mulder 2005).

The circumstances on canals may well meet these criteria, especially via the licence system.

### 2.5 Formal agreement

Where two or more parties agree to a management regime, there are benefits in drawing up a formal written agreement. Although this has some disadvantages, such as the cost of legal advice or the formality that such agreements impose, there are many advantages, including:

- the reduction of scope for misunderstanding;
- the provision for continuity in cases of change of personnel;
- imposing a level of commitment that may otherwise be lacking, or which reduces over time.

There are several examples where formal agreements have been used to enable improved recreational use simultaneously with better environmental protection:

- on North Solent NNR covering canoeing on the Beaulieu river, between English Nature and Liquid Logistics Ltd (Mark Larter, Pers Comm.);
- Broads Authority and Eastern Rivers Ski Club (Crowe and Mulder 2005).

### 2.6 Monitoring

Monitoring is an important component of consensus building as it provides feedback on the success, or otherwise, of management measures used (Taylor et al, in prep). An example provided by Crowe and Mulder (ibid) shows how monitoring at Bassenthwaite Lake has helped determine the effectiveness of zoning measures which give priority to nature conservation over recreation. Important factors to be agreed with respect to monitoring, as identified by the Best of Both Worlds (BoBW) website www.bobw.co.uk, are:

- what is to be monitored, and over what period of time (and procedures for the monitoring data be reviewed);
- who does the monitoring and using what methods;
- what are the critical thresholds;
- possible implications if critical thresholds are crossed.

It is inferred that monitoring methods would focus on ecological variable, but there may be merit, in some circumstances, in monitoring visitor/participant behaviour.

### 2.7 Step by step guide to consensus building

### Step 1: Assessing the situation

- identify the position and name of the land and/or water over which recreation is desired
- analyse the current situation at the site
  - land/water management
  - nature conservation/landscape interest
  - existing recreational use
- know where each party stands legally

### Step 2: Preparation

- establish objectives which include the most and least favourable likely outcomes
- find out about who to deal with
- do your research:
  - establish the facts of the case's history
  - understand the findings of relevant scientific research on impacts of an activity
  - collect objective data on usage of the site
- think about sharing resources not competing for them

### Step 3: Meeting and opening communications

- talk to all interested parties
- make sure dealings are with the right people and deal with them courteously
- be open and honest in all dealings
- hold some meetings on site

### Step 4: Getting down to business

- start on a positive/encouraging note
- explore each other's objectives
- list all the subjects/issues to be discussed
- don't be fazed by 'shows of strength'
- distinguish between conflicts of belief and conflicts of interest

### Step 5: Confronting conflict

- conflict sometimes cannot be avoided in achieving a long-lasting solution, so don't shy away from it
- look for areas of agreement as well as disagreement
- look for ways in which all can gain
- keep debates constructive and adjourn if they become destructive

#### Step 6: Reaching consensus

- adopt a 'can do' philosophy be positive and flexible
- only promise what you can deliver
- ask for more time if needed
- watch out for signs of agreement and build on them
- when agreement is in sight, don't let it get away
- allow for others to be consulted if necessary
- be clear who is expected to do what, and when to put the agreement into effect
- where necessary, make provision for the future of the agreement

Drawn from Best of Both Worlds website www.bobw.co.uk, which in turn was based on Kotler (1988) and Sidaway (2005)

### 3. Codes of Good Practice

3.1 Development, promotion and review process for a Code of Good Practice



Source: Scott and Annett, 2006

### 3.2 List of codes of good practice

Organisation	Codes	Web Address
British Sub-Aqua Club	The Divers' Code of Conduct	www.tolgus.com/infoandcodes/diverscodeofconduct.htm
British Surfing Association	Code of Conduct	www.britsurf.co.uk/html/code_of_conduct.asp
British Water Ski	Statement of Purpose and Environmental Commitment	www.britishwaterski.org.uk/UKSki/Portals/57ad7180-c5e7- 49f5-b282c6475cdb7ee7/Statement%20of%20Purpose%20& %20Environ%20Commitment.doc
British Water Ski	General Code of Conduct of Cable Tow Water Skiing	www.britishwaterski.org.uk/UKSki/DesktopDefault.aspx? tabid=35
British Waterways	Waterways Code	www.britishwaterways.co.uk/waterways/waterways_code/ waterways_code.html
British Waterways/ Environment Agency	The Boater's Handbook – Basic Boat-Handling and Safety	www.british-waterways.org/images/Boaters_Handbook.pdf
Environment Agency	Golden Rules for Anglers	
Inland Waterways Association	Guidance Notes	www.waterways.org.uk/library/Guidance_notes/index.htm
Marine Conservation Society	Seashore Code	www.adoptabeach.org.uk/pages/page.php?cust_id=17
Marine Conservation Society	Underwater Photographers' Code of Conduct	www.mcsuk.org
Marine Conservation Society/CCW/ English Nature	Conservation Code for Sea Anglers	www.mcsuk.org
National Angling Alliance	Code of Conduct for Coarse Anglers	www.anglersnet.co.uk/code.pdf
Pembrokeshire Coast National Park	Canoeing & Kayaking	www.pcnpa.org.uk/PCNP/live/sitefiles/related_items/canoein g_english.pdf
Pembrokeshire County Council	Pembrokeshire's Personal Water Craft and Speed Boat – Code of Practice	www.ukmarinesac.org.uk/activities/recreation/r07_05_3.htm
Royal Yachting Association	Environmental Guidance for Boat Users	
Salmon and Trout Association	Salmon and Trout Trust	www.salmon-trout.org/conservation_main.htm
Thames Water	River Thames Users Code	www.visitthames.co.uk/uploads/a_users_guide_to_the_Riverthames.pdf

### 4 Consultation techniques employed

### Rural Resources (2004)

- User questionnaires
- Group discussion
- Using maps to show who wants what and where
- Semi-structured interviews
- Organisations questionnaires
- Parishes questionnaires

### Conclusions:

- benefits were gained from investing time and effort into explaining to stakeholders what the process was about
- use appropriate skills to carry out the chosen method (not always available in-house)
- different methods are needed for different situations and types of stakeholder

### Nottinghamshire County Council (undated)

- Face to face
- Written Consultations
- Group Consultation
- Parish newsletters
- Direct Public Consultation
- In Depth Consultation

### Conclusions:

- face-to-face consultations, be they with groups or individuals, seem to elicit a more detailed response than other methods
- talking and be able to ask questions leads to a better quality of response, in a format more useful to those posing the questions
- the biggest part of the battle was getting people to come to the group consultations
- the local newsletter part of the process produced a mixed response, depending on which local residents read them in detail

### 5 Definitions of commonly used terms

Codes of Practice	A list of actions that, taken together, represent the responsible and legal way in which to undertake an activity. A code may be specific to a single recreational activity (e.g. canoeing), and possibly in a specific location or type of habitat (e.g. Marine Code for the Pembrokeshire Coast, by Wales Tourist Board et al, undated).		
Conflict resolution	The process through which differences in views between parties are removed, such as through correction of misunderstandings, improving knowledge, changing opinions, compromise and so on.		
Consensus building	A negotiation or process of decision-making aimed at recognising and respecting common interests and working together for mutual benefit (taken directly from Sidaway, 2005). It differs from "conflict resolution" as consensus building can occur without any conflict existing.		
Consultation	A process in which one party exposes its thinking, ideas and options to scrutiny by others, with a view to improving the consultors' proposals through the responses of consultees, including facilitating acceptance of the proposals.		
Engagement	Any form of contact between interested parties. This could be one-to-one discussions, public meetings, seminars/workshops and written communication. This differs from "consultation" as it usually involves contemporaneous exchange of ideas.		
Good practice	Actions that would generally be regarded as responsible behaviour. It differs from "best practice" in that good practice is what can reasonably be expected of most people.		
Participant	An individual who takes part in an activity, such as canal boating.		
Participation	A process during which individuals, groups and organisations are consulted about, or have the opportunity to, become actively involved in a project or programme of activity.		
Participatory appraisal	An approach which uses group animation to facilitate information gathering and sharing, analysis and action. Its purpose is to get development practitioners, government officials and local people to work together.		
Stakeholder	Anyone with an interest in a site/area of land, including watercourses and canals. In terms of canal boating, stakeholders will include: - canal boat users, businesses that rely on canals, environmental regulators (e.g. Scottish Environment Protection Agency, English Nature), navigation authorities (British Waterways), local residents, environmental bodies, riparian landowners and so on.		

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Please note that the organisations English Nature and the Countryside Agency, referred to below, became part of Natural England (www.naturalengland.org.uk) at its creation in October 2006.

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# Case studies





**Contributors - roles:** Geoffrey Pursglove, Ashby Canal Project Officer

Organisation(s): Leicestershire County Council (LCC) Email: ashbycanal@tiscali.co.uk or gpursglove@leics.gov.uk Website: www.leics.gov.uk and www.ashbycanaltrust.co.uk Partners: British Waterways as a consultee. Funding for the canal extension project is provided by LCC, East Midlands Development Agency, Inland Waterways Association, Community Foundation, Ashby Canal Trust, Ashby Canal Association, National Forest Company, Measham Development Trust and Ashby Canal Trust Supporters.

### Waterway description

Built in 1804, it served mainly coal mines and experienced a decline during the twentieth century due to subsidence. The top 8 miles (out of 30) were closed by 1966, with a current terminus at Snarestone. There is a new 2,100m length at Moira managed by Leicestershire County Council (LCC) and partners, which is isolated from the larger main system managed by British Waterways (BW). The BW length of canal has no locks and is essentially rural in character apart from some recent development in Hinckley. It is approximately 10m wide, 1.2 to 1.4m deep, shallow at the sides and mainly puddle clay lined. Mooring is difficult for deeper boats except at certain limited points. There is sufficient depth for loaded working boats so long as they keep to the channel. The Moira length has 1 lock (compensating for subsidence) and is situated in mainly open countryside with strong National Forest and industrial heritage influences. It is approximately 12m wide, 1.4m deep and lined with either MDPE liner, bentomat, or puddle clay.

Along the BW stretches, the canal has sedge banks, sheet piling and some wooden bank protection installed mainly to assist in reinstating the towing path in places.

Along the Moira stretch the canal has bank protection consisting of concrete walling and galvanised sheeting, along with natural banks protected by sedge and other aquatics.

Some dredging has been carried out on the BW length over last 4 years in accordance with a Natural England (NE) management agreement, estimated at a maximum depth of about 1.2m.

The main water source for the BW length is the River Swift on the Northern Oxford; its water quality is generally good with no known significant abstractions. For the Moira length, there are 2 boreholes with a total licensed abstraction of 26 cubic metres per hour. The water has a high iron content and is treated by reed bed to meet the Environment Agency discharge consent.

The canal's current use along the BW length, whose top 6 miles are a Site of Special Scientific Interest (SSSI), is for general boating, angling and passenger boats (4 at Sutton Cheney Wharf.). Along the restored Moira length the canal sees trip boats, work boats, trailable boats, some limited angling and some canoeing by local groups.

### Navigational use

Boating and other recreational activities are encouraged in accordance with BW policies and plans, such as Waterways 2025.

The objective for the Moira length is for it to be connected to the main navigable network, potentially within the next 10 years, and LCC is currently preparing an outline feasibility study to that effect.

The BW length has predominately leisure use, both private and hire, with a hire base at Stoke Golding. It also hosts a major historic working boat event at Shackerstone, has very minor freight use by narrow boat and also some canoeing.

The Moira length currently sees trip boats, limited trailable boats and some canoeing.

The 2005 boat figure movements along the BW length show that approximately 5,500 to 6,000 passed Market Bosworth; about 4,000 passed the Snarestone Tunnel portal in 2006. Boat numbers show seasonal variation, being low in the winter.

Movements along the Moira length are presently low; aiming to reach 3,000 to 4,000 boat movements a year by 2015 should it become connected to the BW system.

There are no movement restrictions on the BW length; at Moira the lock and swing bridge are padlocked and opened on request.

### Navigation restoration proposals

The Moira section has been restored to full navigable condition.

Otherwise, there is a Transport & Works Act (TWA) Order authorising the reconstruction of the 4,500m Snarestone to Measham length. LCC is in the process of raising the necessary funding and finalising the legal and planning issues; these include water abstraction matters, compliance with NE conditions, performing site investigations and an archaeological survey.

### Local navigation interest groups

Ashby Canal Trust, Ashby Canal Trust Supporters, Ashby Canal Association, Measham Canal Restoration Group, Inland Waterways Association Lichfield branch.

### Nature conservation interest

The top 6 miles are an SSSI; BW has a management agreement with NE. The SSSI has emergent aquatic vegetation, crayfish and species of damsel fly.

Along the Moira stretch banks are, where practicable, allowed to vegetate naturally so providing useful habitat, particularly on the offside.

On the Snarestone to Measham length (the subject of the TWA Order), the Gilwiskaw Brook (to be crossed by aqueduct), is an SSSI and Special Area of Conservation (SAC).

Copies of the SSSI designation for Ashby Canal and River Mease/ Gilwiskaw Brook are appended to the LCC Environmental Statement.

Specific conservation issues are turbidity, along the BW length, and bank erosion, along the Moira length, which is now largely resolved by planting of appropriate reed and sedge species.

