

References and further reading

Appendix 1

The standard work on the subject is **The Drainage Channel Biodiversity Manual: Integrating Wildlife and Flood Risk Management**, (DCBM) Buisson, R. S. K., Wade, P. M., Cathcart, R. L., Hemmings, S. M., Manning, C. J., & Mayer, L. (2008). Association of Drainage Authorities and Natural England, Peterborough. This is a major revision and expansion of the original publication **Nature Conservation and the Management of Drainage Channels** by Chris Newbold, John Honnor & Karen Buckley for ADA and the NCC (English Nature's predecessor). A copy of the current manual should be in the hands of every IDB Chairman and District Officer.

The DCBM is also an excellent source of information on further reading titles concerning all aspects of waterway management for conservation.

One of the best and most appropriate guides to managing the type of ditches that occur in the Middle Level area is the Defra publication **Guidelines for managing and prioritising ditch types in arable land for biodiversity**. In 22 pages (illustrated version) it sets out why and how one can conserve and manage the natural features that occur in typical arable ditches. The publication can be viewed at this web site address, (I have not been able to find a menu route to it again).

<http://randd.Defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=10080>

The New Rivers & Wildlife Handbook, published in 1994 is a comprehensive handbook on the subject. Although it is more orientated towards rivers and larger drains, its many illustrations and excellent selection of over 40 case studies make it an invaluable source of information and ideas for those managing channels of all types.

The **Manual of River Restoration Techniques** (2002) produced by the River Restoration Centre is more focussed on large channels and rivers but some of the examples would be applicable to certain IDB situations.

The Water Vole Conservation Handbook, Second Edition, by Rob Strachan and Tom Moorhouse, published in 2006 gives a much more extensive coverage of management of water-bodies for wildlife than the title suggests. Supported by excellent coloured images, it sets out clearly and comprehensively the management required to support the species and ensure ditch maintenance can proceed without falling foul of the legislation that protects its population.

The Association of Drainage Authorities published **Mitigation Measures for Water Voles** and is available to download from its website <http://www.ada.org.uk/> Go to 'Downloads', then 'Guidance, Consultations & Technical Documents'. It is also reproduced here in Appendix 4. It sets out in a series of keys the approved Best Practise procedures IDBs should follow to ensure their works, large or small, can proceed where water voles are present. Surveys have shown water voles have been recorded in at least 60% and often over 80% of the ditches in Middle Level IDB districts so it is wise to proceed assuming they are present. Conformation to these

procedures will ensure a board's actions do not infringe the legislation that protects water voles and their habitat.

An excellent paper on what makes up the characteristics of a 'good ditch' for water plants is **Aquatic Plant Diversity in Arable Ditches: Scoping Study**. Owen Mountford and Henry Arnold. CEH Monks Wood. February 2006. The full study can be downloaded from the web address below. The source is NERC Open Research Archive (NORA). Available at: <http://nora.nerc.ac.uk>

The Environment Agency (EA) have produced their own guide for EA staff on the subject – **Environmental Options for Flood Defence Maintenance Works** which sets out in a series of diagrams 40 different options for mowing, weed-cutting, tree & bush management and de-silting.

Water Management Alliance, formerly Kings Lynn Consortium of Internal Drainage Boards, has summarised its management methods in its publication **Standard Maintenance Operations**.

The Middle Level Commissioners internal guidance for operators on its channels and banks was revised in 2007 and re-titled **Operations Manual for the Management of Middle Level Watercourses**. Other Drainage Authorities have produced their own guidance. Many other sources of specialist information are available dealing with specific ditch or wetland species.

A survey of the distribution of water voles at Ransonmoor DDC and Curf Fen, part of Curf & Wimblington Combined IDB was carried out in 2010, repeating a survey carried out by the Wildlife Trust in 2005. The dissertation written by the principle surveyor, Yuping Chen is **AN INVESTIGATION OF THE ENVIRONMENTAL FACTORS THAT AFFECT THE WATER VOLE (*Arvicola terrestris*) DISTRIBUTION IN TWO FENLAND DRAINAGE BOARDS, CAMBRIDGESHIRE**, Yuping Chen, University of East Anglia. The full paper can be viewed on the Middle Level web site, www.middlelevel.gov.uk under Conservation then Water Voles.

The internet is of course a very useful source of information and one only has to put a key word or two into a search engine like Google to find a wealth of information on the subject. **The Environment Agency, Natural England, The Wildlife Trusts** and many other specialist sites have a good range of information available to view online.

Appendix 2 Useful Addresses & Contacts

Middle Level Commissioners staff

David Thomas		07725 134179
Bill Ransom		07770 670751
Jonathan Fenn		07725 134175
Paul Lee		07770 670753
Malcolm Downes		07850 633873
Richard Lloyd		07768 026119
Cliff Carson	Office	01354 602965
	Mobile	07765 597775

Fitters:	Steve Baker	07771 637011
	Kevin Russell	07725 134170

Workmen:	Julian Carlile	07725 134171
	Tony Clare	07725 134172
	Alan Davey	07725 134173
	Morgan Lakey	07725 134174
	Darren Oakey	07725 134176
	Lewis Ransom	07725 134178
	Vince Richardson	07770 607413

St Germans Pumping Station

Landline:		01553 618883
	Graham Buhlemann	07715 175643
	Jon Van Dyke	07789 874807

Lock Keepers

Paul Grodkiewicz, Salters Lode	01366 382292
Tina Rootham-Hayward, Stanground	01733 566413 07824 600470
Maureen Norton, Marmont Priory	01945 773959 07824 821737

Contractors

Robin Ashman	07980 566149
Jim Barnes, Fen Ditching Company	07961 531061

Other Contacts

EA Floodline	0845 988 1188
EA Incident hotline (pollution, de-oxygenation, etc)	0800 80 70 60
Fenland District Council	01354 654321 (Office Hours)
Cambridgeshire County Council	0345 0455200(Office Hours)

Huntingdonshire District Council 01480 388388 (Office Hours)
01480 434167 (Out of Hours)

Kings Lynn & West Norfolk Borough Council 01553 616200 (Office Hours)
01553 616601 (Out of Hours)

Norfolk County Council 0344 800 8020 (Office Hours)

RSPCA 0300 1234 555 (Office Hours)
0300 1234 999 (24 hr Cruelty Line)
Wildlife Crime Officer Paul Carter 07921 294942

IDB District Officers:

Benwick I.D.B.

Ibbersons Pumping Station 07761 664136 (Brian Hunt, Pump Attendant)
Beezlings Pumping Station 01354 677353 (Reg Few, Pump Attendant)
Copalder Pumping Station 07900 862672 (Andrew Hunt, Pump Attendant)
Broadalls Pumping Station }
Ramsey Mere Pumping Station } 01354 677459 (John Moulding, Pump Attendant)
Betty's Nose Pumping Station 07778 610551 (Nigel Thacker, Pump Attendant)

Bluntisham I.D.B.

Bluntisham Pumping Station (Barley Croft) 07774 164683 (Ian Scrafton, Pump Controller)

Botany Bay (Private) DD 01354 677209 (Bank Farm Ltd)
Botany Bay Pumping Station

Cambridgeshire County Council

Stitches Pumping Station 07976 605522 (Ian Johnson, Pump Attendant)

Dale Boyce Churchfield & Plawfield I.D.B. 07748 036236

Peter Davies Conington & Holme I.D.B. 07774 726181
Conington Pumping Station

Curf & Wimblington Combined I.D.B.

Curf Pumping Station 01354 693674 (Jim Carson, Pump Attendant)
Bensons Pumping Station 01354 688406 (Derek Watson, Pump Attendant)
Jenny Gray's (Finchams Farm)PS 07778 240108 (Neil Cook, Pump Attendant)
Wimb' Combined (Stonea Fen) PS 07836 577253 (Robin Gowler)
Wimblington Common Pumping Station " " " "

Nigel Russell Euximoor I.D.B. 07788 721768
Reed Fen Pumping Station
Ironbridge Pumping Station

Feldale I.D.B.

Feldale Pumping Station 07808 582250 (Marilyn Wright, Clerk)

Haddenham Level D.C.

Haddenham Pumping Station 01353 741460 (Michael Church, Clerk)
Sutton Gault Pumping Station 07801 565488 (David Jordan, Pump Attendant)

John Ayres Holmewood & District I.D.B. 07850 666146
Whittlesey Mere Pumping Station

	Yaxley Mere Pumping Station	01733 245549 (John Mears, Pump Attendant)
Stuart Ayers	Hundred of Wisbech I.D.B.	07771 803927 07778 913027 (Ben Wales, Workman)
Michael Fenn	Ladus D.D.C.	07887 815297
Brian Cobb (Superintendent)	Manea & Welney D.D.C. Purls Bridge Pumping Station Glenhouse Pumping Station	07778 489989
March & Whittlesey I.D.B. Attendant)	Staffurths Bridge Pumping Station	07768 382186 (Hugh Whittome, Pump Attendant)
	West Fen Pumping Station	07768 901923 (Mike Mottram, Pump Attendant)
	Turves (Beggars Bridge) PS	07768 366332 (Nigel Bates, Pump Attendant)
	Moore's Pumping Station	07768 903046 (Henry Kisby, Pump Attendant)
	Duncombes Pumping Station	07768 980458 (Ralph Potts, Pump Attendant)
Robert Jones Geoff Hopkin	March Fifth D.D.C . North Creek Pumping Station South Creek Pumping Station	07789 237881 01354 653321
James Martin Attendant)	March Sixth D.D.C. Norwood Pumping Station	07718 971935 07880 557923 (Tony Alterton, Pump Attendant)
Martyn Wilkinson	March Third D.D.C. Burrowmoor Pumping Station	07850 356564
Clive Martin Attendant)	March East I.D.B. Latches Fen Pumping Station	07770 671522 07982 733579 (Darren Storey, Pump Attendant)
Attendant)	Bedlam Pumping Station	01354 638269 (Ted Smart, Pump Attendant)
	Binnimoor Pumping Station	07884 036323 (David Brooks, Pump Attendant)
Michael Fenn	Needham, Burial & Birdbeck D.D.C.	07887 815297
Afe Edgley	Nightlayers I.D.B. Nightlayers Pumping Station	07738 424618
Glenn Boyce	Nordelph I.D.B. Aqueduct Pumping Station	07758 515340
Jeff Edwards	Ramsey I.D.B. Stocking Fen Pumping Station Lodes End Pumping Station	07753 190487
Cedric Armstrong	Ramsey First (Hollow) I.D.B. Ramsey Hollow Pumping Station	07790 525787
Jason Edwards	Ramsey Fourth (Middlemoor) I.D.B. Middlemoor Pumping Station Daintree Pumping Station	07719 922578
Des Cox	Ramsey, Upwood & Great Raveley Green Dyke Pumping Station	07802 426091