### Local wildlife interest groups

Leicestershire and Rutland Wildlife Trust.

# Relationship between navigation and nature conservation interests

BW has a management agreement with NE.

NE requires LCC to provide off-line reserves, where practicable, on the BW length to compensate for any potential increase in traffic due to restoration.

Local waterway groups support wildlife protection measures that are not at the expense of navigation; the only real uncertainty is what, if any, increase in boat traffic on an additional 4,500m of canal will generate and how this would affect aquatic wildlife.

### Management actions or proposals

On the BW length, trees were felled over a few hundred metres north of Shackerstone to get more light into the canal and encourage weed growth.

From Snarestone to Measham, offside planting areas are incorporated in the restoration design.

Along the Moira length, bankside aquatic growth is encouraged. Experimenting with coir matting and coils showed coir coils to be satisfactory by allowing the establishment of aquatics and also preventing erosion. This method will be used where appropriate on the Snarestone to Measham length.

### **Good practice lessons**

A consensus building approach is done mainly through meetings, to ensure agreement is reached.

This is a lengthy process, given the differing agendas of the key stakeholders, e.g. NE and the SSSIs, BW in ensuring navigation and Leics County Council wishing to restore stretches of the canal with no SSSI on it, but affected by it.

Communication and consultation is important, taking care that talks and meetings do not result in excessive investigations and surveys which slow down the actual planned restoration.

### Sources of further information

Leicestershire County Council Environmental Statement, Vols 1 and 2.

# Case study 2 The Broads



Contributors - roles: Andrea Kelly, Conservation Officer (Waterways strategy) Organisation(s): Broads Authority Email: Andrea.Kelly@broads-authority.gov.uk Website: www.broads-authority.gov.uk Partners: A wide range of partners and stakeholders are involved in managing the Broads wetland. Some are represented at the Broads Authority consultative committee (the 'Broads Forum') which includes representation from the following areas: boating/water based recreation, commercial boating, land based recreation, angling, tourism, farming/landowning, environmental protection, conservation, drainage/flood prevention, cultural heritage/landscape, local charities and other societies such as the Broads Society which is a campaigning and volunteer organisation aiming to promote the future well-being of the area.

### Waterway description

The area known as the Broads is located in Norfolk and Suffolk in the east of England. It extends over the lower valleys of the Rivers Waveney, Yare and Bure, together with the two tributaries of the Bure (the Ant and the Thurne) and the tributaries of the River Yare. The nature of the low-lying land in these valleys is diverse. The wetland habitat includes rivers, streams, dykes and the open water of the broads (shallow lakes), fens and carr woodland. The Broads area covers some 30,000ha. There are around 63 broads, which range in size from tiny isolated lakes to the huge expanse of water like Hickling Broad (120ha). The majority of the Broads are tidal, but only the lower reaches are saline/brackish.

The shallow lakes known as the broads were created as a result of peat digging (turf cutting) from the 12th to 14th century. Throughout the history of the region, the waterways linking the broads were essential for communication and commerce. Commercial cargo traffic was at its heights in the Broads in the 19th century. Changes in economic conditions and the development of the railway system were the main factors which brought about a gradual shift away from commerce and trade to recreation and pleasure in the region. The 20th century brought an explosion in commerce based on recreation, helped by the development of the railway system in Norfolk which brought many visitors to the region. The recognition of alarming environmental degradation in the late 1960s led to the creation of the Norfolk and Suffolk Broads Authority through an Act of Parliament in 1988. The organisation began operating in 1989 and is responsible for conserving and enhancing the natural beauty of the Broads, promoting their enjoyment by the public and protecting the interests of navigation.

The potential for recreation in the Broads is immense and includes sailing, motor-boating, rowing, canoeing, fishing and bird watching. With more than 2 million visitors a year, the area needs sensitive management for nature conservation and amenity use to coexist successfully.

The majority of the Broads area is below high tide level and defended by river embankments. Climate change and the potential for sea level rise is therefore a big issue in the Broads, which will shape future policy development and management decisions, particularly with respect to the cost and practicality of maintaining sea defences. Important issues in the Broads are nutrient enrichment, with the resultant loss of species and habitats, and sediment accumulation. This is mainly due to treated sewage effluent inputs and agricultural practices in the upper part of the river catchments, although half of the siltation that occurs is due to bank erosion partly caused by boat wash. In order to maintain navigation, an intensive dredging programme is required which has a huge cost implication. The Broads Authority, as part of its Sediment Management Strategy, is working with the Catchment Sensitive Farming Initiative to try and minimise silt input from agricultural fields in the upper catchment.

### Navigational use

The Broads have some 200km of lock-free navigable waterways and 400ha of navigable waters on 17 broads (two of which are restricted to summer navigation), with navigable links to the sea via Great Yarmouth and via Mutford Lock at Lowestoft. The maximum depth of the navigable rivers is 6m in small parts of the Port area, but most are much shallower. For the broads the mean depth is around 1.5m. All broads are privately owned, and some have boat access restrictions or prohibition, although around 75% of the water space is navigable. Some areas within the Upper Thurne are voluntary exclusion zones to protect wintering wild birds; these are usually well respected by boaters. The Broads Authority provides a free mooring network where boats can stay for 24 hours. Moorings can also be found at public houses and boatyards. Scheduled works to river navigations are posted on their website.

A total of 13,000 recreational vessels are registered in the Broads, including private and hire boats. The majority (about 75%) are motorised vessels but there is also much sailing activity. There is a wide range of navigation related activities on the Broads including sailing schools and regattas, power boat racing (Oulton Broad) and water skiing on designated sections of rivers. There is also a large hire boat industry which caters for holiday-makers. The majority of visitors come to the Broads in the summer and holiday seasons.

The Broads Authority works with the Green Blue initiative to encourage environmental friendly boating and some of the Broads' boatyards are at the forefront of development and design of sustainable boating (e.g. new wash down collection systems and the EcoBoat project). In total, there are about 20 electric boats for hire on the Broads; the Broads Authority provides a network of charging points throughout the waterway network.

### Navigation restoration proposals

The main rivers and majority of the broads are open to navigation. The recent opening of Whitlingham Broads provides new water space near Norwich. In addition, a proposal to create a new broad for Great Yarmouth is receiving considerable local support.

There are proposals for the restoration of some linked navigations, particularly the North Walsham and Dilham Canal, which linked the River Ant to Swafield and Antingham Ponds via 6 locks. The East Anglian Waterways Association (EAWA) has recently organised volunteer working parties to undertake restoration work on the canal. Other derelict navigation works include 5 locks on the River Bure, between Coltishall and Aylesham, and 3 locks on the River Waveney, between Geldeston and Bungay. The examination of opportunities for extending navigation on all three of these waterways is included in the Broads Authority's Action Plan.

### Local navigation interest groups

EAWA, the Broads Society, Norfolk and Suffolk Boating Association, Broads Hire Boat Federation.

### **Nature conservation interest**

The Broads are one of Europe's finest and most important wetlands for nature conservation. Under national legislation, there are 28 sites designated as Sites of Special Scientific Interest (SSSIs), and many of these are also National and Local Nature Reserves (NNR and LNR). Virtually all the SSSI network is also designated as Special Areas of Conservation (SACs) under the Habitats Directive or Special Protection Areas (SPAs) under the Birds Directive and as a Ramsar site of international importance. The Broads are renowned for their high biological diversity and the presence of many rare species of wetland birds such as the bittern, teal and widgeon.

Both ecological and chemical monitoring is carried out in the Broads. Biological monitoring includes annual surveys of aquatic plants around 24 broads. Wetland plants are a good indicator of freshwater ecosystem health and this program has shown slow recovery of the broads since their decline 30-40 years ago. From an ecological perspective, the Broads system as a whole is not stable and is affected by a wide range of factors. There are a number of issues linking nature conservation and navigation:

- The number of motor boats on the Broads has created problems in the fragile Broads environment. Boat wash has damaged river banks and mobilises silt, producing cloudy water. This silt gathers at the bottom of the waterways, increasing the need for dredging if the waterways are to remain navigable.
- Restoration projects aimed at improving navigation and water quality on some broads, for example projects on Barton and Hickling Broads, have stimulated aquatic plant growth which can interfere with navigation. To prevent some of the past conflicts between various interests, wide consultation and information dissemination has been carried out. Water Space Management Plans have also been prepared, which zone the waterway according to use and allow a suitable macrophyte cutting regime to be developed taking into account the needs of various stakeholders.
- The application of antifouling paint is necessary for sea going boats and fast sailing. Toxic compounds used in the past and now banned, e.g. Tri-Butyl Tin, have contributed towards the past ecological decline of the waterways. Alternatives and their use are now being trialled and monitored. The Broads Authority and the Green Blue initiative have produced a leaflet and poster to raise the awareness of boat owners and boatyards on this issue.

### Local wildlife interest groups

Norfolk Wildlife Trust, Suffolk Wildlife Trust, the Broads Society.

## Relationship between navigation and nature conservation interests

There is a big focus on conservation in the Broads, coupled with a decline in tourism over the past 10 years or so. Overall, there is a growing awareness that the Broads experience needs to be sustainable and that environmentally friendly holidays are more satisfying for customers, and consequently for the local economy. The relationship between boaters and nature conservation interests can be affected when it leads to restrictions or hindrance to navigation, for example on Barton Broad.

On most issues the Broads Authority has a good working relationship with the various stakeholders. Its Waterways Directorate facilitates close working of officers on joint issues. Its strategy for the management of aquatic plants is to try and identify problems before they occur, so that solutions can be identified in advance and rapidly implemented should those problems occur.

### Management actions or proposals

The maintenance of navigation is a big issue. The Broads Authority has prepared a Sediment Management Strategy with a range of stakeholders, which aims to look at the source as well as the settlement and removal of sediment. The Waterway Specifications for navigation have been designed by boaters and have been posted on a local boating society website for wider consultation in the boating community.

Under the Norfolk and Suffolk Broads Act (1988), the Broads Authority is required to produce a Broads Plan and review it at least once every five years. The Broads Plan 2004 sets out a vision and long-term 20-year aims for the future of the Broads. It also specifies short-term priority objectives towards addressing these aims in the next five years, which are supported by an Action Plan. A wide range of organisations are involved in drawing up and implementing the plan and many others are consulted. The effectiveness of the Action Plan is monitored using a set of indicators to assess progress. It is planned to establish a small representative panel of partner organisations and other key stakeholders to assist the Authority in overseeing the monitoring and assessment of the implementation of the Broads Plan and Action Plan. There are four main themes to both plans: Living Landscape, Water, Habitats and Wildlife, Tourism and Recreation, and Understanding the Broads.

The aims of the Broads Plan are to maintain and enhance water quality and biodiversity along with promoting tourism and recreation in a sustainable manner. These aims are to be achieved through a comprehensive program of research, monitoring and practical actions as set out in the Action Plan and which cover both nature conservation and navigation. For example, they include:

- review and analyse water quality and ecological data from the last 20 years;
- identify sustainable levels of boat traffic;
- develop management strategies for controlling invasive alien organisms;
- maintain and expand navigation through a dredging program;
- promote the design and use of environmentally friendly craft;
- promote boat etiquette to improve safety and reduce environmental impacts;
- use soft engineering solutions, where practicable, to protect banks from erosion;
- sustainably manage aquatic plants;
- encourage stakeholder and community participation.

### Good practice lessons

Consultation via the Broads Forum and Broads Tourism Forum was judged by the Beacon Council Awards judges to be "innovative and appropriate" and the involvement in the process of the boat hire industry and other commercial businesses "impressive".

Early consultation with stakeholders before any action is taken is essential to minimise conflict.

Making time and resources available for the development of a management plan with genuine involvement of all stakeholder groups, to achieve maximum buy-in from interested parties, yields benefits in the long term. Considerable efforts were made to ensure that the process was transparent, participatory and inclusive from the outset. The process was designed to bring together a wide range of organisations and individuals, create a common purpose and collective responsibility for the future of the Broads, generate consensus around a set of objectives based on a shared vision for the future of the Broads and to engender a strong sense of ownership among organisations.

Sources of further information Broads Authority website www.broads-authority.gov.uk

Broads Society website www.broads-society.org.uk/index-2.html

The Green Blue Initiative website www.thegreenblue.org.uk/practicalprojects/index.asp





Contributors - roles: Charlie David, Public Space Manager Organisation(s): North Cornwall District Council (NCDC) Email: charlie.david@ncdc.gov.uk Website: www.ncdc.gov.uk **Partners:** Local interest groups, landowners, Devon and Cornwall County Councils, Environment Agency, South West Lakes Trust, Local Community Groups.

### Waterway description

The Bude Canal was built in the 1820s to take sea sand, primarily, into the agricultural hinterland. Use ceased by 1900. Barges were used on the first section and tub boats operated on the three inland arms of the canal.

The length was 57km in total, comprising the main line from Bude to Blagdon Moor Wharf, near Holsworthy, with a branch from Red Post to Druxton Wharf, near Launceston, and a feeder arm from the newly constructed Tamar Lake (now Lower Tamar Lake). The canal was unusual in that it was constructed for agricultural purposes: the transporting of lime rich sand for the improving of soil. The canal engineer James Green and Thomas Sheaton, a surveyor, concluded that because of rising land and a poor supply of water most of the ascents would be by inclined planes, which were cheaper to construct, saved water and were quicker to use than a flight of locks.