	New Fen Pumping Station Upwood Common Pumping Station	
Michael Dale	Ransonmoor D.D.C. Ransonmoor Pumping Station	07889 074976
Roly Laxton	Sawtry I.D.B. Moat Farm Pumping Station Castlehill Pumping Station Sawtry Roughs Pumping Station	01487 830606 } 07747 844986 (John Dean, Pump Attendant) 07887 722112 (Tony Darby, Pump Attendant)
David Stimson	Sutton & Mepal I.D.B. Fortrey's Hall (Mepal) Pumping Station	07747 803758
Keith Wilderspin (Superintendent)	Swavesey I.D.B.	07850 599016
John Hartley	Upwell I.D.B. Cock Fen Pumping Station Upwell Fen Pumping Station Nordelph Pumping Station Padgett's Corner Pumping Station Bedlam Bridge Pumping Station	07714 264521 } 07771 927052 Graham Nunn Foreman 07909 928471 Carl Nunn
Jim Clarke	Waldersey I.D.B. (Southern End) Rings End Pumping Station	07850 037004
Ben Wales	Waldersey I.D.B. (Northern End) Waldersey Pumping Station	07778 913027 01945 583737 (H Wheatley, Pump Attendant)
Bob Wilmer	Warboys Somersham & Pidley I.D.B. Washway Pumping Station Westmoor Pumping Station Puddock Pumping Station Pidley Pumping Station High Fen Pumping Station Acre Fen Pumping Station	07909 527721
	White Fen D.D.C. White Fen Pumping Station	07761 664136 (Brian Hunt, Pump Attendant)
Roy Hales	Whittlesey I.D.B. New Plantation Farm Pumping Station Old Plantation Farm Pumping Station Ironsides Pumping Station Mereside Pumping Station Glassmoor Bank Pumping Station Underwoods Pumping Station Tebbits Bridge Pumping Station Conquest Lode Pumping Station Lords Farm Pumping Station Manor Farm Pumping Station Goosetree Corner Pumping Station Goosetree Estate Pumping Station Beggars Bridge Pumping Station Wype Doles Pumping Station Drysides Pumping Station	07850 866655
	Woodwalton D.C. Speechleys Pumping Station	07808 582250 (Russell Wright, Clerk)

Clerks to Parish/Town Councils

Mrs M Meyrick	Downham West Parish Council	01366 384679
Mrs D Newton	Outwell Parish Council	01945 774327
Ms K Cobley	Upwell Parish Council	01945 772260
Ms K Bennett	Ass.Clerk Upwell Parish Council	01945 861345
Mrs E Oliver	St German's Parish Council	01553 630655
Mrs J Melton	Chatteris Town Council	01354 695166

Cambridgeshire & Peterborough Environmental Records Centre (CPERC)

The Manor House, Broad Street, Great Cambourne, Cambridgeshire CB23 6DH

Telephone 01954 713570 Fax: 01954 710051

Email data@cperc.org.uk

Web site: <http://www.cperc.org.uk/>

Norfolk Biodiversity Information Service (NBIS)

Planning and Transportation Department, County Hall, Martineau Lane,
NORWICH NR1 2SG

Telephone: 01603 224458 Fax: 01603 223219

Email: nbis@norfolk.gov.uk

Web Site: <http://www.nbis.org.uk/>

The Wildlife Trust, Bedfordshire, Cambridgeshire & Northamptonshire

The Manor House, Broad Street, Great Cambourne, Cambridge CB23 6DH

Tel: 01954 713500 Fax: 01954 710051 Email: cambridgeshire@wildlifebcn.org or
firstname.surname@wildlifebcnp.org

Web Site: <http://www.wildlifebcnp.org>

Norfolk Wildlife Trust

Bewick House, 22 Thorpe Road, Norwich NR1 1RY

Telephone: 01603 625540

Email: info@norfolkwildlifetrust.org.uk

Web Site: <http://www.norfolkwildlifetrust.org.uk>

Licensed barn owl box surveyors

Peter Wilkinson Mobiles 07543 950678 or 07916 998010

Jake Alsop

Suppliers of bat boxes, experts in bat surveys and environmental works

Conservation Constructions

41 Ten Mile Bank Littleport, Ely, Cambridgeshire CB6 1EF

Telephone 01536 480 183

Email: enquiries@conservationconstructions.co.uk

Web Site: <http://www.conservationconstructions.co.uk/>

Supplier of barn owl and many other types of bird boxes

John Stimson, Wilburton

Telephone 01353 740451

Suppliers of sedge plugs and other native plants –

British Wild Flower Plants, Burlingham Gardens, 31 Main Road, North Burlingham, Norfolk

NR13 4TA Telephone 01603 716615

Web site: www.wildflowers.co.uk

Suppliers of pre-established coir rolls, etc. –

Salix River & Wetland Services Limited

Swansea

Salix, Blackhills Nurseries, Blackhills Lane, Gower, Swansea, SA2 7JN

Telephone: 0870 350 1851

Fax: 0870 350 1852

Email: info@salixrw.com

Thetford

Salix, Croxton Park, Thetford, Norfolk, IP24 1LS

Telephone: 0870 350 1851

Fax: 0870 350 1852

Email: info@salixrw.com

Web Site: <http://salixrw.com/>

For the Historic Environment Record to check if any statutorily protected sites or significant non-designated are likely to be affected by works -

Kasia Gdaniec, Senior Archaeologist, Historic Environment Team, Cambridgeshire County Council, Box CC1008, Shire Hall, Cambridge, CB3 0AP Tel: 01223 728568

email: kasia.gdaniec@cambridgeshire.gov.uk

Web: www.cambridgeshire.gov.uk/archaeology

Reporting Mitten Crab sightings

The web site <http://mittencrabs.org.uk/> gives information, a distribution map and a location to report sightings of mitten crabs.

Fenland Bird Recovery Project

Niki Williamson

01354 680212

Street Pride Co-ordinator

Jeanette Milner

01354 602134

Appendix 3 Wildlife Legislation affecting IDBs

The Middle Level Commissioners and all Internal Drainage Boards, as public bodies, have statutory nature conservation responsibilities and duties under

- The Land Drainage Act 1991
- The Wildlife and Countryside Act 1981 (as amended)
- The Countryside and Rights of Way Act 2000 (CRoW)
- As 'Competent Authorities' under the Conservation of Habitats and Species Regulations 2010 (Habitats Regulations 2010)
- The Water Framework Directive.

Other legislation places obligations on Drainage Authorities and IDBs to carry out actions that support various conservation or environmental objectives.

Protected species guidance is more comprehensively covered in the ADA/NE Drainage Channel Biodiversity Manual, Appendix 9, which is recommended reading for more detailed coverage of the subject.

The Land Drainage Act 1991 (as amended by 1994 Act)

Section 12 of the Act requires that in discharging their functions in relation to Land Drainage, the Boards must **'further the conservation and enhancement of natural beauty and the conservation of flora, fauna and geological or physiological features of special interest.'**

The Countryside and Rights of Way (CRoW) Act

Section 28G of the Countryside and Rights of Way (CROW) Act states that public bodies must **"take reasonable steps, consistent with the proper exercise of their functions, to further the conservation and enhancement of SSSIs"**. (Sites of Special Scientific Interest)

Natural England (formerly English Nature) must be consulted by public bodies if they wish to carry out work that may damage a SSSI, or if they are considering authorising others to carry out operations that may do so. This requirement applies to operations within a SSSI, and to operations outside the SSSI that may affect the features of interest.

The CRoW Act updates and strengthens the Wildlife and Countryside Act 1981 (as amended). This includes the legislation that protects –

- all wild birds, their nests and eggs. Exceptions exist for the control of certain pest species including crows and magpies.
- certain animals other than birds, including common frogs, common toads, all newts including great crested newts, otters. Adders, grass snakes, slow worms, and common lizards receive partial protection under Section 9 whereby it is an offence to intentionally kill or injure an individual.
- certain rare plants including ribbon-leaved water-plantain.

Defence under the Wildlife & Countryside Act 1981 (as amended).

There are provisions contained within Section 10 of the Wildlife & Countryside Act 1981 (as amended) which provides a defence against offences where the action is the incidental result

of an otherwise lawful operation and could not reasonably be avoided. For example, destruction of a protected species or its place of shelter. However this would be a matter for the courts and each incident is judged on a case by case basis. In the case of mowing banks, the courts may well consider that the destruction of birds' nests could reasonably have been avoided by carrying out the operation outside the nesting season.

Water Voles

Section 9(4) of the Wildlife and Countryside Act 1981 (as amended) protects water voles' places of shelter or protection.

From 6th April 2008 water voles and their resting places are fully protected in England.

It is an offence to

- Intentionally or recklessly damage or destroy or obstruct access to any structure or place of protection.
- Intentionally or recklessly disturb water voles while they are using such a place.
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place which water voles use for shelter or protection or disturb water voles while they are using such a place
- Intentionally kill, take or injure water voles
- Possess or control live or dead water voles or their derivatives
- Sell water voles or offer or expose for sale or transport for sale
- Publish or cause to be published any advertisement which conveys the buying or selling of water voles

All management or mitigation techniques that involve trapping water voles require licensing by Natural England.

Water voles are present in the majority of ditches in the Fens. As a UK BAP species (see below) that has suffered very significant decline in its population nation-wide, the water vole has very severe penalties for damage to its habitat. Fines of up to £5,000, imprisonment for up to six months and forfeiture of any vehicle, machine or item used to commit the offence are available to the courts. There is no provision for licensing the intentional destruction of water vole burrows for development or maintenance operations.