The canal for the first 2 miles was a barge canal, 11.4m wide at water level with a depth of 1.4m, accommodating vessels of 40-50 tons. A sea lock and breakwater were constructed to allow sailing vessels of 70-100 tons to be admitted to the basin. The course of the River Neet was changed from discharging along the northern edge of Summerleaze Beach to its present course, to create a channel to give depth for manoeuvring vessels.

Further inland the canal was narrower, 3m wide at water level and 1m in depth, using tub boats which had wheels to traverse the inclined planes in trains, towed by a continuous chain. Inclined planes at Marhamchurch, Venn, Merrifield, Tamerton and Werrington derived power from underground waterwheels at the head of the plane. The largest plane at Thurlibeer, now called Hobbacott Down, which was 285m long and raised the level of the canal 69m, used water power in the form of counter-balancing 'buckets of water' (cysterns) in 2 wells of 69m depth. Each 'bucket', holding 15 tons of water, would rise and fall in the well. A valve on the bottom of the 'bucket' released the water which returned to the canal.

The canal banks have stone revetment at the Lower Wharf, inland of which their construction comprises earth banks with puddle clay lining. Part was dredged in 1995, otherwise no dredging has taken place since the 1970s. The sea lock gates were restored in 2000 and consolidation has been undertaken of the sea lock walls damaged in 1996 by storms.

Water supply is from the Rivers Neet and Strat which converge at Helebridge. At this point there is a weir; this is overtopped at times of high flow water to supply the river Neet which then continues down to Summerleaze beach in Bude, adjacent to the canal. In times of low flow, no water overtops the weir and the paddle in the weir allows water to pass into the river. There is a concern about low flows. The canal also leaks, supplying water into a Local Nature Reserve (LNR), significantly enhancing its reed bed habitat. The Environment Agency (EA) has required NCDC to apply for, and has subsequently provided, an abstraction licence to enable there to be a better share of the water resource at times of low flow. NCDC is working on a methodology to monitor and adjust flows.

Blue green algae has also occurred in both the canal and the river, giving rise to health and safety concerns and highlighting the need to consider water flows.

The canal is now used for leisure boating, outdoor activity training, angling and nature conservation.

### Navigational use

Currently the main navigation use of the canal is by recreational boats including canoes, dragon boats and kayaks, for water sports/training, and small rowing boats, for general recreational use. The harbour (Lower Wharf) is also used for visiting vessels of varying sizes and by local boatmen when bringing their boats out of the seaward harbour in times of bad weather, for repairs or during the winter. It is also proposed to provide for small electrically powered craft for trips up the canal.

For the first 1km from the sea lock gates, the use by water sport trainees and by recreation rowing boats is intense in the summer. There is an issue with the adjacent river which was once used as a boating area; a weir retained a navigable depth of water at all states of the tide as the natural river is tidal. Now, for various reasons, the weir is kept down and the users of the river have transferred to the canal.

NCDC has had a carrying capacity study done to enable it to understand the opportunities for managing current and future demand. There is a licensing policy in place for commercial users. There are currently no other restrictions, but this is likely to change.

Principal issues to be addressed include the level of use and resulting noise, low water flows in the summer and derelict locks on the barge canal preventing use of the canal further inland.

### **Navigation restoration proposals**

The Bude Canal is subject to a comprehensive restoration proposal, mainly focussing on restoring navigation along the barge canal length. This includes dredging, repairs to the lining, the restoration of two sets of locks, possibly installing a lift bridge, reconnecting the end of the canal close to its historic end point at the Helebridge wharf, improvements to physical and intellectual access and the development of a training and marketing strategy.

Technical feasibility studies have been undertaken and a Conservation Plan prepared, some funded through a Heritage Lottery Fund (HLF) grant. The project has now been awarded a Phase 2 pass by the HLF and grants have been forthcoming from Europe, through the Objective 1 programme, and from the South West Regional Development Agency. The £4.3m project is now well underway and due to be completed in December 2008.

### Local navigation interest groups

Bude Canal and Harbour Society, Bude Canal Trust (owners of the Bude Aqueduct part of the canal system).

### Nature conservation interest

The objective is to maintain and, where possible, enhance the nature conservation interest of the canal. These objectives have been articulated within the Conservation Plan and the bid documentation.

The Canal passes through a LNR, closely associated with the canal, a Site of Special Scientific Interest (SSSI) and a national nature reserve. Protected species associated with the canal include the otter and marsh fritillaries, which are also Biodiversity Action Plan (BAP) priority species. The Culm grasslands, a BAP priority habitat, adjoin the canal. Some structures are important as bat roosting sites and the canal is known as a feeding site for bat species.

No biological monitoring is routinely undertaken. Water quality is tested regularly close to the side weir allowing water to discharge into the river and thence onto the adjacent beach. Full details and data can be obtained from the NCDC Environmental Health Section.

Water quality has become an issue with the appearance of blue green algae, not a direct nature conservation concern in its own right but probably indicative that the aquatic environment is stressed. Management of the seepage from the canal into the adjacent LNR is critical in that this water makes the LNR habitat special, but this has to be balanced against water requirements of the canal and river.

There is also a perceived issue over potential disturbance to the wildlife if the canal becomes used more intensively. This is something that needs to be addressed.

There has probably been no change in chemical water quality over the last 10-20 years. Agricultural run off is likely to have enriched the water nutrient levels in the past when farming was locally more intensive, but agriculture is becoming more extensive, which is likely to reduce nutrient rich run off. There are no known sources of other contaminants.

Recreational use is seen as a pressure on nature conservation interests but mitigation measures are planned, such as the creation of new ponds and wetland areas.

### Local wildlife interest groups

Cornwall Wildlife Trust, Devon Wildlife Trust, Environment Agency, Bude Marshes Management Committee.

### Relationship between navigation and nature conservation interests

The Bude Canal Regeneration Partnership embraces all interests. The Environment Agency provides nature conservation input, as does NCDC's Coast and Countryside Service.

The Bude Canal Regeneration Partnership began in 1997. It meets regularly; all interests have been involved in developing the regeneration plan and have been able to comment on the various proposal documents that have been developed, including the Conservation Plan and the Feasibility studies. The waterway management has a high regard to nature conservation. However, there is a perception that additional navigation activity may increase disturbance to wildlife.

As they are integral partners to the development of the project, the nature conservation interests are well known and addressed. There appears to be no conflict at this time. Most issues are well covered through the detailed feasibility work already undertaken in advance of the possible implementation of the canal restoration project.

### Management actions or proposals

The Bude Canal Conservation Plan aims to balance recreational and nature conservation interests. All regeneration proposals have been undertaken in light of this plan.

The assessments of technical measures for minimising adverse effects have been incorporated into contract specifications. The development of appropriate mitigation measures to counteract potential adverse effects on nature conservation is important in that there is a duty of NCDC to demonstrate that nature conservation has due regard paid to it during the development and implementation phase.

The Bude Canal Regeneration Partnership is a major vehicle for consensus building, as is the consultation process which has engaged with the local community and the various interest groups. The effectiveness of these approaches is currently being analysed. NCDC believes that the approach taken has been open, transparent and, as all of the community has had an opportunity to engage, successful. It believes that the approach used has been successful in avoiding or resolving conflict. The development of the canal regeneration project has taken so long and involved so many people that, realistically, NCDC feels little more could have been done to encourage more involvement and contact with users of the canal and the local community in building a consensus approach.

The fact that the project has been awarded a stage two pass from the HLF suggests to NCDC that its approach to the project and the management of the canal is satisfactory, when measured against the HLF criteria, which are probably quite useful guidelines.

### **Good practice lessons**

### 1) Bude Canal Users' Forum

A number of years ago there was a Bude Canal Users Committee which met at least once a year in order to discuss matters relevant to the canal. This group consisted of riparian owners, boat users, walkers, parish and town councils, as well as elected members of the District Council. When the committee structures changed a few years ago, the Council decided to do away with sub committees and chose to go to cabinet style management. Consequently this forum disappeared at the very time that the canal regeneration project started.

NCDC has now resurrected the user group as the Bude Canal Users' Forum, the chairman of which now sits on the Partnership. The Forum meets at least twice a year and sub (special issue) groups meet as and when required to discuss specific issues.

### 2) Bude Canal Regeneration Partnership

The development of the regeneration project has taken a long time. A Partnership was developed to take the project forward. This Partnership, particularly as the time has been so long, has required considerable management and encouragement. There are probably lessons to be learnt about how to manage expectations within a Partnership, knowing now that project development can take many years.

### 3) General consultation process

Much of what is described above is centred upon local consultation. Where the canal is seen as an important local asset there can never be enough local engagement. The resources required for demonstrable consultation should not be underestimated. At the start of any project, or indeed when introducing a new management regime, preparing a consultation strategy which identifies how local people and the various statutory and non statutory bodies can be kept involved, is strongly recommended. The strategy needs to be realistic about the resources required, which may be considerable.

### Sources of further information

Please see the web page on www.ncdc.gov.uk (use the search facility to search for Bude Canal).

# **Forth and Clyde Canal**



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### Waterway description

Built 1768-1790 as a ship canal linking east and west coasts of Scotland, the Forth and Clyde became an important transport route for goods (agricultural, industrial including coal, wood, quarried stone and sand) and people (up to 200,000 a year).

It spawned the development of numerous industries along its length including shipbuilding, foundries, iron works, engineering plants, distilleries, chemical works and factories (glass, dye). Navigation rights were extinguished on 1 January 1963. Through navigation was re-established via the Millennium Link project in 1999-2001, which involved the provision of 25 new fixed and 12 opening bridges, dredging 150,000t of sediment and dumped items, building 1km of new canal channel, the renovation of 32 locks, building 6 new locks (including the first drop lock in the world at Dalmuir) and upgrading 55km of canal towpath. The link with the Union Canal via the Falkirk Wheel boat lift was opened in 2002. This is a man-made canal: 18.0m wide at the top and 1.8m deep with 39 locks which are mostly 20.9m x 6.0m, but the sea locks at Bowling and the Carron and Dalmuir Drop Lock are larger. The summit pound is 26km long at 47.5m AOD. It is principally clay lined in cutting or earth embankment. Some areas are also as dug or lined with concrete or bentonite clay matting. 70% of the bank is protected, using various methods: vertical stone walls 24%, stone pitching 10%, wooden piles 20%, concrete 10%, sheet piling 2%, trench sheet piling 3% and gabion baskets 1%. Where walls have collapsed, and along most embankments, there is substantial development of emergent vegetation fringes estimated to be around 65% of the canal's length.

The Millennium Link dredging project removed 150,000t of contaminated sediment and larger items including cars, furniture and shopping trolleys to provide a channel 6m wide and mainly 1.8m deep. In some areas wall to wall dredging was undertaken to allow for boat mooring. A wide range of sediment contaminants was encountered on the canal as a result of the industrial past, with high levels in some locations. The disposal of dredged material is a key management issue due to Waste Management Licensing requirements and the recent EU Landfill Directive. Since 2001, major works have included further repairs and a new link between Port Dundas and Spiers Wharf, completed in October 2006, which includes a new basin, a new fixed bridge and two new locks.

Hillend Reservoir, Lilly Loch and Black Loch feed into the western end via the North Calder Water and the Monkland Canal (some of which is piped). Two further reservoirs, Birkenburn and Townhead, supply water to the summit near Kilsyth. The side-long catchment also provides some water supply. The whole supply system can support flows of up to 35M litres per day, average flow velocities within the canal are less than 0.1 metres per second.

Canal water quality ranges from Class A2 (Good) to Class C (Poor) (2001 statistics - Scottish River Classification Scheme). The main contributor to the poor classifications is the low level of dissolved oxygen associated with slow flows, high weed growth and organic enrichment. There are very localised impacts of discharges, for example from septic tanks, and very occasionally small algal blooms have been reported.

The canal's uses include boating (powered and unpowered), angling (coarse), environmental and built heritage education, nature conservation, bird/general wildlife watching, practical conservation, limited freight carriage, water supply and drainage.

### Navigational use

Navigational objectives are to provide safe navigation for inland and transit vessels and, through bringing 'life to the water', stimulate regeneration and economic growth in the area. British Waterways Scotland (BWS) is endeavouring to deliver 1.8m water draught, 3.05m air draught, 19.2m length and 5.94m beam to suit the use of both transit and mixed inland craft, including cabin cruisers, narrow boats, trip boats, de-masted yachts, canoes and freight vessels. The main boating season is April to October. There were 165 long term moored boats, 12,000 lockages and 125 transit passages by yachts and motor boats in 2005. There are localised closures for engineering works in the winter months. There are tidal restrictions to entry at the sea locks at Bowling and River Carron; boats are encouraged to travel together through locks to save water where possible. Boats are escorted through locks by BWS staff.

At the moment the number of boats transiting the canal is relatively small and the market is developing since the re-opening in 2001. There have been some very localised problems where anglers have complained about boats passing too close to angling equipment or free clumps of aquatic vegetation hampering their sport. A small number of boaters have formally complained about the aquatic weeds/sediment/objects hampering movement in some areas.

### **Navigation restoration proposals**

The main line of the Canal was restored in 2001; the new link between the Glasgow Branch at Spier's Wharf and Port Dundas occurred in October 2006.

### **Local navigation interest groups** Forth & Clyde Canal Society.

### Nature conservation interest

Nature conservation objectives are defined in the BW web based Biodiversity Action Plan for the Lowland Canals as:

- improve our knowledge of the distribution and abundance of our key species;
- manage the waterway environment to reduce and mitigate the threats to habitats and key species;
- develop a greater awareness amongst colleagues, partners and visitors of key species and their conservation requirements;
- effective management of invasive species;
- improved management of key habitats to maintain and increase biodiversity value;
- develop a greater awareness amongst colleagues, partners and visitors of key habitats and their conservation requirements;
- develop and establish partnerships to benefit biodiversity;
- where appropriate create new areas of key habitat in line with country and national BAP objectives.

There are Sites Of Special Scientific Interest (SSSIs) adjacent to some reservoirs and the linked estuaries of the Forth and Clyde are SSSIs and Special Protection Areas (SPAs). Possil Marsh SSSI is adjacent to the canal and includes open water habitat but does not include the navigable channel.

The canal supports the water vole, otter, Daubenton's bat, common toad, common frog, palmate newt and smooth newt, as well as nationally scarce pondweeds Potamogeton friesii and P. trichoides. Other species of interest include Nuphar x spenneriana (a water lily), Alisma lanceolata, Potamogeton x bennettii (endemic to the canal), Bdellocephala punctata (a triclad), Alona weltneri (a cladoceran) and Piscicola geometra (fish leech).

Potential and developing problems include: invasive species out-competing and threatening native species (e.g. Japanese knotweed, Himalyan balsam, water fern, Canadian and Nuttall's pondweeds, ruffe and mink); diffuse pollution from adjacent land contributing to the occurrence of filamentous algal growth and of blue green algal blooms; shading from tall urban developments; boat movements resulting in localised increased water turbidity; disturbance of waterfowl by boat traffic and increased bank erosion. In some areas formal walls have collapsed creating soft embankments of high nature conservation value.

The perceived ecological quality trends are both positive and negative. Water quality has improved with the removal of contamination and increased water flows. Water voles have declined due to predation by mink, despite the presence of suitable habitat. The incidence of duckweed/water fern has decreased as the obstructions to water flow have been removed. There are some anecdotal reports of waterfowl numbers decreasing in the Glasgow area. This trend has not been reported elsewhere.

### Local wildlife interest groups

Scottish Wildlife Trust, Scottish Natural Heritage, Biodiversity Action Plan steering groups of the local authorities through which the canal passes, Scottish Federation for Coarse Angling and Lowland Canals Angling Partnership.

## Relationship between navigation and nature conservation interests

The nature conservation value of the Canal is recognised. In general the low traffic intensity is not seen to have a nature conservation impact on the greater part of the Canal and nature conservation interests are not seen as a threat to navigation.

Problems have been reported of aquatic vegetation causing a navigation hazard and interfering with angling. BWS has addressed these concerns successfully by implementing an aquatic weed management strategy to keep the centre 6m of the canal channel open. However, Glasgow City Council and others are concerned about the effects of aquatic plant management and about disturbance of waterfowl by boat traffic. BWS' management approach aims to balance its navigation and nature conservation duties and this is communicated regularly in presentations to user groups.

BWS liaises with local Scottish Natural Heritage officers regarding works on SSSIs along the canal and is aiming to agree on a management plan for Dullatur Marsh SSSI. This will aim also to meet Water Framework Directive requirements in protected sites.

Long term biological monitoring will assist in developing methods for measuring nature conservation value and identifying any links to particular management techniques.

The impact of invasive species, including disease causing agents, on the ecology of the canal is difficult to predict.

### Management actions or proposals

In 1995, the Forth & Clyde Canal Joint Advisory Committee produced the Lowland Canals Sustainable Development Strategy, Forth & Clyde Canal Nature Conservation Strategy and Scottish Natural Heritage produced a draft Strategy for the Millennium Link in 2000.

The Scottish Canals Development Group has proposed the development of 'A strategy for enhancing and protecting the Environment of Scotland's Historic Canals' and Glasgow City Council is preparing Canal Development Planning guidance to address the competing issues of adjacent land development, maintaining navigation and furthering the cause of biodiversity.

Technical measures used to support both navigation and nature conservation include: boat speed limits and boat safety scheme requirements help to reduce direct impacts on the nature conservation interest; boats carrying spill kits to deal with oil pollution incidents; canal profiles to promote emergent vegetation growth; soft bank details (support matrix included rip-rap, coir matting, coir rolls and man-made mesh alternatives), with native planting using plants from elsewhere on the canal; positioning of pontoons to allow for the development of emergent vegetation fringe between them and the embankment; the management of invasive emergent and aquatic vegetation, to maintain the full range of habitats from open water to hedgerow.

Measures taken to improve communication with users and others have involved: regular meetings with the Scottish Government; establishment of the Highland and Lowland Canal groups; public meetings for specific projects; talks and presentations to groups/societies/ schools; public notices on the canal bank and in newspapers, 'The Link' (regular Millennium Link project magazine); direct bank staff contact with customers; BWS led user group meetings; one to one meetings with customers and contractors; direct liaison with regulators (Scottish Natural Heritage, Scottish Environmental Protection Agency) and with biodiversity plan steering groups and angling organisations; Annual General Meetings including question and answer session; media presentations; radio and TV programmes/ interviews; a feedback reporting procedure and a web-based enquiry service. These have been effective and the aim is for continual improvement.

Practical conservation projects are undertaken on the ground with volunteers, local community members, British Trust For Conservation Volunteers.

### **Good practice lessons**

Re-opening a waterway to navigation after nearly 40 years is a continuing challenge. For BWS to demonstrate sustainable management of the canal into the future, it must take note of stakeholder aspirations, meet legislative requirements, protect the canal's built and natural environment, be affordable and provide a catalyst for appropriate economic regeneration and development. This will be a continuing and dynamic process.

There is good evidence of reduced boat wash erosion in areas where native planting was introduced, in particular behind coir rolls, with untreated areas showing significant signs of erosion. The coir breaks down as the emergent vegetation becomes established. This approach reduced boat wash effects, provided an attractive landscape feature and created an important wildlife habitat with some species that are known to be scarce elsewhere in the UK. e.g. tufted loosestrife, Lysimachia thyrsiflora. Simple use of man-made alternatives without planting was less effective, with some material becoming detached and a navigation hazard.

The communication approach uses transparent, open and varied formats. Some customers have in addition asked for better web based information and provision of policy information in a customer accessible form.

#### Sources of further information

The following references provide additional background:

Bats and the Millennium Link survey 2000-2005. See website for details www.batml.org.uk

British Trust for Ornithology WEBS counts of bird activity – various dates.

British Waterways 1995 Environment and Heritage Report – Part of Millennium Link Bid.

Forth & Clyde Canal Joint Advisory Committee, October 1995, Lowland Canals Sustainable Development Strategy, Forth & Clyde Canal Nature Conservation Strategy,

Fozzard, Doughty & Clelland 1994, Invertebrates In The Fresh Waters of Scotland, Wiley Eds Maitland, Boon and McLusky.

Keane 2005 Aquatic Plant survey, University of Glasgow MSc thesis (limited number of locations on Forth & Clyde Canal).

Lassiere, O.L. 2001 Wildlife, Forth & Clyde Canal Guidebook.

Lassiere, O.L. 2001, Conservation and Restoration Case Study, the Millennium Link; in the State of Scotland's Environment and Natural Heritage, HMSO Edinburgh.

Scottish Wildlife Trust 1997, pre-Millennium Link survey of habitats, plants, odonata and birds in 1km sections along the entire canal corridor. Excel spreadsheets of data available.

Scottish Executive (now Scottish Government), October 2002, Scotland's Canals: An Asset for the Future; describes the intended relationship between environmental regulators and BWS as a navigation authority.

Scottish Natural Heritage 2000, draft Strategy for the Millennium Link 2000.

Scottish Wildlife Trust 2000, Survey of Wester Common wildlife site adjacent to the canal.

Watson K. 1988, Aquatic Plant Survey, MSc thesis, Glasgow University.

Wildcru 2001, Scottish Natural Heritage commissioned Water Vole survey 2000-2005 (Includes information on minks, otters, bank voles and water shrews).

# Grand Union Canal



### Website: www.britishwaterways.co.uk

### Waterway description

The modern Grand Union Canal (GUC) is a 1929 amalgamation of several older, separate waterways. One of these was the Warwick & Napton Canal built by engineer Wm Felkin (replaced by Chas Handley 1795-1800) to link Warwick with the Oxford Canal at Napton. The Warwick & Napton Canal connected at Warwick with the Warwick and Birmingham Canal, thus providing a new route from Birmingham to Oxford and thence via the River Thames to London. The Warwick canals were both opened in 1800. The future GUC Main Line from Birmingham to London was completed by the opening of the Grand Junction Canal from Braunston to London in 1805. The 1929 amalgamation absorbed the Warwick canals and the Grand Junction Canal into the Grand Union Canal Company's system.

The Warwick and Napton Canal and the Warwick and Birmingham Canal were originally built with narrow locks measuring 21.95m x 2.13m. The route from Napton to Birmingham was widened in 1932-34 under a modernisation scheme and new locks were built measuring 27.73m x 4.68m, which would each accommodate a larger barge or a pair of narrowboats. The modernisation scheme is significant as being one of the last attempts at improving a UK inland waterway in the Midlands for 20th Century transport purposes.

The old narrow locks remained in use in parallel to the new wider locks for some time and the disused lock chambers still exist alongside the new locks in use as bywash weirs and, in some cases, pumping chambers.

The canal banks comprise mainly of concrete piles dating from the 1930s enlargement, with some natural bank on the offside. There is a towing path on one side only.

Routine dredging takes place as part of the British Waterways (BW) dredging programme. Other recent works include the ongoing scheduled lock gate replacement along with the embankment repairs at Long Itchington in 2002/03. The towing path was upgraded to National Cycle Route standard in 2002/03.

Water supply for the canal is from the Oxford Canal summit (fed by reservoirs) and from Napton Reservoir, with water used in lock operations discharged from the sump pound through Leamington to the River Leam. Backpumping has been installed to maintain water supplies, the system comprising twenty pumps between Radford Bottom Lock and Napton, operated automatically in response to water level sensors.

The canal has 23 locks and 17 bridges and currently accommodates boats of up to 23.77m long, 3.81m beam, about 1m draught and 1.98m air draught.

Regular commercial freight use of the canal ceased in 1969, with the cessation of cement traffic from Southam to Birmingham. Since then significant leisure boating use has developed. The canal is also used for angling, cycling, walking, nature conservation and keep-fit activities, while the towpath provides a route for a national fibre-optic cable network.

### Navigational use

Currently the canal has 'Cruising Waterway' status under the 1968 Transport Act, requiring BW to make it principally available for cruising.

The canal is used by a variety of craft, including narrowboats and broader beamed vessels. There are three off-line marinas along its length (Stockton, Ventnor Farm and Calcutt) as well as off-line moorings in Kaye's Arm branch canal near Stockton and lay-by moorings in Warwick. Boat hire fleets operate from Stockton and Warwick; boat building and repairs take place at Calcutt, Stockton, Kaye's Arm and Warwick.

In 2005, the annual boat movement count (one way) at Calcutt Locks was 7600, with traffic density varying from one or two a day during the winter period to an average of 45 per day during August (peak period).

Closures have occurred in the past due to insufficient water supply; this is now managed through backpumping.

The water space is also used by multiple fishing clubs along the length.

### Navigation restoration proposals

The canal has remained open to navigation throughout, so restoration is not applicable.

### **Nature conservation interest**

A full ecological report was undertaken and reported in December 2001. BW's West Midlands Waterway also has a Biodiversity Action Plan (BAP) covering this section with the following objectives, which include some actions relating to the aquatic habitat:

- to survey, map and develop tree management principles for every tree or group of trees;
- to implement a priority tree programme (5 years);
- to implement a new vegetation management regime that will encourage wildflowers in verges;
- to ensure that bat roosts are considered during all bridge refurbishments;
- to introduce a grassland management regime around Napton reservoir;
- to survey and map water vole activity;
- to survey and map otter activity;
- to survey and map crayfish activity whenever the opportunity arises during dewatering or development.

The waterway BAP will be monitored and updated as necessary.

There are no statutory nature conservation sites along the canal; the Calcutt meadows Site of Special Scientific Interest (SSSI) designation is for being hay meadows. The entire canal length is a County Wildlife Site.

There are a number of records of protected white-clawed crayfish at Napton, Gibraltar Bridge and Bascote Bridge; great crested newts are also recorded at Napton.

Although the canal does not qualify for statutory nature conservation designation, wildlife benefits are recognised and, where practicable, enhanced. Of particular note is the retention of a broad reed fringe on the towing path side, in front of hard bank protection, for most of the length between Bascote and the Fosse Way, with breaks to allow for boat mooring. This significantly enhances dragonfly populations along this section. The areas of the canal to the side of the main channel upstream of the former narrow locks also provide good habitat for emergent plants and their dependent ecosystems. BW has a water quality action plan and regular water quality testing is carried out by the Environment Agency. Using the General Quality Assessment system for rivers (although this is not entirely suitable for assessing water quality in canals) the water quality moved from Class E (poor) in 1994 to Class D (fair) in 2002.