It is not the intention of the law to prevent maintenance works in areas used by water voles but this legal protect does require that due attention is paid to the presence of water voles and appropriate actions taken to safeguard the places they use for shelter or protection. The role of the Environmental Officer is a key element in this process in advising IDBs and their contractors in relation to specific measures required to mitigate negative effects where water voles are present. The ADA and Natural England nationally agreed procedures for carrying out works in drains or ditches where water voles are present are set out in Appendix 4, below.

Badgers

Badgers and their setts are protected under various legislation, drawn together under the Protection of Badgers Act 1992. This makes it an offence to:

- Willfully kill, injure, take, possess, or cruelly ill-treat a badger, or attempt to.
- To interfere with a sett by damaging or destroying it.
- To obstruct access to, or any entrance of, a badger sett.
- To disturb a badger when it is occupying a sett.

Non-native Species

Plants

The Wildlife and Countryside Act 1981 also places controls on the release of non-native species into the wild in Great Britain. It is an offence under section 14(2) of the Act to 'plant or otherwise cause to grow in the wild' any plant listed in Schedule 9, Part II. The flowering plants listed currently are Japanese knotweed and giant hogweed. There is therefore a requirement to control these plants where they occur on land over which ML or the IDBs have jurisdiction. Other non-native bank-side or water plants that are not covered by this legislation but require equal diligence in controlling their spread include - parrot's feathers, floating pennywort, water fern and Himalayan balsam.

Non-native crayfish

It is illegal under the W&C Act to release, or allow to escape to the wild, signal and other non-native crayfish. They pose a threat to native crayfish as carriers of 'crayfish plague' and can undermine banks by extensive burrowing if allowed to become established. Signal crayfish have been recorded in the ML system in 2006. Where they occur, there has been increased interest in trapping non-native crayfish for culinary purposes. This requires a licence from the Environment Agency. While it may seem a useful contribution to the reduction of number of the species scrupulous attention must be paid to cleaning and treatment of traps and equipment to prevent the spread of either the plague or the signal crayfish themselves. Crayfish traps can also drown water voles if they are designed without an escape hole in the roof and/or are sited close under the banks. While the Environment Agency will take the lead in this fisheries related issue, IDB staff or members will be well placed to report any sightings in their districts promptly to the EA. Please also, or alternatively, report them to the Environmental Officer.

Responsibilities and Penalties

It is the responsibility of Boards to ensure these legal requirements are observed. Each Board member is personally liable for penalties delivered by the courts. Fines of up to £20,000 are available to the Courts for breeches of the CRoW Act.

The Habitats Directive

SSSIs can also be designated as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). These designations indicate that the sites are internationally important and are protected under the European Habitats Directive, implemented by the Habitat Regulations in the UK. This places a requirement on the Government and its bodies to **'protect sites from any deterioration or disturbance which would have significant effect on the nature conservation interest and to take steps to conserve that interest'**.

It is not only habitats that are covered by the legislation. Species such as otter, great crested newt and all bat species are covered by the Habitats Directive where ever they are, in a designated site or not.

The Conservation of Habitats and Species Regulations 2010

On 1 April 2010 The Conservation of Habitats and Species Regulations 2010 replaced The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) in England and Wales (and to a limited degree, Scotland – as regards reserved matters).

The Conservation of Habitats and Species Regulations 2010 (which are the principal means by which the Habitats Directive is transposed in England and Wales) update the legislation and consolidate all the many amendments which have been made to the regulations since they were first made in 1994.

Biodiversity Action Plans

In 1992 the UK Government signed a convention at the 'Earth Summit' held at Rio de Janeiro that required the 150 signatory countries to develop national strategies, plans and programmes for conservation and sustainable use of biodiversity. This required measures to '**halt and reverse the decline of wildlife**' in their respective countries. 'Think globally and act locally' was the watchword from the summit.

The Biodiversity Action Plan (BAP) is the UK's initiative to maintain and enhance biodiversity. Section 74 of the CRoW Act 2000 places a duty on Government to deliver the UK Biodiversity Action Plan. The Government is fully committed to the Biodiversity process and has taken steps to ensure all Statutory Bodies participate in the implementation of its plans. Many organisations from across all sectors are committed to achieving the Plan's conservation goals over the next 20 years and beyond.

The Biodiversity Action Plan identifies the species and habitats that are at risk. Species Action Plans (SAPs) are in place for otters, water voles, great crested newts, several rare plants, birds and invertebrates. A list of BAP species that could occur in or near drainage ditches is in the appendix. Habitat Action Plans (HAPs) have been prepared for habitats such as reedbeds, fens, floodplain grazing marsh and rivers & streams. Local Biodiversity Action Plans (LBAPs) are prepared on a County basis to represent the specific requirements of species and habitats based on local knowledge and community-based strategies. The Environmental Officer is responsible for the Local Habitat Action Plan for Drainage Ditches for Cambridgeshire.

Our IDB BAPs tie in to all the other Local and National BAPs and are the route by which IDBs implement their share of the actions and fulfill their biodiversity duty.

The Weeds Act 1959

The Weeds Act specifies five injurious weeds: **Common Ragwort, Spear Thistle, Creeping or Field Thistle, Broad Leaved Dock and Curled Dock**. Under the Weeds Act 1959 the Secretary of State may serve an enforcement notice on the occupier of land on which injurious weeds are growing, requiring the occupier to take action to prevent their spread. Enforcement of the Weeds Act is carried out by Natural England on Defra's behalf.

Water Level Management Plans

Water Level Management Plans (WLMPs) have been required by Defra to be produced for all SSSIs that IDBs can affect or influence since 1994. This sets out a plan for the distribution of water and the management of water levels balanced between the interests of agriculture and conservation. They are both practical and strategic documents that ensure issues that need to be addressed are identified and dealt with. They ensure responsibilities under the

Habitats Regulations are met and provide a basis for the application for grant aid for approved projects. They are required to be reviewed at regular intervals, usually five yearly.

Land Drainage Improvement Works (Assessment of Environmental Effects) Regulations 1988

Drainage Authorities are required to consider whether an Environmental Impact Assessment is required before undertaking any improvement works (as defined by the Land Drainage Act 1991). This involves advertising the proposals and their intention. It also makes provision for representations by conservation bodies and other interests. If a project is likely to have significant effects on the environment (this could be a habitat or a species) an environmental assessment is required. This should not only identify potentially adverse effects but also identify opportunities for positive conservation measures as well.

The Protection of Badgers Act 1992

The Protection of Badgers Act 1992 makes it illegal for any person to kill, injure or take a Badger. Under the 1992 Act it is illegal to damage a badger sett. Offences include 'Interfering with a badger sett by damaging, destroying, obstructing, causing dog a dog to enter a sett, disturbing an occupied sett - either by intent or by negligence'. It is an offence to attempt any of these actions or recklessly allow a dog to enter a sett. A fine of up to £5000 can be imposed for each animal.

Where excavations threaten to obstruct drains or where flood banks are in danger of being undermined, Defra licences can be applied for to allow excluder flaps to be fitted to setts to move animals away. Licences are not issued during the badger breeding season (between December and mid July). They require the burrow behind each flap to be inspected every two to three days for signs of occupation and only after 28 days of non-use can the burrows be collapsed. Carrying out the license requirements is time consuming and there is the possibility that badgers will dig new holes at another location in ditch sides.

An alternative to allow bank and ditching work to proceed is a license to temporarily block the holes with straw bags while maintenance works are carried out. The bags are removed after the work has been completed. The Environmental Officer holds a blanket license to carry out temporary blocking of badger burrows on any IDB banks in the Middle Level area where maintenance works are being carried out.

Natural Environment and Rural Communities Act (NERC) 2006

From 1st October 2006, all public authorities (which includes IDBs via their BAPs) in England and Wales have a Duty to have regard to the conservation of biodiversity in exercising the functions. The Duty aims to raise the profile and visibility of biodiversity, clarify existing commitments with regard to biodiversity, and to make it a natural and integral part of policy and decision making.

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

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

Biodiversity is a core component of sustainable development, underpinning economic development and prosperity, and has an important role to play in developing locally distinctive and sustainable communities.

Section 41 (S41) of the Act requires the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. The list has been drawn up in consultation with Natural England, as required by the Act.

The S41 list is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under section 40 of the Natural Environment and Rural Communities Act 2006, to have regard to the conservation of biodiversity in England, when carrying out their normal functions. IDBs fulfill their duty under this legislation via the creation and deliverance of their BAPs.

The Water Framework Directive (WFD) and River Basin Management Plans (RBMP)

The Water Framework Directive is a European Union directive which commits European Union member states to achieve good qualitative and quantitative status of all water bodies by 2015. The directive defines 'surface water status' as the general expression of the status of a body of surface water, determined by the poorer of its ecological status and its chemical status. Thus, to achieve 'good surface water status' both the ecological status and the chemical status of a surface water body need to be at least 'good'. Ecological status refers to the quality of the structure and functioning of aquatic ecosystems of the surface waters. Water is an important facet of all life and the water framework directive sets standards which ensure the safe access of this resource.

The Water Framework Directive defines a surface water body as a "discrete and significant element" of surface water such as a lake or reservoir or entire (or part) stream, river or canal, estuary or stretch of coastal water. Each water body is classified in terms of its current condition or "status". A range of biological and non-biological elements (e.g. fish, macrophytes, ammonia, and phosphate) is sampled to determine the current status of surface water bodies. Objectives are also set for each water body, based on the status we expect these elements to achieve, by a particular date (e.g. good by 2015), as a consequence of implementing the management actions (measures) in the river basin management plans.

All statutory organisations (such as IDBs) have a duty to "have regard to" the requirements of the Directive. They should ensure deterioration does not occur (except in very specific conditions) and should enhance the water body so that it can improve in status.

The Directive requires the production of a number of key documents over six year planning cycles. Most important among these is the River Basin Management Plans, to be published in 2009, 2015 and 2021. Draft River Basin Management Plans are published for consultation at least one year prior.

The MLC and the IDBs of the Middle Level look forward to working with the Environment Agency and other stakeholders in taking forward the WFD and the RBMP. We acknowledge that the RBMP may provide a number of opportunities to improve the environment of the various water bodies, whether reportable or not, which are administered or controlled by the MLC/IDBs and that the MLC/IDBs have a potentially major role to play in ensuring that these opportunities are grasped so far as possible. It is also acknowledged that the RBMP process is a developing entity and that, while many improvements will not be achievable by 2015, many more may be realised by 2027.

A number of the watercourses under the direct jurisdiction of the MLC are designated as reportable water bodies under the WFD. While none of the watercourses maintained by the

IDBs are themselves reportable water bodies, it is accepted and appreciated that their watercourses connect with and may influence such reportable water bodies.

Eel Management Plans

The Environment Agency has prepared Eel Management Plans (EMPs) for each of the 11 Water Framework Directive river basin districts. Each EMP describes the likely current state of eel stocks within the district and identifies the principal factors limiting silver eel (mature eels ready to migrate to sea) survival. They also set management actions that aim to ensure that more eels survive and migrate back to sea.

The Eels (England & Wales) Regulations 2009

On the 15th January 2010 the Eels (England & Wales) Regulations 2009 came into force as a Statutory Instrument to implement the Eel Management Plans.

The first half of the new regulations set down certain requirements for eel fishing:

- A statutory requirement for eel license holders to give catch returns
- A closed season for elver fishing (26th May 2010 to 31st March 2011)
- Eels <12cm to be made available on the market for restocking;
- New powers for the Environment Agency to revoke licenses to reduce fishing effort.

Part 4 of the regulations looks to improving the passage of eels in and out of rivers and watercourses in England and Wales. Within this section there is a new statutory regulation that will require the installation of eel screens on intakes and eel passes on structures where passage of eels is likely to be impeded.

The Environment Agency has produced best practice guides on eel pass design and screening, which are available via their web site. Internal Drainage Boards may play an important role in conserving eel stocks by providing screening and eel passes where there are opportunities. The Eels Regulations 2009 are available for download from http://www.opsi.gov.uk/si/si2009/uksi_20093344_en_2

**Appendix 4 National Guidance for IDBs on Mitigation
Measures for where Water Voles are present**

NATIONAL GUIDANCE FOR
INTERNAL DRAINAGE BOARDS

MITIGATION MEASURES FOR
WATER VOLES

Note, the law was changed on 6th April 2008 and water voles are now fully protected. All techniques that involve trapping require licensing by Natural England.

June 2007



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Internal Drainage Boards manage the thousands of kilometres of ditches and drains that form the drainage network of lowland England. Thus, the Boards have a major role in maintaining the biodiversity of our countryside and, in many areas, its distinctive landscape character. A wide range of plants and animals are supported by this network of watercourses and so depend for their continued well-being on the sympathetic maintenance of channels and bank sides.

Chief among those species reliant on the ditch habitat is the water vole *Arvicola terrestris*, a species protected by law and designated as a conservation priority under the government's Biodiversity Action Plan.

In order to promote the conservation of the water vole in Internal Drainage Board channels, the Association of Drainage Authorities and Natural England – the government's statutory wildlife advisor – have produced these guidelines to help ensure that water vole populations are not harmed by channel works.

The guidance shows that, with good forward-planning, Internal Drainage Boards can continue to undertake essential flood management works with limited disturbance to water voles and their habitats.

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This guidance was produced with valued contributions from Stuart Hemmings, Chris Manning, Lou Mayer and Rob Strachan.

NATIONAL GUIDANCE FOR INTERNAL DRAINAGE BOARDS ON MITIGATION MEASURES FOR WATER VOLES

Purpose of this Guidance

This guidance is aimed at providing a national standard for Internal Drainage Board engineers and operational staff who are planning their annual work programme and would like to ensure that they are able to undertake works whilst giving full consideration to water voles and their habitats. It gives a basic understanding of when water vole mitigation is needed and provides alternative options for phasing work. The favoured option would be to find a way of leaving the water voles in their habitat and not moving them on or trapping them out, and this can be achieved in some cases by working on one side only. Good forward-planning will enable an Internal Drainage Board to avoid the need to undertake extensive trapping. It is recommended that where surveys and trapping are needed they should be undertaken by trained professionals.

Water Voles

Under the Wildlife and Countryside Act 1981 it is an offence to intentionally or recklessly¹:

- damage, destroy or obstruct access to any structure or place which water voles use for shelter or protection;
- disturb a water vole whilst it occupies such a place.

The purpose of the legislation is not to prevent management or maintenance operations from taking place, but to ensure consideration is given to water voles and their habitat. Therefore, Section 10 of the Act, requires that “reasonable” steps are taken to avoid unnecessary damage and it is within this context that the mitigation measures set out here have been identified and agreed with Natural England.

When will you need to consider mitigation?

When planning for any works that will significantly disturb the bank and/or bank toe, regardless of size or length, water voles will need to be considered. This will include re-profiling, re-sectioning, culverting and occasionally de-silting.

For any maintenance programme that only requires vegetation mowing or in-channel vegetation clearance it is best practice to provide water voles with undisturbed areas. In practice this may mean that one bank is always left uncut as a vole refuge area and/or setting the flail roller higher in order to leave a slightly longer grass sward.

Where the works will significantly disturb the bank, the first step is to undertake a survey of the site to establish whether water voles are present and then carry out appropriate mitigation. The ideal time of year for mitigation to take place is in March-April, when the water voles have emerged from their winter activities and prior to voles having young. Alternatively, mitigation can take place in late September-October. Mitigation should be avoided during the summer when the water voles have young in the burrows, and winter when they have a higher fidelity to their burrows and underground food stores.

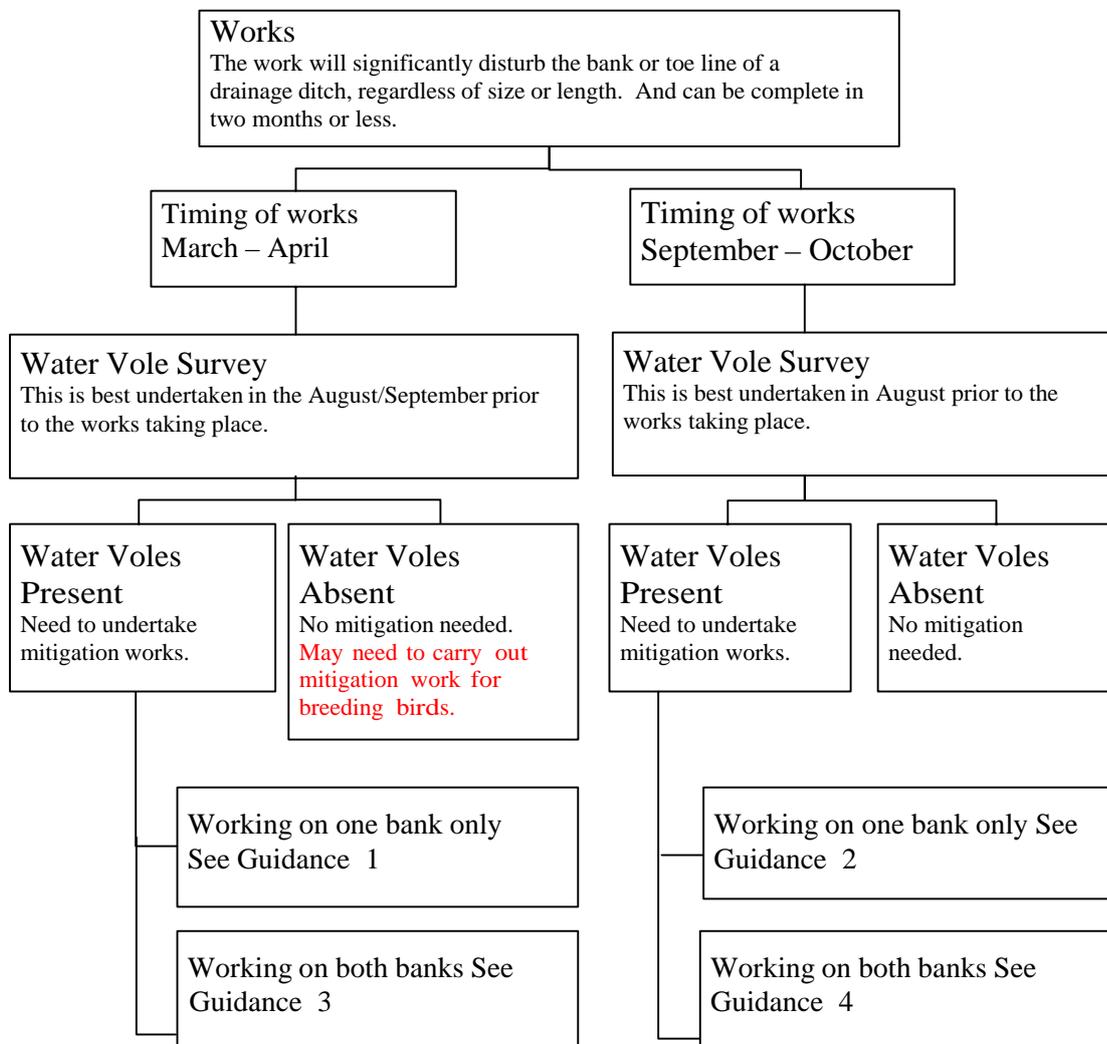
For small-scale projects it should be easy to plan for and work within the ideal time for mitigation, March-April and late September-October. If the work is then delayed it may be effective to fence the area to maintain it in a vole-free state.

¹ Interpretations: Intentionally – acting with knowledge of consequences; Recklessly – recognising risk but acting anyway; Disturb – any activity that may affect survival chances, breeding success or reproductive ability, or leads to a reduction in the use of habitat.