Offside bank erosion is an issue for nature conservation, including occasional cattle damage.

### Local wildlife interest groups

Warwickshire Wildlife Trust.

## Relationship between navigation and nature conservation interests

BW undertakes an Environmental Code of Practice (ECoP) assessment for 'every' project undertaken – this is an ECoP 'Short Form' appraisal which helps to evaluate and minimise likely impacts (positive or negative) from future planned work along the canal corridor. Through this process BW strives to minimise negative impacts and maximise positive benefits for both built heritage and environmental issues. For larger engineering projects over £50k, wider sustainability issues are also considered.

The nature conservation value of the canal is generally seen as a significant benefit, with use for bird watching, visits by school parties and the like, and not as any threat to navigation interests.

All groups, including BW as the management body, take a positive approach to nature conservation. The BW approach fulfils statutory and corporate responsibilities.

The West Midlands Waterway BAP provides adequate data on which to base decisions so that nature conservation interests can be protected and enhanced.

### Management actions or proposals

Management actions or proposals Management actions are guided by BW's Environmental Code of Practice, its Waterway Mooring Strategy and Towingpath Standards.

Specific management actions have included:

- coir roll bank protection;
- spot dredging carried out in isolated locations;
- back pumping to maintain an adequate supply of water.

These are all consistent with the maintenance of the nature conservation interest of the canal.

The management regime BW employs aims to strike a good balance between the needs of the environment and those of an increasing volume of all sorts of visitors; it appears to have been successful in avoiding and resolving conflicts.

Consensus building methods employed have included:

- surveys & questionnaires (hire boat users and towing path users);
- regular user group meetings;
- BW formal complaints procedures;
- responses to local issues where possible within BW's framework of corporate objectives & local business plan targets.

This achieves a better understanding by all users of the complexities that have to be managed and an appreciation of the approach BW takes towards its responsibilities. It also enables BW to gain a better awareness of the views and concerns of visitors and to plan accordingly.

Given the resources available, the processes applied have achieved encouraging results for nature conservation on the waterway.

#### **Good practice lessons**

Early consultation and communication with stakeholders is important.

The nature conservation value can be enhanced significantly by relatively simple management measures on heavily used waterways.

### Sources of further information

British Waterways, West Midlands Waterway Biodiversity Action Plan for the canal.





### Waterway description

The River Great Ouse and its tributaries, the Rivers Cam, Lark, Little Ouse and Wissey, comprise the major navigation in the Fens and East Anglia, providing about 240 km (150 miles) of navigable waterway. Upstream of St Ives, the river passes through many areas important for their landscape and nature conservation value. The lower reaches (Old West River and then the Ely Ouse) take boaters through the fenland landscape. The Great Ouse catchment represents a heavily regulated lowland river. Much of it has been heavily engineered for flood defence and land drainage purposes as well as for navigation purposes. Modifications include completely artificial cut-off channels, channel re-alignment and resectioning, bank reinforcement, weirs/locks and a loss of floodplain channel diversity. As a result of drainage, fens were transformed from wetland with raised islands of clay into some of the most productive arable land in the UK. Overall, despite the extensive human influence on the landscape, parts of the area have been designated as Special Protection Areas (SPAs), Sites of Special Scientific Interest (SSSIs) and Ramsar wetland sites.

The Great Ouse can be classed as a modified natural river, canalised in the lower Fenland reaches, with its width varying from 12m to 80m and its depth varying from 1m to 6m. It is provisionally classed as a heavily modified water body under the Water Framework Directive.

Its bank protection is mostly natural, with extended areas of piling in the fenland reaches; its dredging regime is limited, consisting mostly of localised shoal dredging.

Work done in the last 10 years has been mostly in the fenland reaches: bank revetment, as detailed in the Ely Ouse strategy, along with some soft engineering. There has also been bank raising, as detailed in the Ouse washes strategy (a £20m capital project).

The Great Ouse has a natural river flow with no significant water quality issues. Its abstraction is regulated to prevent adverse impact on the river's ecology, water quality or boating.

The river is used for boating, fishing, water resources and is a habitat for wildlife.

### Navigational use

Navigational objectives are to maintain navigation infrastructure, improve facilities to the Association of Inland Navigation Authorities' standards and optimise the economic, social and wildlife benefits of the river.

Around 3,500 recreational craft per year use the waterway, mostly powered in the 6m to15m class; there is some rowing and canoeing but no freight.

The Bedford Ouse is busier than the Ely Ouse; busy locks have around 2,500 to 4,000 boat movements per year.

The waterway is navigable throughout the year, subject to flows and work related stoppages.

There are some minor localised navigational issues between power boaters and anglers, and rowers and anglers. Water resources are not a major issue other than in extreme droughts, for example in 1976.

### **Navigation restoration proposals**

There has been some interest in the restoration of the River Ivel, Little Ouse Brandon to Thetford. Major regeneration proposals include the south reaches of the 'Fens Waterway Link' and the NORA project in Kings Lynn (NORA is a partnership between the Borough Council of King's Lynn and West Norfolk, English Partnerships, East of England Development Agency, Norfolk County Council and Morston Assets.)

### Local navigation interest groups

Anglian Waterway Association, Association of Nene River Clubs, Cambridge Marine Industries, Great Ouse Boating Association, Inland Waterways Association, National Association of Boat Owners.

### Nature conservation interest

There are various riverside meadow locations with SSSI designations; along the Ouse washes there are SPAs, Special Areas of Conservation, Ramsar wetlands and SSSI designations.

Biodiversity Action Plan (BAP) priority species and habitats on the Great Ouse include reed beds, wet grassland, otters, water voles, bitterns, spined loach and various invertebrates.

The Environment Agency performs biological monitoring of the river's fisheries and invertebrates and performs routine chemical monitoring for nitrate, phosphate, BOD, turbidity and other standard parameters. The river's biology is also monitored by Natural England and the Royal Society for the Protection of Birds. Perceived trends include an improvement to water and biological quality.

Key nature conservation issues are related to the Habitats Directive, for example reviews of consents for water abstraction and discharge.

Pressures on nature conservation include water resources and eutrophication due to point source and diffuse pollution.

#### Local wildlife interest groups

Natural England, Royal Society for the Protection of Birds, Wildfowl & Wetlands Trust, Wildlife Trust.

# Relationship between navigation and nature conservation interests

Environmental Impact Assessments are completed for all maintenance and capital schemes.

There are few issues of contention between navigation and nature conservation interests; some which related to restrictions on reed cutting on the Old West Bedford (Ouse washes) are now largely resolved.

There is a low-level concern by some boaters that nature conservation can lead to boating restrictions, though no examples of this are given to support the case.

Both waterway managers and boaters are generally very supportive of nature conservation; water resources and eutrophication issues are far more important for conservation than boating. There remain some questions on the impact of boats on macrophyte growth.

### Management actions or proposals

The Great Ouse Waterway Plan outlines the strategic aims of managing the navigation.

Nature conservation measures used to mitigate impacts include retaining marginal vegetation when weed cutting and issuing best practice guidance with illustrated methodologies for use by machine operators. This is perceived to be effective from river habitat survey data available for some reaches.

Formal meetings to share works programmes, presentations and specific projects take place to ensure good and continuous dialogue with all interested stakeholders.

These measures are deemed as successful, having in the past 20 years protected the river environment without compromising recreational activities. They have helped to build trust between the Environment Agency, conservation and boating groups; enabling all to listen and help understand each of their needs.

### Good practice lessons

The building blocks for success are dialogue, active listening, consensus building and accurate science: develop, consult and publish environmental good practice, then deliver on promises.

The science and dialogue approach provides a general framework to follow, however there is no "one size fits all" approach to dealing with all specific issues.

### Sources of further information

Environment Agency website www.environment-agency.gov.uk

# Lancaster Canal (section north of the Ribble only)



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Organisation(s): British Waterways (BW) Email: cath.ferguson@britishwaterways.co.uk Website: www.britishwaterways.co.uk **Partners:** Rural Regeneration Cumbria, South Lakeland District Council, British Waterways, Kendal Town Council and the Lancaster Canal Trust (LCT).

### Waterway description

The Lancaster Canal was authorised by Act of Parliament in 1792 to link Kendal with the Lancashire coalfield. It was built in several stages and by 1826 extended from Preston, through Lancaster, to Kendal and provided a link with the Lune Estuary via a branch to Glasson Dock. In 1948 the Canal was transferred to the British Transport Commission which determined in 1955 that the canal had 'insufficient commercial prospects to justify its retention'. Shortly thereafter the northernmost section of the navigation between Stainton and Kendal was closed and 3.5km of the waterway approaching Kendal were drained and in-filled. During the 1960s a further section of the canal in the centre of Preston was in-filled and the length north of Tewitfield was closed following the construction of the M6 motorway. Today the Lancaster Canal between Preston and Tewitfield Locks, including the Glasson Branch, remains navigable and is promoted as a 'cruising waterway' under the 1968 Transport Act. Under the same Act the length of waterway between Tewitfield and Stainton, which forms part of the Northern Reaches of the canal, is classified a 'remainder waterway' and is closed to through navigation. Both sections continue to be owned and operated by British Waterways (BW). To the north of Stainton, the tenure and extent of the waterway is very fragmented.

The canal is a rural broad canal that follows land contours for most of its length. There is a series of 6 locks on the Glasson Branch and 8 (currently disused) locks at Tewitfield. The Northern Reaches are severed in several places by the A6070, M6, A65 and A590 roads. This section of the Canal is generally 12m wide at water level and 1.5m deep in the centre.

Where present, bank protection consists of masonry, timber slabbing and trench sheeting. On the watered length of the Northern Reaches there appears to be little bank protection other than that provided by natural vegetation. Photographs dating from the 1950s indicate wash-walls at the top of the side slopes along the dry section of canal into Kendal. Each bridge has sloping masonry wash-walls and, based on photographic evidence, the wharves at the in-filled canal head in Kendal appear to be masonry. At Crooklands a short length of the towpath is fronted by a 'Nicospan' geo-textile, behind which dredgings were deposited.

As a 'remainder waterway', the Northern Reaches are not generally dredged for navigation, although a short section at Crooklands was dredged about 5 years ago to accommodate a trip boat operated by the LCT. Aquatic vegetation on this section is controlled annually to maintain the water supply to the south of Tewitfield. As a 'remainder waterway', the Northern Reaches are not generally subject to a programme of major works. BW undertakes work required by statute to ensure public health and safety, land drainage and preservation of amenity.

The Northern Reaches receive water mainly from Killington Reservoir and the Peasey Beck catchment via the Crooklands Feeder, as well as from Stainton Feeder (Saint Sunday's Beck) and Farleton Feeder (Lupton Beck). The southern navigable section receives water from the White Beck Feeder and the Caterall Feeder from the River Calder, as well as water from the Northern Reaches. Flows from several of the feeders can be limited in times of drought. The Glasson Branch receives water from the River Conder, as well as from the main line. There are no significant water abstractions from the canal, but there are numerous consented discharges to the canal and its feeder streams. The canal between Stainton and Galgate has fairly good water quality, as does the Glasson Branch, but this deteriorates towards Preston.

Throughout its length the canal is used by anglers and canoeists. The navigable length between Preston and Tewitfield is also popular with powered craft. On the Northern Reaches between Stainton and Crooklands, a powered trip boat is operated by the LCT.

### Navigational use

The navigation objectives are to maintain the currently navigable section of the canal as a 'cruising waterway' and, subject to the availability of funding to sustain its restoration, to restore the Northern Reaches between Stainton and Kendal to a navigable standard.

There are approximately 1,200 licensed powered craft based on the navigable section of the Canal. Approximately 60% are cruisers, with narrowboats accounting for the other 40%. An additional 200 craft visit the waterway each year. There are no official canoe clubs but it is a popular location due to the absence of locks.

Historically, the general pattern of cruising was dominated by short cruises in locations close to mooring facilities. There is no recent data available to determine current patterns of boat use since the opening of the Ribble Link. BW operates a booking system for passages via the Ribble Link between April to October to allow access to and egress from the canal.

During 2005 and 2006 there were some minor restrictions to navigation due to constraints on water supplies caused by low rain fall.

### Navigation restoration proposals

The restoration of the Northern Reaches is currently being planned in 3 phases. Phases 1 and 2 include the dry length between Kendal and Stainton and Phase 3 includes the watered length south to Tewitfield.

Phase 1 includes the creation of a basin in Kendal and the restoration of the canal to Natland and will provide a focus for mixed-use development. A 2-year programme of planning for Phase 1 has commenced, with funding from partners, which will include engineering feasibility, master-planning, economic appraisal and environmental impact assessment (EIA), prior to submission of a planning application. The outcomes will determine the project's viability.

### Local navigation interest groups

Lancaster Canal Restoration Partnership, including BW, Cumbria County Council, Lancashire County Council, South Lakeland District Council, Kendal Town Council, Lancaster City Council, Lancaster Canal Trust, Inland Waterways Association and The Waterways Trust. The Northern Reaches Restoration Steering Group includes local authorities, Government departments and a wide range of other public bodies and Non Governmental Organisations.