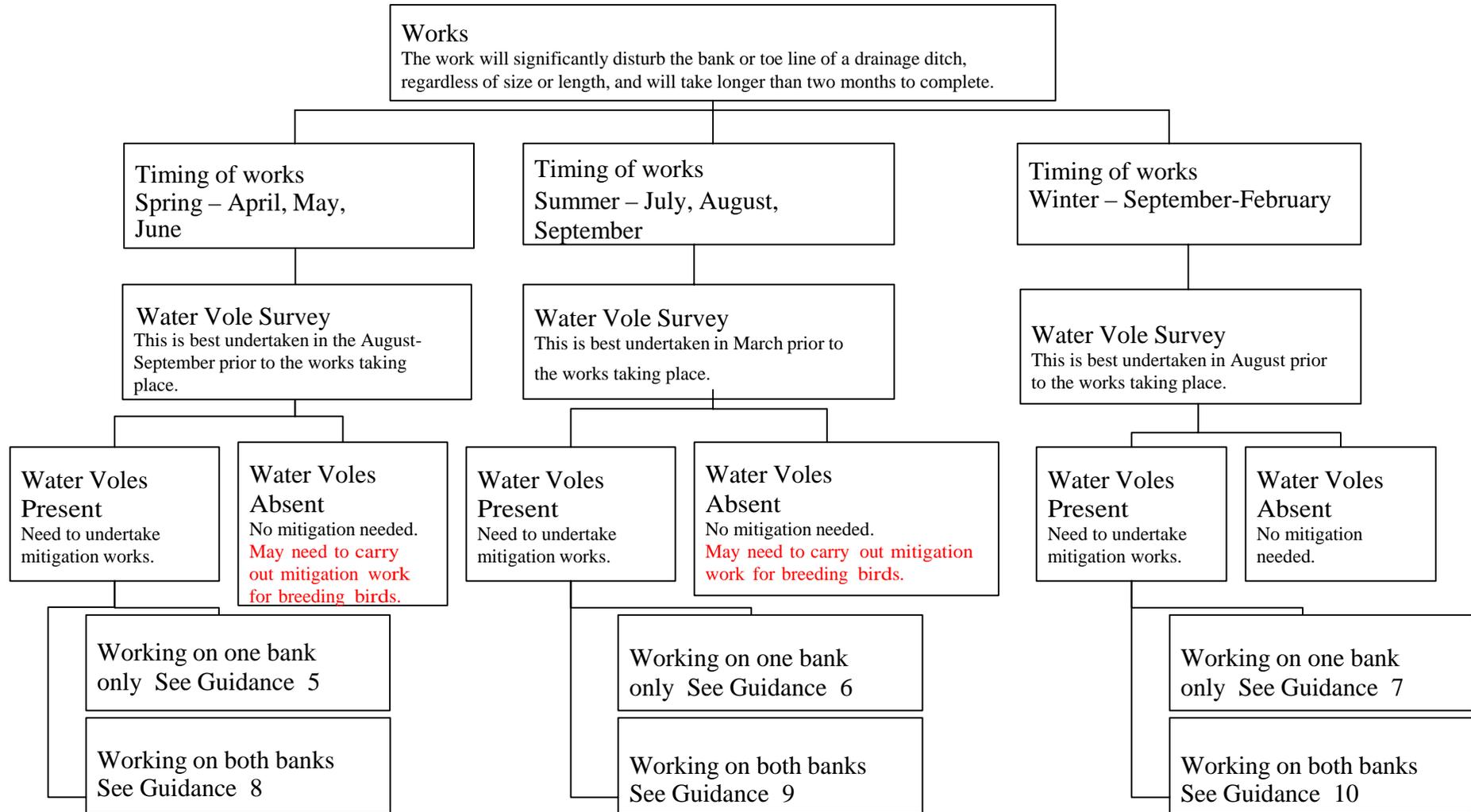
However, for large-scale projects where it is not possible to undertake all the work at the ideal time then best practice would recommend the incorporation of a plan to reduce risk for water voles. This may include the retention of refuge areas that are left untouched (e.g. ditches adjacent to the principal drains) or the retention of one untouched bank while the opposite is cut and reprofiled. It may be possible to design the works so that not all adjacent areas are managed simultaneously but done in sections to allow for voles to retreat to safe havens. Where the proposed works will result in permanent loss of water vole habitat it is recommended that the IDB consider alternative options and/or habitat improvements elsewhere in the drainage district.

Whilst there are optimum times to undertake surveys and carry out mitigation, the scale and timing of the work may also be crucial. The flow charts below and the linked guidance sections are a quick guide to be used when planning work so that the surveys and mitigation works (if needed) can be phased to ensure that the work can proceed at the required time.

Guide For Planning Small-Scale Works, Water Vole Surveys And Mitigation



Guide For Planning Large-Scale Works, Water Vole Surveys And Mitigation



Guidance for Small-Scale Works

Guidance 1 – Working on one bank only

Timing of works – Spring (March-April)

Water vole survey – August-September prior to works

In March the vegetation should be removed from the targeted bank by use of a side- arm flail. All growth should be stripped to bare soil, and should include, where possible, the emergent fringe. Any re-growth should also be removed to prevent recolonisation. Work can continue one week after the vegetation has been stripped.

Guidance 2 – Working on one bank only

Timing of works – Winter (September-October)

Water vole survey – August/September prior to works

In September the vegetation should be removed from the targeted bank by use of a side-arm flail. All growth should be stripped to bare soil, and should include, where possible, the emergent fringe. Any re-growth should also be removed as and when it occurs. The opposite bank will act as a refuge and animals should relocate. Trapping is not required. Work can continue one week after the vegetation has been stripped.

Guidance 3 – Working on both banks

Timing of works – Spring (March-April)

Water vole survey – August-September prior to works

In March the vegetation should be removed from both banks by use of a side-arm flail. All growth should be stripped to bare soil, and should include, where possible, the emergent fringe. Any subsequent re-growth should be removed up until works take place.

A repeat survey of the drain for water vole signs should be undertaken two weeks prior to works starting or one week after the vegetation has been stripped. If the extent of the works does not exceed 100m this displacement technique will not require any subsequent trapping. If water vole latrines or other water vole signs are found, a programme of trapping and removal should take place. Animals will be transported

away from the working area and placed in areas of suitable habitat where occupancy is low or preferably absent. Where no latrines are recorded works can progress without the need for trapping.

Trapping should continue in a given section until there are three consecutive days when no voles are trapped. Experience suggests a total trapping period of eight days may be required. No engineering works will take place in this section until no voles are trapped for three consecutive days.

Guidance 4 – Working on both banks

Timing of works – Winter (September-October)

Water vole survey – August-September prior to works

In September the vegetation should be removed from both banks by use of a side-arm flail. All growth should be stripped to bare soil, and should include, where possible, the emergent fringe. Any subsequent re-growth should be removed up until works take place.

A repeat survey of the drain for water vole signs should be undertaken two weeks prior to works starting or one week after the vegetation has been stripped. Where

water vole latrines or other water vole signs are found, a programme of trapping and removal will take place. Do not attempt to trap during frosty or cold periods as water voles may die in the traps. Animals will be transported away from the working area and placed in areas of suitable habitat where occupancy is low or preferably absent. Where no latrines or other signs are recorded works can progress without the need for trapping.

Trapping should continue in a given section until there are three consecutive days when no voles are trapped. Experience suggests a total trapping period of eight days may be required. No engineering works will take place in this section until no voles are trapped for three consecutive days.

Guidance for Large-Scale Works

Guidance 5 – Working on one bank only

Timing of works – Spring (March-June)

Water vole survey – August-September prior to works

In March the vegetation should be removed from the targeted bank by use of a side- arm flail. All growth should be stripped to bare soil, and should include, where possible, the emergent fringe. Any re-growth should also be removed to prevent recolonisation.

Guidance 6 - Working on one bank only

Timing of works – Summer (July-August) Water vole survey – March

In March the vegetation should be removed from the targeted bank by use of a side- arm flail. All growth should be stripped to bare soil, and should include where possible the emergent fringe. Any re-growth should also be removed and maintained as bare ground until works are due. The opposite bank will act as a refuge and breeding females should relocate offspring. Trapping is not required.

Guidance 7 – Working on one bank only

Timing of works – Winter (September-February) Water vole survey – August-September prior to works

In September the vegetation should be removed from the targeted bank by use of a side-arm flail. All growth should be stripped to bare soil, and should include, where possible, the emergent fringe. Any re-growth should also be removed as and when it occurs. The opposite bank will act as a refuge and animals should relocate. Trapping is not required.

Guidance 8 – Working on both banks

Timing of works – Spring (March-April)

Water vole survey – August-September prior to works

In March the vegetation should be removed from both banks by use of a side-arm flail. All growth should be stripped to bare soil, and should include, where possible, the emergent fringe. Any subsequent re-growth should be removed up until works take place.

A repeat survey of the drain for water vole signs should be undertaken two weeks prior to works starting. If the extent of the works does not exceed 100m this displacement technique will not require any subsequent trapping. If water vole latrines or other water vole signs

are found, a programme of trapping and removal should take place. Animals will be transported away from the working area and placed in areas of suitable habitat where occupancy is low or preferably absent. Where no latrines are recorded works can progress without the need for trapping.

Trapping will continue in a given section until there are three consecutive days when no voles are trapped. Experience suggests a total trapping period of eight days may be required. No engineering works will take place in this section until no voles are trapped for three consecutive days.

Guidance 9 – Working on both banks

Timing of works – Summer (July-August) Water vole survey – March

In March the vegetation should be removed from both banks by use of a side-arm flail. All growth should be stripped to bare soil, and should include, where possible, the emergent fringe. Any subsequent re-growth should be removed up until works take place.

A repeat survey of the drain for water vole signs will be undertaken two weeks prior to works starting. If water vole latrines or other water vole signs are found, a programme of trapping and removal will take place. Animals will be transported away from the working area and placed in areas of suitable habitat where occupancy is low or preferably absent. Where no latrines are recorded works can progress without the need for trapping.

Trapping will continue in a given section until there are three consecutive days when no voles are trapped. Experience suggests a total trapping period of eight days may be required. No engineering works will take place in this section until no voles are trapped for three consecutive days.

Guidance 10 – Working on both banks

Timing of works – Winter (September-February) Water vole survey – August-September prior to works

In September the vegetation should be removed from both banks by use of a side-arm flail. All growth should be stripped to bare soil, and should include, where possible, the emergent fringe. Any subsequent re-growth should be removed up until works take place.

A repeat survey of the drain for water vole signs should be undertaken two weeks prior to works starting. Where water vole latrines or other water vole signs are found, a programme of trapping and removal will take place. Do not attempt to trap during frosty or cold periods as water voles may die in the traps. Animals will be transported away from the working area and placed in areas of suitable habitat where occupancy is low or preferably absent. Where no latrines or other signs are recorded works can progress without the need for trapping.

Trapping will continue in a given section until there are three consecutive days when no voles are trapped. Experience suggests a total trapping period of eight days may be required. No engineering works will take place in this section until no voles are trapped for three consecutive days.

Post Project Monitoring

For all areas where mitigation takes place it is recommended that post-project monitoring will be undertaken to identify the speed and degree of re-occupation.

Further Information

Strachan, R. and Moorhouse, T. (2006). Water Vole Conservation Handbook. Wildlife Conservation Research Unit, University of Oxford.

Appendix 5 The Middle Level Mink Control Scheme

The Middle Level Mink Control Scheme was formed as part of the Middle Level Water Vole Support Project.

The aim of the ML Water Vole Support Project is to support the recovery of the water vole population in the waterways of the Middle Level catchment by (a) controlling American mink numbers and by (b) carrying out improvements to riparian habitats to link existing populations and allow them to recover and expand. These are targets in the Cambridgeshire Biodiversity Action Plan (BAP) for water voles.

In 2008 the Middle Level Commissioners (MLC) successfully applied for a grant from Biffaward, an environmental fund managed by the Royal Society of Wildlife Trusts (RSWT) which utilises landfill tax credits donated by Biffa Waste Services. Additional funding and support for the project comes from The Environment Agency, The Cambridgeshire and Peterborough Biodiversity Partnership and Natural England.

The major part of the funding was used by MLC to promote a Mink Control Scheme throughout its catchment. American mink (releases or escapees from former mink farms) are a non-native predator that our native water voles have been unable to escape from on waterways throughout the country.



Although water voles are thinly distributed in this area, the Fens hold better numbers than many other parts of the UK where distribution has been reduced to less than 10% of their former range. This is why water voles have been designated a UK Biodiversity Action Plan (BAP) species. In other counties mink control has resulted in a recovery of water voles to former haunts. Reducing mink numbers, especially in early spring before the breeding season, benefits not only water voles but other creatures that mink prey on, especially moorhens, coot, grebes, reed warblers, pheasant, partridge, ducks and ducklings, in fact any waterside bird or animal with small young. Fisheries will also benefit from reduced losses to mink.

Approved mink traps and Game & Wildlife Conservation Trust designed mink rafts are available for loan to people involved with land or water management in the Middle Level area. The scheme aims to encourage control of mink wherever they are known to be present. The mink rafts are designed by the Game and Wildlife Conservation Trust. In addition to supporting live-catch traps, the rafts can have a clay tray fitted that shows the tracks of mink, indicating when they are in the area. Mink often favour sites such as pumping stations, bridges, culverts, locks, boats and landing stages.

Surveys are being carried out to record the presence or absence of water voles on Middle Level drains and rivers using small indicator boards. Water voles take every opportunity to climb on to a small piece of plank if it is moored in their territory and checking these boards for the voles' distinctive round-ended droppings is a reliable way to confirm their presence.



Water voles take every opportunity to climb on to a small piece of plank if it is moored in their territory and checking these boards for the voles' distinctive round-ended droppings is a reliable way to confirm their presence.

The success of the mink control project depends on the good will and voluntary work of many people involved in work and recreation in the countryside. Internal Drainage

Board members and staff that carry out regular checks on their drains and ditches are particularly well placed to monitor mink activity. Anglers, boat owners, shoot managers and nature reserve wardens also have a common interest in reducing mink numbers. The aim is to build up a network of mink controllers throughout the 70,000 hectare catchment of the Middle Level. Reports of mink sightings will be welcomed by the Environmental Officer who will seek to contact a mink trapper in the locality.

Anyone interested in joining the Middle Level Mink Control Scheme can receive further information and borrow traps or rafts by contacting the coordinator-

Cliff Carson
Environmental Officer
Middle Level Commissioners
85 Whittlesey Road, March. PE15 0AH

Tel. 01354 602965 Mobile 07765 597775
Email cliff.carson@middlelevel.gov.uk
Website <http://www.middlelevel.gov.uk>

Useful contacts & information

The Game and Wildlife Conservation Trust

(formerly The Game Conservancy Trust)

Website where the instructions for use of the GCT mink raft can be accessed.

Website <http://www.gct.org.uk>

Mink Lure

Hawbaker's Mink Lure No. 1

F&T Fur Harvester's Trading Post

10681 Bushey Road, Alpena, MI 49707 USA

Website <http://www.fntpost.com/>

Humane dispatch

Co2 air pistol (.22 calibre) recommended by the Game and Wildlife Conservation Trust - Crossman 2240 .22 Air Pistol

Available from - Gun Shops

Additional traps

Albi-Traps

The Granary, Silfield Road, Wymondham, Norfolk, NR18 9AU

Phone:-01953 605983, Fax:-01953 606764,

Email sales@albionmanufacturing.com

Web site <http://www.albionmanufacturing.com>



Appendix 6 Providing potential nest sites for kingfishers

An easy, low-cost action that Internal Drainage Boards can carry out to provide secure nesting opportunities for kingfishers.

If you are a kingfisher in the Fens, life can be very good. There is an abundant supply of



small fish that are easy to catch in the placid waters of the regions drains and ditches. Winters in recent years have been largely free of long, hard frosts that cover feeding sites in thick ice. There is one major problem however – lack of suitable breeding sites. Elsewhere, natural rivers create the vertical banks with water below that they need to make their nest tunnel with a tiny chamber to lay eggs and rear young. Some find sites at flooded gravel pits if there is a bank that is sufficiently vertical to make it

impossible for a weasel or a rat to gain access to the entrance.

Others are forced to use less than ideal locations, such as the vertical root plate of a fallen river-side tree. Kingfishers usually make a tunnel that is 60 to 90 centimetres long so they have to severely reduce their digging aspirations in these circumstances. At tree root sites one usually sees where they have tried successive holes near the top before eventually finding a point where there is sufficient soil to avoid coming out the other

side. These sites rarely last more than one season as the soil dries during the summer and falls off the roots of the tree.



A nest site behind a hole in sheet piles that kingfishers found for themselves. The white trail from the tunnel entrance is from the liquid droppings produced by the young.

Some enterprising kingfishers have however pointed the way in which IDBs could make a significant contribution to the creation of nest sites for little cost. In their search for nest sites, a pair found a set of riverside sheet piles with a five centimetre wide bolt hole that was just the right location, size and height for them to excavate a nest tunnel. Over the last three years, six broods of kingfishers have been raised in what is a very secure site. Even the most agile weasel could not gain a foothold up or down the vertical piles. Kingfishers dig their own nesting tunnel, typically 60 to 90 cm long with a chamber for egg laying at the end. If they find a good site they (or actually their progeny) will use it for many years.

IDB pumping station inlets are popular feeding sites for kingfishers. Many District Officers will have had their day brightened by a glimpse of turquoise as a kingfisher darts away from its

perch on a handrail overlooking a sheltered inlet where tiny fish shoal. The retaining piles or the pump building itself may also help by casting a shadow on the drain reflection that aids the tiny hunter's view of its prey. Most pumps have sheet piles on either side of the inlet grills and it is here that a judiciously placed hole can provide an opportunity for kingfishers to make their nest site.

The correct diameter 50mm (2 inches) and positioning of the hole is crucial. It obviously has



to be above the highest water level occurring in the drain. It is very important that there is water directly below the selected point, not earth or vegetation. The hole must be within a metre of the top of the piles. When kingfishers select their own nest sites they often dig them within 50 cm (20 inches) of the top of the bank but as the tunnel is always dug at a slight upward angle (to enable the brood's liquid droppings to escape) in a pumping station location one

needs to be wary of the nest chamber being too close to the surface. Vehicles used in the collection of material from the weed screen could collapse the nest chamber inadvertently so if a choice is available the non-access side would be the one to select. About 75 cm (30 inches) from the top of the piles would be a good compromise, if that does not make it lower than the mid point between the underside of the capping beam at the top of the piles and the maximum water level at the bottom.

Another consideration is what lies behind the piles. Placing the hole too high could result in encountering hardcore or concrete, a little too testing for a kingfishers bill! The ideal soil is one that is soft enough for burrowing through without obstructions but firm enough to prevent tunnel collapses if it dries in a warm summer. It will be a matter of luck as to what fill material was used behind the sheet piles. If the area behind is not capped with concrete it may be possible to auger a small test hole from the surface close to the planned site to check feasibility. The hole in the pile should be made by drilling, not cutting with acetylene torch as that process could burn and dry the soil behind and may make it less attractive for tunnelling. The ideal equipment for the job is a magnetic attaching drill with