### Nature conservation interest

Specific nature conservation objectives for the Northern Reaches of the Lancaster Canal have not yet been defined. There are no statutory nature conservation designations directly relating to the canal. However, the conservation and enhancement of both the natural and built heritage is recognised as an important element of the restoration proposals, which will aim to conserve or enhance the nature conservation value of the Northern Reaches. Specific objectives will be defined during restoration planning and a biodiversity action plan prepared.

The canal supports a range of habitat types which are home to a wide variety of plants and animals and the value of the canal lies as much in its ecological diversity as it does in the rarity of species recorded along it. although there are records of water voles and bats (pipistrelle, Daubenton's, whiskered, long-eared and Brandt's bats) on the canal whilst great crested newts have been recorded nearby. Other species of national conservation interest recorded on the Northern Reaches include: mayfly Caenis robusta, caddis-fly Setodes argentipunctellus, mud snail Lymnaea glabra, Duke of Burgundy Hamearis lucina and hairlike pondweed Potamogeton trichoides. The canal has been particularly valued for its aquatic plants; in 1993, several sections of the Northern Reaches of the canal met the gualifying criteria for designation as Sites of Special Scientific Interest (SSSIs) (see: Environmental Management Consultants (1993) Lancaster Canal: A Botanical Survey and Management Plan Phase 1 report for English Nature).

A summary of nature conservation interests on the Canal and impacts of restoration is provided in the 2002 report "Lancaster Canal: Towards restoration of the Northern Reaches", prepared by BW on behalf of the former Northern Reaches Restoration Group (now the Lancaster Canal Restoration Partnership).

Chemical water quality (including biological oxygen demand, ammonia and dissolved oxygen) of the Lancaster Canal is routinely monitored by the Environment Agency. BW is not aware that any routine biological monitoring is undertaken on the canal.

The trends in waterway chemical or biological quality have not been reviewed in any detail by BW. However, there is a perception that eutrophication caused by fertilisers and increasing levels of boat traffic has caused deleterious changes in the aquatic flora of the Lancaster Canal (see: E.F. Greenwood (2005) The changing flora of the Lancaster Canal in West Lancaster (v.c. 60). Watsonia, 25: 231-253).

### Local wildlife interest groups

Cumbria Wildlife Trust, Lancashire County Council, Lancashire Wildlife Trust, local naturalists' groups.

### Relationship between navigation and nature

Restoration of the dry section will create approximately 9km of open water canal habitat, including a fringe of emergent vegetation on the off-side of the canal. This will largely replace improved agricultural land and so will contribute to national and local biodiversity objectives. Phase 3 of the restoration is perceived as a potential catalyst to increased boat movements, which may impact on the aquatic flora and fauna of both the navigable Southern Reaches of the Lancaster Canal and the currently watered section of the Northern Reaches.

Many organisations represented on the Partnership and the Steering Group (such as BW and the local authorities) have both navigation and nature conservation interests. There is an annual meeting of the Steering Group at which issues may be aired and incorporated into the on-going restoration planning where appropriate. The LCT organises annual canal camps which include vegetation management. Local concern has previously been expressed about the potential impacts of restoration and navigation of the Northern Reaches on the nature conservation interests of the canal, especially the aquatic flora. However, there is also recognition that the restoration has the potential to bring nature conservation benefits.

At the present time, the key nature conservation issues that may impact upon restoration and navigation are understood to be: water supply for Phases 1 and 2 (the Environment Agency is being consulted on a potential abstraction and return of water to the River Kent), the transfer of non-native signal crayfish to the River Kent via the canal, and bats in bridges (conservation measures will be incorporated into the scope of restoration works).

The restoration of the Northern Reaches of the Lancaster Canal has been well researched over the past decade or so. Further work is planned to resolve some of the outstanding issues, in consultation with stakeholders.

### Management actions or proposals

A desk study of the environmental, cultural and social resources of the Lancaster Canal was undertaken to provide a preliminary assessment of the significance of environmental resources in the waterway corridor. This will form the basis for future work, including the Environmental Impact Assessment (EIA).

Technical measures for mitigating or enhancing nature conservation interests on the canal which may be impacted by the restoration of the Northern Reaches will be determined through the formal EIA. It is envisaged that the design of the engineering works will provide for both navigation and nature conservation interests. The designs will draw from BW previous experience of canal restoration to ensure the use of best practice techniques.

The technical measures for mitigating or enhancing nature conservation interests have not yet been fully defined. However, the desk study and the engineering feasibility studies have proven valuable tools for identifying the likely requirements/opportunities for such technical measures.

For many years the Northern Reaches restoration has been coordinated by the Lancaster Canal Restoration Partnership (formerly the Northern Reaches Restoration Group) with assistance from a wider steering group which includes both navigation and nature conservation interests. The Partnership meets every quarter.

An Environment Focus Group, chaired by the Friends of the Lake District, is being established to consider environmental issues associated with the restoration of the Northern Reaches.

Currently, it is too early to assess the effectiveness of the communication or consensus building methods.

### Good practice lessons

Progress with the restoration proposals, while maximising nature conservation protection and enhancement, have been facilitated by a diverse and well-coordinated Restoration Partnership supported by broad stakeholder representation on the Steering Group.

Early identification of key issues (including nature conservation) affecting restoration is essential, as is an early establishment of open dialogue to address these issues.

It is important to identify and consider the positive aspects of restoration on nature conservation, as well as adverse impacts.

### Sources of further information See references above and BW website www.britishwaterways.co.uk (search for Lancaster Canal).

# Case study 8 Montgomery Canal



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### Waterway description

The Montgomery Canal is notified as a Site of Special Scientific Interest (SSSI) for much of its length and is particularly important for its range of rare aquatic plants. It is used for recreational and leisure purposes and is a habitat for wildlife.

The canal runs from Welsh Frankton to Newtown and was part of an extensive network of over 200 miles of waterways once owned by the Shropshire Union Railways and Canal Company. It was commenced around the same time as the Ellesmere Canal, part of which was to become known as the Llangollen Canal. Carreghofa marks the original junction between what was then the Montgomeryshire Canal and the Llanymynech Branch of the Ellesmere Canal; the curious feeder arrangements from the River Tanat are indicative of the jealous emphasis on water supply. Terminating for a while at Garthmyl, its continuation to Newtown was delayed by the Napoleonic Wars and it was left to a separate company to construct the Western Branch, or Newtown Extension, which opened in 1821. Completion of the Weston Branch of the Montgomery, which was to connect with the Severn at Shrewsbury, failed to materialise.

Competition from the railways led to a decline in trade and when the Montgomery breached its banks near Perry in 1936, isolating it from the rest of the system, the cost of repairs vastly exceeded the annual revenue and it was closed in 1948. The line from Llangollen to Hurleston become known as the main line of the Llangollen Canal, with the derelict Montgomery perceived as merely a spur off it at Welsh Frankton.

Plans to build a relief road on the canal bed led in 1969 to the 'Big Dig' targeted restoration event at Welshpool and the focus of efforts to reclaim the waterway. The Montgomery Canal is being restored and just over half of the line has been reinstated in various sections, with a view to eventual full restoration.

Two sections of the canal are currently open to navigation. The canal has been restored from its northern end - the junction with the Llangollen Canal at Welsh Frankton south through Frankton and Aston Locks. There are then extensive dry sections and some road blockages around Llanymynech and Pant; although a 500-metre section at Llanymynech is used by a trip boat. The canal is then navigable for an 11-mile section around the town of Welshpool.

A phased dredging programme is being drawn up to reduce silt and mud clouding the water; fencing of offside banks will prevent stock breaking the canal edges.

Water is currently supplied from three main points: the Llangollen Canal for the English section, the Tanat feeder at the northern end of the Welsh length, and the Penarth feeder near Newtown in the south.

Current supplies will enable up to 5,000 boat movements a year in England. Flows may be changed around Pant to maintain separation of the different water types from England and the River Tanat. Some channel works are required to ensure water supplies in Wales in times of low flow, including minimising leakage. If restoration extends to Newtown, an additional supply will be needed for the currently dry section above Freestone Lock. Water quality is also an important issue for the Montgomery Canal, and has contributed to its special wildlife interest. Hence nature conservation measures include a range of proposals to protect and enhance the water quality of the canal.

The canal is a candidate artificial water body under the Water Framework Directive; it generally maintains a width of 10m and a depth in the centre of the channel of 1.2m. The first section is a new trapezoidal section lined with HDPE protected by concrete, with some gabion baskets at the margins. The next two miles are cut through wet peat farmland and unlined. Most of the channel is lined with silt/clay excavated on site. For long lengths in Wales the canal is perched on the side of a hill, part of the Severn Valley.

### Navigational use

Apart from a short section used by a trip boat at Llanymynech, navigation is currently limited to two parts of the canal: in England, a length of 7.5 miles (12km) from the junction with the Llangollen Canal at Frankton down to Bridge 82 south of Maesbury; in Wales, a length of 11 miles (18km) around Welshpool, from Arddleen to Refail Bridge, near Berriew. Current total figures for the two navigable sections are around 2,500 boat movements (hire, trip and private) for the Frankton to Maesbury section in England and less than 500 boat movements for the Welshpool section in Wales.

The canal is used for canoeing by Shropshire Paddlesports, based at Queen's Head, and also by visiting activity centres, including the Red Ridge Centre, based near Welshpool. Some private canoes also use the canal, although there are no accurate records of numbers. An annual dinghy dawdle, organised by the Shropshire Union Canal Society, attracts in the region of fifty participants. The relatively low number of movements by powered craft makes the canal particularly attractive as a safe environment for canoes and other small craft.

In Wales, boat numbers are largely limited by low demand for the isolated section. BW has sought environmentally friendly businesses, so the only commercial operator on this length has a horse drawn boat offering luxury short breaks. In England, passage on to the canal is through Frankton Locks which are staffed from 12-2pm every day in the summer and on request in winter. Boats have to book passage, although they may do so up to 10am on the day of travel in the summer and with 48 hours notice in the winter.

Navigation on the canal will be gradually increased up to the maximum capacity consistent with protecting the natural and built heritage of the canal. In Wales, the target level for navigation on the canal to build up to, subject to annual monitoring, is 2,500 boat movements per year. In England, the current limits on navigation will be lifted after a new nature reserve has been constructed and established. At this point, water supply will determine the level of navigation possible. These figures are much lower than on the adjacent Llangollen Canal, but very similar to some other rural canals, for example much of the Leeds & Liverpool Canal.

Numbers of boat movements can be managed by a number of measures including:

- managed access at Frankton Locks;
- a system to manage the numbers of boats continuing into Wales from Llanymynech;
- selective location of private moorings and commercial hire or trip operations.

There is also a need to strike a balance between visiting boats, locally moored private boats and hire craft. It is proposed to maintain the numbers of boats visiting from the Llangollen Canal, and look towards additional boats moored on the canal, as this provides better returns to the local economy.

### Navigation restoration proposals

The major costs involved mean that the continued restoration of the canal is likely to be undertaken in stages. The first priority is to re-connect the navigable length of canal at Welshpool, through Llanymynech, to join up with the northern section at Gronwen Wharf, near Maesbury, and thus to the national network.

This is likely to be undertaken as two separate stages of work, Phase 1: England and Phase 1: Wales. The economic impact from this section is expected to be great, as restoring eight miles of canal will connect with a further eleven miles which is currently under-used.

Restoration of the southern section (Phase 2: Wales) will need to follow as a later phase or phases. Access to funding will depend on demonstrating the success of Phase 1.

In parallel to the major engineering, the restoration will seek to deliver small scale local improvements to the amenity, for example local footpath and signage improvements; increased local access and use will support and reinforce the case for further major restoration.

The capital costs of restoration will be met through a range of grants likely to include heritage sources, local authorities and economic regeneration packages. This means that progress will be dependent on the availability of funding, and it is not possible to give accurate timescales.

### Local navigation interest groups

Friends of Montgomery Canal, Inland Waterways Association, Montgomery Waterway Restoration Trust, Shropshire Paddlesports, Shropshire Union Canal Society, Waterway Recovery Group.

### Nature conservation interest

The Montgomery Canal Conservation Management Strategy (CMS) sets out the key principles for wildlife as follows:

- wildlife interest will be safeguarded throughout restoration works and future use;
- interest will be monitored annually, and management of the canal adapted to ensure wildlife protection;
- the wildlife interest where there is enhancement of overall value;
- water quality is integral to maintaining the interest of the canal corridor;
- navigation levels will build up only on successful establishment of the reserves and careful monitoring, and will start lower than the target levels;
- there will be support for other wildlife schemes in the canal corridor, especially where they help re-create original wetland sites and ponds.

All of the Welsh section and part of the English length of the Montgomery Canal have been notified as a Site of Special Scientific Interest (SSSI). The Welsh section is also designated as a Special Area of Conservation (SAC). The SAC designation is because of the abundance of Luronium natans (floating water plantain) in the Wales length; the SSSI citation also refers to Potamogeton compressus (grass-wrack pondweed), the whole assemblage of aquatic plants and also the Odonata (dragonflies) that the canal supports. The citation for the English section of the canal refers to submerged and emergent species of plant.

The canal supports a range of rare aquatic plants, including floating water plantain and grasswrack pondweed. It is also important for invertebrates, such as dragonflies, and has otters and occasional water voles. Seen more often, a high proportion of Wales' mute swans breed on the canal.