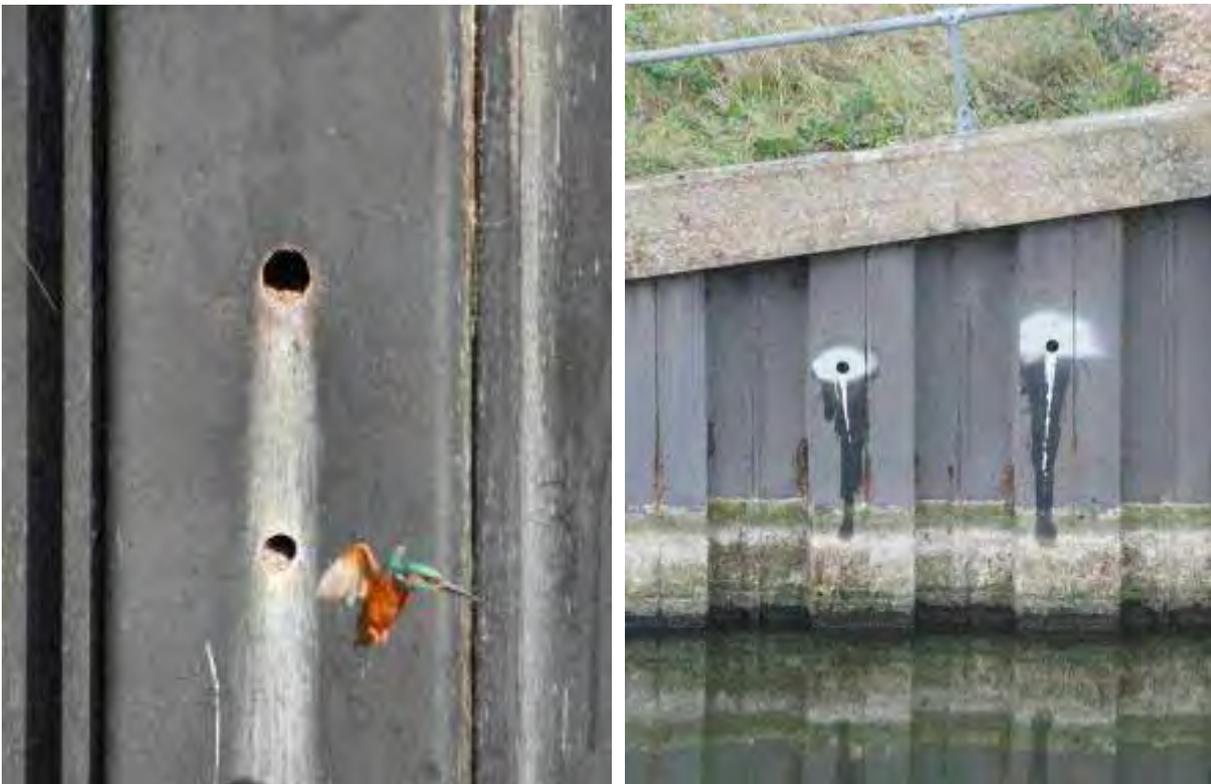


A mag drill, (a pillar drill with an electromagnetic attaching base) makes a neat job of drilling a 50mm hole through sheet piling.

a 51mm bimetal hole-cutter fitted, running at 170 rpm. An 'outward' facing pile, as in the photograph, will be easier to work on than an 'inward, concave' pile, and probably preferred by kingfishers for the better view on exit.

Kingfishers prefer to excavate their own tunnel so once the hole has been cut through the steel and any burrs removed from the inside edge it should be left for them to find. A small start could be made, just enough for a kingfisher to grip the rim of the hole and gain a foothold for the burrowing process. If it is found that a gap has developed between the back of the piles and the soil face, suitable silty soil will need to be introduced via the hole with a funnel to fill the crevice. It will need to be tamped down with a suitably angled piece of metal strip to avoid further settlement. This should prevent any youngsters from disappearing just before their maiden flight. When the drilling equipment is on site it is best to drill additional holes. Kingfishers are very territorial so there will be only one pair nesting at any location but providing alternative holes gives them the opportunity to change if they encounter an obstacle in tunnelling. The male kingfisher often digs several tunnels for the female to select and she may start a new clutch in an adjacent tunnel while the male is feeding the first brood in the original nest site.

A final touch can be the addition of a white trail of paint going down from the hole. This mimics the trail of liquid droppings that appear below an occupied kingfisher hole and could attract a kingfisher's attention to the location of the nesting opportunity. Liquid correction fluid like Tippex is convenient to us as it comes with its own brush.



Left. The natural liquid droppings draining from an active kingfisher nest site. Right. White paint added below newly drilled holes at Wype Doles Pumping Station, Whittlesey IDB. Grey anti-rust paint has also been sprayed around the new hole to inhibit corrosion.

Kingfishers like to perch near their nest site before going in with food. A willow rod (with the bark removed from the base to prevent it growing into an inconveniently located tree) placed to overhang the water could be usefully sited within 30 metres of the hole. When they leave the nest tunnel after delivering fish the adults usually clean their feathers by plunging repeatedly into the water and may also use the perch as a launch pad for that purpose.

Kingfishers are not long-lived birds. The oldest recorded was 4 years 6 months and few birds survive longer than two years. They depend on high productivity to compensate for a short life span and will usually have two broods per year and often will raise three broods if conditions are good. This requires an early start with many pairs laying five to seven eggs during the last week of March and the first week of April.

Although kingfishers are shy of humans, they become accustomed to routine and predictable activities. The site mentioned above had vehicles and pedestrians regularly passing by within a few metres of the nest site. They would not enter the nest if anyone was close by, but still managed to rear three broods in 2005. They are likely to become habituated to the sound of a weed-screen cleaner in action in the same way that herons and many other birds will nest alongside busy railway tracks.

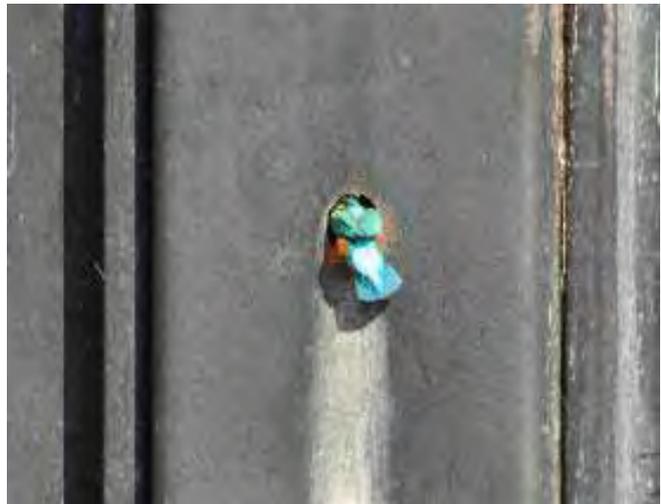
It may take several seasons before a pair of kingfishers become aware of the opportunity presented to them, but once they do, the secure nature of the site will mean it remains in use for many years.

Kingfishers' conservation status in the UK is 'amber', of medium conservation concern. Its numbers can however plummet after a hard winter and then the availability of nest sites is important for their recovery. It is not a 'BAP' (Biodiversity Action Plan) species, but like the barn owl, it is a bird everyone loves to see. Many Boards have boosted the barn owl population in their District by providing nest boxes for them. Doing the same for kingfishers in this way involves even less outlay and will be an indicator to the watching world of the conservation interest of the Board. Like barn owls, kingfishers and their nest sites are specially protected but the usual operations at pumping stations would not be affected by this legislation in the same way as a farmer goes about his business with an active barn owl box in the corner of his shed.

I am happy to provide further advice to anyone interested in creating nesting opportunities in this way. Within the Middle Level IDB Biodiversity Action Plan Partnership Districts I am able to advise on specific sites, bring a magnetic attaching drill and carry out the process.

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Web www.middlelevel.gov.uk



Background

The Middle Level Commissioners instigated an Otter Recovery Project in 2008 funded by SITA, a Landfill Tax Trust, and also with support from the Environment Agency, Natural England and the Cambridgeshire & Peterborough Biodiversity Partnership. One of the main aims of the project was to create a network of holts, otter dens, along Middle Level waterways to provide safe resting sites for otters with young throughout the catchment. Nearly 70 holts have been constructed, most of them underground.

Aims

To create a secure underground otter holt that will be suitable for occupation by a female otter with young. The holt will be designed and constructed to last at least 20 years, probably much longer. The external appearance of the holt site will be as discreet as possible and not attract attention to its location. The location and installation of underground holts will be carried out so that bank stability is never compromised



The holt is positioned in line with the crest of the bank at least one metre deep.

Site Selection

In selecting the exact site position various factors are considered.

- Bank height. The bank for an underground hold should be at least 2.5 metres high from the water level to its top. This will allow for its base to be one metre above normal summer water level, the height of the holt itself (0.5 metre) and sufficient soil cover depth to allow vehicular traffic above it without risk of damage (at least one metre).
- Bank slope. A bank with a steep slope should be avoided to prevent any risk of bank slip.

- **Bank width.** The bank area selected should be wide enough to allow the excavator room to operate. The centre line (lengthwise) of the holt will typically be in line with the crest of the bank, see picture below.
- **Features.** An existing feature such as a willow or ash tree that can be pollarded can add interest and cover to the holt entrance. Care should be taken in positioning the holt to ensure excavation of the site for the shelf does not cut or weaken major tree roots.

Method

Willow pollarding by chain-sawing may be required at the selected sites (otters are attracted to sites where the tree roots of coppiced willows or ash trees are present). Depending on the location, some of the cut willow logs may be used as cover to the holt entrance pipes. If not, the logs should be removed from site. When cutting willows to create good coppices or pollards for conservation, stump lengths of about 2" to 3" (50 to 75mm) should be left proud of existing crowns to encourage maximum re-growth and the creation of a good crown for wildlife use.

A 360 degree hydraulic excavator will be on hand for the excavation and making good of the selected bank site. A typical site will be one metre above the highest river water level and one metre below the surface bank top level. The excavator operator will create a flat shelf in the bank at these levels, usually under the direction of the Environmental Officer who will have established the position of the holt and the location of the two entrance pipes and the camera tunnel. The shelf area is dug to accommodate the holt which is 1.2 metres by 1.8 metres (4 feet by 6 feet) and room to work around it. The centre line of the holt is typically parallel with the bank top crest. This gives one metre of soil cover above the top of the holt from the bank top and 0.75 metres of cover on the bank slope. The excavated bank should be laid-back to give a sufficiently safe profile for working on the holt shelf.



The route for the entrance pipes can be cut at the same time. In many cases it may be convenient to cut the first entrance pipe route, then the holt shelf and finally the second pipe route. Installing the first entrance pipe at this time will help give the position of the holt on its shelf. An entrance pipe can be up to 7.5 metres long, or less if the site permits. It is always curved to prevent light entering the holt. The bottom of the entrance pipe is set just above normal summer retention level. Establish with the Operational Engineers on the day of installation what the current water level is in relation to the summer retention level and adjust the pipe outfall level accordingly. A small ramp from the pipe mouth down to the current water level may be required to be hand dug. The one-metre pipe gradient from water level to the holt floor level should be gradual, without steep rises.