The two different feeds (River Dee via Llangollen canal for England and River Severn via two feeders for Wales) results in significantly different qualities in the two sections.

The Environment Agency regularly monitors water quality at a number of points on the Canal. Classifications are geared towards assessments of river quality and do not bear immediate relation to conservation value. This is exemplified by the apparent significant failure against water quality standards of the best section of canal ecologically, around the Vyrnwy Aqueduct. Measuring invertebrate fauna is one method by which conservation assessment is made and the Agency's data and survey work has enabled a more canal-specific assessment to be made. Suspended sediment concentrations have not varied greatly either along the canal or over the last decade or so. In general there is a significant difference between lower water quality and higher nutrient levels in the English length, when compared to the canal in Wales.

A computer analysis, plotting the invertebrate results for the ten sample sites from the 2005 survey, showed a correlation with navigation and water transparency; there was also a smaller correlation with dissolved oxygen and amount of aquatic vegetation cover.

Results overall indicate a mesotrophic water canal, with some tendencies to eutrophic, and an invertebrate assemblage indicative of high water quality for a canal.

### Local wildlife interest groups

British Trust for Conservation Volunteers (BTCV), Montgomery Angling Association, Montgomeryshire Wildlife Trust, Preston Montford Field Studies Centre, Shropshire Botanical Society, Shropshire Wildlife Trust.

### Relationship between navigation and nature conservation interests

The key elements for the future management of the Montgomery Canal are:

- a community resource, valued and used by all;
- a corridor of opportunity that will provide a driving force for rural regeneration;
- a restoration to navigation that respects values and enhances the unique nature of the Montgomery Canal;
- sustainability at the heart of all management and development.

Wildlife has flourished since the closure of the canal to navigation and so the aquatic plants are especially sensitive to disturbance by boats. However, the plants would not flourish in the long term if the canal is left to nature, as it would eventually revert to swamp and then woodland.

There has been overwhelming support for the restoration of the canal, with careful safeguards, and the CMS maps a way forward, providing practical solutions to resolve the previous tensions between different interests e.g. boaters, wildlife organisations and other recreational users.

Perceived threats to nature conservation include a lack of dredging, structural failure, eutrophication and suspended sediment from navigation.

Perceived threats to navigation include the risks associated with ensuring that the canal restoration works in Wales receive consent under the Habitats Regulations. This will involve a twin track approach of seeking both an extension to the SAC site boundaries from the UK Government and an application to the EU for restoration approval on the grounds of IROPI (Imperative Reasons of Overriding Public Interest). The attitude of waterway management and nature conservation advisors is favourable to the canal restoration based upon the CMS. The advantage of restoration, and the sustainable future for the canal that it offers, requires careful balancing with the need to conserve rare and protected wildlife.

Following publication of the final CMS, attitudes between different canal stakeholders have calmed down. It is expected that other issues are likely to arise during the Options Appraisal process and final negotiations on the canal restoration.

### Management actions or proposals

The CMS gives the following measures used to protect nature conservation:

- a range of new nature reserves will be constructed, to provide additional areas of habitat as far south as Berriew. These new reserves will be spread over a range of sites in Wales, and will total twenty seven acres of aquatic habitat;
- boat barriers with silt screens will be provided along some wider sections of canal, e.g. redundant winding holes to maintain some aquatic plants within the canal;
- plants living in the margins of the canal will be protected where possible along the banks;
- towpaths, hedges and dry land areas will be managed for other wildflowers and animals;
- active measures will be used to improve water quality;
- best practice for environmentally friendly boat design will be required for commercial craft based on the canal. All craft will have to comply with local speed limits and other controls in sensitive areas;
- managed navigation levels will be employed in Wales.

The Montgomery Canal Partnership has worked hard to develop a willingness to share and understand the values and interests of everyone with an interest in the canal, both within the Partnership and in wider circles, and has reached a shared way forward in the CMS which is based on sustainable restoration.

### **Good practice lessons**

The creation of a partnership representing a wide variety of stakeholders with a common purpose has been important. Seeking consensus through publication of a CMS can be a lengthy process; issuing the initial consultation document and producing the final Montgomery CMS took two years.

### Sources of further information

Montgomery Canal Conservation Management Strategy: www.britishwaterways.net/montgomery/conservation\_ management\_plan/conservation\_management\_plan.html

### Waterscape:

www.waterscape.com/canals-and-rivers/montgomerycanal

# **River Thames**



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and www.riverthamesalliance.com

**Partners:** All members of the River Thames Alliance, comprising nearly 80 bodies including local authorities, boat user groups, wildlife trusts and other recreational interest groups.

### Waterway description

The River Thames has been a navigable river since time immemorial. From the 12th century boats could reach Oxford and flash locks were a feature from the 13th century, with pound locks appearing in the 17th century.

The formation of the Thames Navigation Commissioners in 1751 heralded the start of a period of improvement in the navigation, with the construction of further pound locks and the extension of the navigation upstream of Oxford to link with the Thames and Severn Canal. Further improvements followed the formation of the Thames Conservancy in 1857, although the last flash lock was not dismantled until 1937. Control passed to Thames Water Authority in 1974 and subsequently to the National Rivers Authority in 1989 and the Environment Agency in 1995. The Thames had a major role in transporting freight but this is virtually non-existent now. It had its heyday for pleasure navigation in the late 19th century, as an escape from London, and reached the peak in its more recent usage in the 1970s. Since then, the Thames as a navigation has been in decline; the most significant indicator of this reduction is the number of holiday hire boats, which has dropped from over 800 in 1980 to less than 130 in 2005. We are now working to rejuvenate the Thames through the River Thames Alliance, a public private partnership. We have also succeeded in getting increased funding from Defra to spend on critical maintenance and improvements to the infrastructure.

The Thames is a managed river with 44 locks. The non-tidal navigable section is 218km. The width varies considerably from 18m at Lechlade to 100m at Teddington. The Lower Thames cross-section is a relatively wide and shallow river, with a substrate of predominantly coarse sediment. The bank is a mixture of engineered and natural banks.

In the past there was extensive dredging but this is very limited now. We dredge on a site by site basis when necessary to achieve the navigable depth for the fairway.

We undertake a regular programme of capital works to maintain the infrastructure of the Thames, mainly focussed on locks and landings.

Flows during a typical summer are: Upper Thames (Buscot) – 230 million litres per day (Ml/d), Middle Thames (Reading) – 970Ml/d and Lower Thames (Kingston) – 1900Ml/d. There are 36 licences to abstract water directly from the non-tidal Thames. About 60% of the river length has been classed as having medium sensitivity to adverse ecological effects of low flows, with about 35% less sensitive than this and a small section between Eynsham and Oxford (5%) highlighted as being more sensitive.

Both the chemical and biological water quality of the Thames have improved dramatically over the last 30 years. Generally, the Thames and its tributaries are graded as A or B (very good or good), although two sites have been classified as grade C (fair). Water quality in the Thames is influenced by discharges from sewage treatment works, diffuse agricultural run-off, urban run-off and accidental or mischievous incidents of pollution. The Thames Waterway Plan recommends that consideration should be given to the need for bacteriological monitoring in lengths where water contact sport is popular.

Current uses of the river include powered boating, sailing, rowing, canoeing, angling, water supply, nature conservation, camping and swimming (as part of organised events), and as a drainage system for flood management.

### Navigational use

Our vision is to increase the use of the Thames for communities, wildlife, leisure and business. It is currently used for recreation and by associated businesses. We plan to investigate freight opportunities although we believe these are limited. The Thames is currently used by powered vessels (launches, Dutch barges, passenger boats and narrowboats) and also unpowered vessels for rowing, canoeing and sailing. A total of 24,510 boats were registered in 2005, of which just over 75% were powered vessels.

Lock dimensions and bridge air draughts limit the size of usable craft to 53m x 6m up to Windsor, 40m x 5.3m up to Reading, 36.5m x 5.25m to Oxford and 33.2m x 4.2m upstream of Oxford, with available headroom of 3.55m to Oxford and 2.28m further upstream. Available draught varies from 1.7m in the lower reaches to 0.9m upstream of Oxford.

The Thames is open all the time as there is a public right of navigation. There is no zoning or limitation on the number of vessels. Teddington Lock is staffed 24 hours every day; staffing at other locks varies seasonally, although locks can be user operated out of hours.

The level of use and waterspace available means that generally, conflicts between users are minimal. There are some issues with rowers in busy rowing reaches, and with anglers, but a system of River User Groups to coordinate local activity has helped inter-user dialogue. River closures for un-powered events are unpopular with powered boat users. Some traditional Thames users are unhappy with the increase in narrowboat numbers.

The increase in winter lock closures due to increased capital spending is unpopular, as many modern boats are useable all year round.

#### Navigation restoration proposals

There are no proposals for navigation restoration on the Thames itself but there are proposals to restore the Wiltshire and Berkshire Canal and the Thames and Severn Canal (now referred to as part of the Cotswold Canals), which will link to the Thames.

### Local navigation interest groups

Association of Thames Yacht Clubs, Association of Thames Valley Sailing Clubs, Cotswold Canals Trust, Electric Boat Association, River Thames Boat Project, Thames Hire Cruiser Association, Thames Traditional Boat Society, and Wilts & Berks Canal Society.

#### Nature conservation interest

The Thames and its flood plain contain a diverse range of valued habitats including flood meadows, wetlands and reedbeds. Examples of aquatic Biodiversity Action Plan (BAP) priority species present include the otter, water vole and depressed river mussel. Regional priority aquatic species include the barbel, club-tailed dragonfly, Loddon lily and Loddon pondweed. Some bat species are also water dependent. The freshwater Thames has a diverse fish community, with approximately 30 different species comprising both coarse fish and salmonids. It supports many species of birds such as the kingfisher, great crested grebe, mute swan, coot and moorhen, as well as reed and sedge warblers which nest in marginal vegetation. There is also great diversity of aquatic plants. The presence of locks and weirs protects some important sites that are water flow and/or level dependent. The richest areas are the shallow margins where plants like the yellow water lily and the common reed are established, providing habitats for invertebrates, fish and birds. Backwaters, such as those in the Little Wittenham Site of Special Scientific Interest (SSSI), often provide habitats for damselflies and dragonflies, including the locally important club-tailed dragonfly and white-legged damselfly. Little Wittenham's ponds also support the UK's largest breeding population of great crested newt. Wetland creation schemes have been undertaken adjacent to the Thames at various sites including Iffley, near Oxford, and Cholsey Marsh, downstream from Wallingford.

There are 35 water related SSSIs, one National Nature Reserve, three Special Areas of Conservation (SAC) and one Special Protection Area (SPA) within the River Corridor, although none includes the main navigable channel.

Monitoring includes routine macro invertebrates, fisheries, macrophytes, phytoplankton and river habitat surveys. Chemical quality is graded using the General Quality Assessment (GQA) system. Generally the upper Thames is classed as good to very good though some lower stretches are only fair. The majority of the Thames has good biological quality measured through macro invertebrate scores (GQA), although there are some exceptions on the lower sections as a consequence of reduced water quality and the extent of hard bank protection. Over the last 20 years the river has seen improvements; these include an increase in water clarity leading to the development of abundant and diverse macrophyte communities, a decline in the amount of material dredged and removed from the river, and improved water quality. Further information is available on www.environmentagency.gov.uk.

Key issues affecting the nature conservation value of the river include: diffuse pollution, water abstraction and low flows, habitat modification through hard bank protection and dredging, invasive species, fragmentation of habitats, impoundment, and barriers to species migration and dispersal.

### Local wildlife interest groups

Berks, Bucks & Oxon Wildlife Trust, Surrey Wildlife Trust, Thames Water and Thames Fisheries Consultative Council.

### Relationship between navigation and nature conservation interests

The main areas of conflict between navigation and wildlife conservation are engineering works on the river, for example bank protection and dredging. Where sheet piling is necessary, various methods are being used to reduce its sterility; success will be monitored over time.

Some people perceive a potential adverse impact on wildlife from boat wash, hard-edged banks, marina development and the potential for growth in boating. For the current ecological status to be maintained and improved, navigation needs to be constantly managed to ensure there is no threat to wildlife. Wildlife interests can also be seen as a threat to navigation if they block the development of boating facilities or insist on mitigation which is prohibitively expensive.

We are continuing to seek ways of improving integration between the different sector/functions within the Environment Agency, so that compromise resolutions to problems are found by discussion and the Agency's high standards towards nature conservation are maintained. Internal Thames Champions groups help to improve integration, as do Capital project workshops.

Key requirements to resolve uncertainties include improved risk assessment tools to identify proportionate responses to bank erosion and better understanding of the impact of boat use on banks and on wildlife. Also, biological monitoring of large heavily managed lowland rivers still presents many challenges. Some existing data, for example from River Corridor Surveys, are out of date; there is a paucity of macrophyte data and a poor understanding of river geomorphology.

### Management actions or proposals

The Thames Waterway Plan has been prepared to address issues of navigation and recreation. The Plan has been subjected to Strategic Environmental Assessment and was developed in consultation with internal colleagues and River Thames Alliance members.

The intention is that none of the Agency's activities will result in the loss of biodiversity and, by 2010, there will be a substantial net gain in the region's biodiversity resource. Other plans and agreements will assist with this; for example Water Level Management Plans address hydrological requirements of water dependent SSSIs, the Lower Thames operating agreement deals with some abstraction issues and there is an agreed protocol on flow share between locks and fish passes in drought conditions. Detailed proposals to improve fisheries are developed through Fishery Action Plans. These are drawn up in partnership with angling, fisheries and conservation interest groups including the Thames Fishery Consultative Council. There is also a special Salmon Action Plan for the river. All capital works, such as lay-bys, weir rebuilds and bank protection, are subject to an Environmental Impact Assessment process.

Design guidance is provided for lock sites, with a pallet of options available for bank protection; for example composite hard and soft bank protection, habitat creation schemes that can off-set damage in other areas and lock by-pass schemes. Techniques include fish refuge pipes attached to the toe of steel sheet piles, pile faces treated with geotextile materials, spawning and refuge brushes or timber cladding to increase structural diversity. Dredged gravels have been removed and re-deposited where this will provide an enhanced habitat, for example Romney Lock Cut dredgings were used to enhance Romney Weir stream.

A naturalised by-pass channel was created on Penton Hook island to mitigate for impacts of the weir structure as a barrier to the movement of fish. This provided the opportunity to create valuable and scarce Thames habitats previously lost because of navigation management pressures. Ecological surveys have shown that this has been very successful for wildlife, including red data book invertebrates, macrophytes, kingfishers and more species of fish in the channel than in any other site on the river. Success as a migration route for fish has been demonstrated by surveys showing 11 species of fish using the channel for upstream migration. Mitigating for the impacts of individual projects has often been difficult to resolve due to a number of constraints, such as land ownership. The Environment Agency has been very proactive in recognising this issue and a process has been developed to allow for mitigation banking. This has meant that targeted offsite ecological mitigation opportunities can be realised effectively.

An enforced speed limit of 8km/h is an excellent control of boat wash. River User Groups have been very effective at managing user conflicts. Educating users is important, through mechanisms such as the Green Blue initiative of the British Marine Federation and the Royal Yachting Association.

### Good practice lessons

Face to face discussions are important, achieved through River User Groups. Mutual understanding and respect helps lead to consensus and compromise solutions.

There is a need to have agreed a strategy and objectives to guide development, incorporating a holistic approach to sustainability (environmental, economic, social and health).

There is a clear message that needs to be communicated: an improved ecological resource equals an improved amenity resource which leads to increased use of the waterway.

### Sources of further information Thames Waterway Plan available at www.riverthamesalliance.com/plan.php

# Case study 10 Rochdale Canal



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### Waterway description

The Rochdale Canal is a broad canal which pioneered the routes up the valleys on each side of Blackstone Edge on to the magnificent rounded slopes of the Pennine moors. Rail and modern road followed on, all packed tightly into the available space. The canal was reopened in 2002 and is a wonderful journey for energetic boaters, especially as it is an integral part of a 'Pennine Ring' including the Huddersfield Narrow Canal or the Leeds & Liverpool Canal. It was the first of three Pennine crossings to be completed (in 1804), the others being the Leeds & Liverpool and the Huddersfield Narrow Canals, also recently reopened. The engineers were Brindley, Rennie, Jessop and Crosley. Running for 53km from Sowerby Bridge to Castlefield in Manchester, through 92 broad locks and a short tunnel, it was designed to take river craft from both sides of the Pennines (lock size 22.5m x 4.27m). Payloads of up to 70 tons of coal, grain, salt, cotton and wool were carried around the urban areas at each end, but a relatively small proportion of trade went through all the locks 'over the top'.

Despite competition from the railways, the Rochdale Canal was busy until the First World War but eventually its commercial use declined due to the development of better road networks. The last through cargo was in 1937 and trading ceased finally in 1958. Sections to the west of the Pennines were partially filled in and locks converted to weirs. The canal was never nationalised but the private company was more inclined to develop the canal company's land assets than waterways traffic.

Control was transferred to BW/The Waterways Trust in 2000 and full restoration to navigation has taken place at a cost of £23.8 million, funded by grants of £11.9 from the Millennium Commission, £10.8 million from English Partnerships and contributions from Rochdale and Oldham Councils. This required approximately 15 blockages to be removed, new sections of channel to be excavated and constructed plus dredging and associated environmental work to be carried out. Since the restoration, many lock gates have been replaced and a programme has been undertaken to improve paddle gearing. A section of the embankment at Whit Brook, Middleton has been repaired to prevent a potential breach. A full account of the restoration can be found at

www.penninewaterways.co.uk/rochdale. Reopening occurred in July 2002, although there have been some restrictions in use due to various factors including breaches, lock gate failures and dredging. It is a broad canal with a general width of approximately 15m. The offside is generally soft with a well developed fringe of emergent vegetation. The tow-path side is a mixture of original dry stone work, copings on wood, sheet piling and concrete. There are some areas with emergent vegetation on the towpath side. The majority of the urban sections have a stone construction on both sides; frequently the offside may comprise a mill wall and foundations.

The canal was widely dredged during the restoration period; additional dredging takes place to address shallow areas at mooring sites and bridge holes.

Warland and Chelburn reservoirs feed the summit pound, while Hollinworth Lake supplements this at the Manchester side of the Littleborough Lock flight. Water supply can be limiting during peak times, however BW operates a booking system during these periods. Through the 'Rochdale 9' locks in Manchester, passage is assisted due to anti-social behaviour.

The canal is used for recreational boating, angling and canoeing, and the towpath has a moderately heavy use for walking.

### Navigational use

The objectives for navigation on the waterway are to develop leisure use, balancing boat demand with nature conservation objectives.

Use is mainly by recreational canal craft. There is one canoe club based at Castleton. The canal is part of the South Pennine Ring and is therefore appealing to recreational users. There is also a community boat based at the top of the Slattocks Lock flight.

Data on boat numbers through the Site of Special Scientific Interest (SSSI)/Special Area of Conservation (SAC) are collected using three webcams. At the time of writing, since re-opening the highest number of boat movements was in 2004, with 231 boats entering the SSSI/SAC section; this number was limited as a result of infrastructure failure leading to the closure of the canal during the season. Due to the number of locks (3 per mile on average) boat numbers are self regulating. There is a defined level of navigation within the SSSI/SAC section at which BW is required, under the terms of a management agreement with NE, to assess the impact of boating on the submerged aquatic flora, currently set at 800 boat movements per year. If no adverse impact is identified then this number can be increased in 100 movement increments. Due to the number of locks, water supply limitations and infrastructure problems, navigation demand to date has been low resulting in few conflicts between navigation and wildlife interests.

### **Navigation restoration proposals**

The canal has been restored to navigation and was reopened as a through route in 2002.

### Local navigation interest groups

Rochdale Canal Society

### Nature conservation interest

19km of the canal in Oldham and Rochdale Boroughs are designated as a SSSI and SAC, due to its important population of floating water plantain (Luronium natans or L. natans) and associated aquatic plant assemblage. L. natans is protected under UK and European law. The nature conservation objectives for the waterway are to maintain and enhance where appropriate the important aquatic flora, while balancing this with its use as an operational canal, and to achieve favourable condition of the SSSI.

UK Biodiversity Action Plan (UKBAP) habitats present on the waterway channel include 'standing open water and canals'; UKBAP priority aquatic species present include floating water plantain, grass wrack pondweed, white clawed crayfish, water voles and bats.

As well as L. natans, the site supports a diverse assemblage of aquatic flora, notably its pondweeds, Potamogeton spp. The nine species of these found in the canal represent a balanced community and reflect the quality of water, which varies from acidic to neutral in pH, with low to moderate levels of nutrients. Significant stands of emergent plants also occur, including water violet and a range of other flowering plants and some uncommon ferns. There is a rich but generally common-place invertebrate assemblage in excess of 112 species; 13 of these species are of local importance, including the locally uncommon freshwater sponge Spongilla lacustris. Two species are nationally scarce, a water beetle Agabus uliginosus and the pea mussel Pisidium pulchellum. The canal also provides habitat for a number of coarse fish and waterside bird species, including the kingfisher.

As part of the management agreement between BW and NE for the SSSI/SAC, the canal is subject to a suite of surveys and monitoring activities. 34 aquatic macrophyte survey plots along the canal are surveyed annually in September, at the end of the main boating season, with a subset of 10 sites surveyed in spring prior to the start of the boating season. A summary of the information is produced at the end of the season in a review document. Eleven water quality sampling sites are sampled monthly for pH, conductivity, secchi depth, phosphate and nitrate to monitor seasonal and long-term variation. Data collected to date indicate that chemical parameters are within the agreed thresholds set during the restoration.

L. natans and other flora and fauna could be impacted by a variety of factors, including boating, water quality and external factors such as shading, pollution incidents and vandalism. The monitoring undertaken covers all these aspects to ensure that the true reasons for any potential impact on the biology can be identified and the correct management actions taken. The SSSI is currently considered to be in a recovering condition following restoration.

The main pressure on the nature conservation interest is perceived to be navigation. It appears that a moderate number of boat movements is required to sustain nature conservation interests in the canal. Some of the important aquatic macrophytes present on the canal, including L. natans, are intolerant to competition from other vigorous aquatic plants. Few or no boat movements allow the dominant species to thrive, which may impact on the abundance of these more sensitive species. Boats have yet to reach the levels that may have a negative impact on L. natans and other sensitive species.

### Local wildlife interest groups

Local wildlife lobby groups (e.g. wildlife trusts). Other key players include NE and Greater Manchester Ecology Unit.

### Relationship between navigation and nature conservation interests

A document known as the exit strategy was produced by BW and NE highlighting all the work that was undertaken to protect L. natans and other species. It also includes details of the monitoring required and maintenance operations that can be carried out without impacting on the features of interest, as well as the protocol to be followed if activities that may impact on the interest features are required. The supervisors and bank staff are all briefed on the nature conservation issues and protocols to be followed. They are assisted and advised by BW ecologists.

The nature conservation interests were balanced against the regeneration benefits of the restoration by having a very close partnership between NE and BW. A jointly funded project officer was employed to liaise between BW, contract engineers and NE so ensuring that the agreed protection and monitoring measures were put in place. The success of the project depended on the ability of the project officer to agree working methods that were practical and efficient and allowed the engineering work to continue without affecting the protected species. Flexibility, the ability to develop new methods rapidly and getting approval from both BW and NE were vital.

Some people initially expressed concern that the protected species might jeopardise the restoration. As the project developed this concern dissipated. The most recent issue was dredging: to preserve L. natans in situ, the dredging was restricted to a 6 metre channel adjacent to the towpath even though the canal society preferred to have the full width dredged.

Nature conservation bodies supported and continue to support the restoration of the canal. They understand the regeneration benefits the canal brings to very challenging urban areas. BW staff understand that a balance between nature conservation and operation is required. There is regular contact between BW's ecological, bank and office staff regarding conservation issues. Ecological staff also screen proposals and works to ensure the BW Environmental Code of Practice and other agreed procedures are followed.

Current levels of navigation, including a moderate increase, are not considered a threat, although NE needs to be notified of the number of boat movements at the end of the season to allow them to determine trends. Current relationships are good. Key uncertainties remain on the potential impact of more than 800 boat movements per year on the nature conservation interest of the SSSI; however, agreed monitoring is in place.

### Management actions or proposals

The exit strategy document covers the strategic aims and includes the management plan. This document is approved by NE and BW.

A wide range of methods was used to ensure that the ecological works had the best chance of success. These included conservation in situ, translocation to alternative sites on the canal, translocation off site and culture and return post restoration (population safeguard). The dredging profile was restricted to a 6m channel on the tow path side. 20 in-channel reserves were created to act as refuges from activities being undertaken in the channel. The technical measures were vital in assuring conservation bodies that all options and potential concerns were being addressed and that all eventualities were considered, including the very pessimistic. Should the restoration, including dredging, have been undertaken without these measures then important species would have been significantly impacted. While working to preserve the protected species, a wide range of other species has also benefited.

The restoration and ecological works were considered a success. Monitoring shows continued development of L. natans populations and stability of the chemical quality. Several vigorous species are expanding and may have potential to impact upon the protected species if left unchecked. In this case, appropriate management activities will be undertaken. Regular ecological steering group meetings were held between BW, NE and Greater Manchester Ecology Unit. These were open and transparent which fostered trust. All issues were looked at, no matter how contentious. The project officer held regular progress updates with all organisations to ensure all parties were appraised of the state of the project and any issues. This led to all parties feeling included in the day to day aspects of the project.

The project was executed without any major problems arising from nature conservation issues and communication throughout the project was good, which was key to its success. In the annual monitoring review meetings, few issues are raised and relationships remain good.

### **Good practice lessons**

It is important to ensure waterway staff are briefed on progress and issues so that they buy-in to the process, championing the nature conservation issues after the work is finished. A close working partnership with NE through the Project Officer proved successful.

In the early stages, it was found difficult to record all meetings and site visits. This is an area that should be looked at right at the start of the project. Good note and record keeping is essential, especially when agreeing potentially contentious issues.

### Sources of further information

See SSSI citation on Natural England's website www.naturalengland.org.uk

See reports on BW's website www.britishwaterways.co.uk

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www.norfolk-broads.org	Page - 26 (Hickling Broad)
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