The shelf created by the excavator for the holt should be level to avoid any possibility of slippage in future years. Some manual distribution of soil may be required but the final

levelled surface can be achieved by scraping and gentle compaction by machine bucket. A sheet of Terram/Fastrack membrane (4.5 metres by 3 metres) is laid down, large enough to cover the base area and wrap around and over the top of the completed holt. Ten solid insulation-type (lightweight) breeze blocks are set out on their flat sides to the holt design leaving spaces for the entrance pipes to create a holt that is 1.20 metres by 1.80 metres externally, 0.75 metres by 1.35 metres internally.



Left, the layout of the holt walls. Right, the breeze block on its side holding the camera pipe sleeve.

Ten hollow-cell, double-width breeze blocks are placed on top. The two blocks at either end of holt that will have the camera pipes fitted are placed on their sides and the camera pipes inserted. The camera blocks should be the 'double bridge' type designed for splitting in half that are included in every pallet of blocks. They are slightly smaller internally and therefore easier to wedge the camera guide pipe into the correct position for a good view of the holt chamber. Ensure the camera pipes are angled correctly to provide views of the whole of the internal area of the holt by the camera lens by adjusting the angle of the breeze block. Only one pipe will have a camera installed. The other is a 'spare' pipe if something blocks the original camera position.

The two 7.5 metre long entrance pipes are put in place and the breeze blocks adjusted to give a tight fit against them. Two giant staples are made by bending two three-metre lengths of 12mm mild steel bar into U shapes. They are pushed into the soil over the pipe just outside the holt entrance and located in one of the corrugations to secure the pipe and prevent it being pulled out of the holt doorway during the soil replacement operation or if the site subjected to pressure during subsequent bank maintenance operations.

The eight upright hollow breeze blocks are secured with 1.5 metre rods of 6mm mild steel pushed vertically into the soil as far as possible through holes drilled in the insulation blocks using long reach masonry bits and cordless drills. Cut off to length if necessary with bolt croppers. Bend the rods 180 degrees around the hollow block edges, ensuring the rod is in the groove in the block lip.

Give the membrane floor of the holt a thin covering of soil to present a more natural appearance and smell. Add a layer of dry hay for further comfort. Tread this down and do not leave a thick layer of hay as it may block the camera view. Hay rucked-up close to the camera reflects the infra red light and causes glare on the camera image.

Take the lintel, the two heavy-duty angle iron bars that have been welded back to back to form an upside down T, that will support the roof slabs and place it across the short, 1.90 metre (48") axis of the holt, resting across two pairs of hollow blocks. Ensure that the angles of the hollow blocks that hold the camera tubes are correct (if possible by installing the camera and checking the view on screen). Put the identification

number of the holt on internal blocks in the camera views to help identify subsequent video footage. Then place the four paving slabs on the roof, ensuring they are well seated on the angle iron support bar. Wrap the Terram membrane up the side and over the top of the holt.

Initially we placed a sheet of heavy-duty (300mu) damp-proof membrane (builders plastic sheet) over the top and down the sides of the holt to prevent the chamber becoming wet from surface water percolating down. We no longer do this as experience has shown that no matter how wet the surface conditions, the core of a bank always remains dry at one metre depth. Also, some condensation was seen on camera lenses in holts with sheets so plastic sheets have not been fitted to allow the holt chambers to breathe more naturally.



Two slabs in position. The second entrance pipe and last two slabs to be added.

To prevent any possible movement of the holt towards the channel slope, push two 1.5 metre lengths of 12mm bar vertically into the soil on the river side of the holt walls, about a third of the way from each end (in the middle of the long side of each paving slab). Push in by hand until prevented by soil resistance. Finish the push if necessary with the excavator bucket (if it has a suitable notch) or cut off the rod level with the top of the paving slabs.

The trench route for the entrance pipes (always curved or angled, never straight to avoid light getting into the holt) initially dug by the excavator, may require hand digging to finish. The height of the bottom edge of the pipes should be slightly above the normal summer water level. The fur of young otters is not waterproof when they initially leave the natal holt so a small apron of bank between the pipe mouths and the water is an important design feature rather than the pipes exiting directly into the water. If a concrete pipe is being used to fit over the corrugated entrance pipe at the waters edge to protect it from accidental damage by mowing, dredging or weed cutting activities it can now be installed. It should be installed as near horizontal as possible. A giant staple of 6mm or 12mm steel bar may be required to secure it at the bank end. A ramp of soil from the waters edge at the pipe mouth may be required to make access into it easy and attractive. The pipe mouth should not protrude significantly beyond the bank slope to prevent it from being caught by machinery, boats, etc. The bank end of the pipe will be covered by soil to retain it in position.

Bank Restoration.

Remove all tools and materials from the excavated holt site. Ensure that the camera pipes are positioned to finish in the desired location on the bank slope at either end of the excavated site by attaching them with 6mm wire rod staples. Ensure that the soil consolidation process does not allow them to be pulled from their block locations. To prevent this, spade-fill some soil underneath the pipe to support it where it comes out of the back of the hollow block for a metre or so. Fit blanking caps to the camera holding pipe ends and have the excavator operator cover the holt with soil.

Make good the bank profile, leaving about a third of the concrete pipes exposed. If seasonal timing is appropriate, sow bank with an approved grass seed mix.

For information regarding the internal infra red holt cameras contact Cliff Carson directly.

Cliff Carson Environmental Officer Middle Level Commissioners

Willow trees are a familiar and beautiful feature of our riverside landscape, and are very valuable wildlife habitats. Unfortunately the number of willows in Cambridgeshire seems to have decreased dramatically over the last few years. In part this is due to changes in land use such as more intensive farming systems, road and housing developments, and alteration of traditional willow habitats such as flood meadows. We also no longer value the products of willow trees – baskets, animal fodder, wood – so those that remain are often left to grow old and die without appropriate management.

In the past many willows were *pollarded*, their trunks cut at 2-3m high, above the reach of grazing animals. The trunk produces new shoots to be cut 10–15 years later, and the wood was used for hurdle fences or fuel. Pollard management prolongs the life of a tree so it lives long beyond its normal lifespan, and it helps to create many unusual niches for wildlife. Re-growth is rapid and trees soon regain their characteristic volume.

Even after an old pollard willow dies, the trunk remains a valued wildlife habitat for many years. The wood itself decays slowly, alive with insects and fungi. Kingfishers may nest in the rootplate of fallen trees.



Photo © The Environment Agency

Pollarding for the future

Managing old pollards

The decline of pollard management has left us a legacy of neglected pollards with dense crowns of larger branches, usually on rotting trunks. These are very vulnerable to wind and ice damage, but in the modern landscape they are also more valuable than ever before. Bringing them back into a program of regular pollarding will often rejuvenate these trees, ensuring that they – and the wildlife that relies on them – survive for years to come.

- A general survey of age, health and date of last cutting will help you to decide which trees will benefit most from a pollarding program. Note that groups of willows of varying ages pollarded several years apart support the greatest variety of wildlife.
- Pollarding is a stressful operation for the tree and for the operator carrying out the work. **Always consult a qualified tree surgeon and hire a skilled operator to bring old, possibly unsafe trees back into management.** Their expertise increases the trees' chance of surviving, and after the initial re-pollarding (which may take place over several years) the work will be easier.
- If working on a group of trees, re-pollard only a small number each year, allowing time to assess the survival rate and plant new trees (from cuttings) nearby as replacements.
- A pollard is valuable to wildlife even after it dies. Unless it is a hazard, leave it to rot naturally in the place where it grew.

Creating new pollards

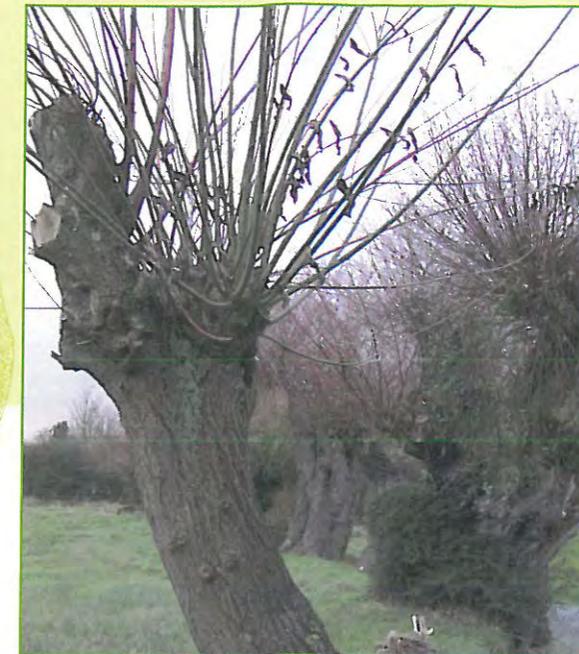
We must create new pollards if they are to remain part of our landscape in the future, but remember that inexperienced people should NEVER attempt tree surgery.

- Pollarding is a commitment. Once pollarded, the tree should be cut regularly, every 10–15 years. Remember that a pollard will never grow as tall as a *maiden* (an uncut tree), and will have a broader, more rounded crown.
- White willow, crack willow and common sallow are traditionally pollarded. Almond willow, bay willow, osier and others are not.

When to pollard

Pollarding is best begun when the tree trunk is less than 10cm in diameter and the tree is less than 15 years old. Cut in February or March, before the sap rises; wound sealants are unnecessary (in fact they can seal fungal spores into the cut).

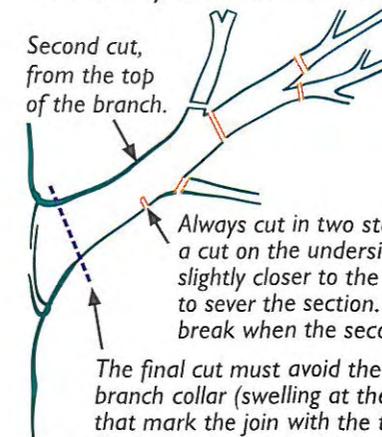
If livestock have access to the area, the height of the first cut must be determined by the neck length of the animals trying to reach the new growth; horses can reach further than cows! If browsing is not a problem, balance convenience (short trunks are easier to work on) and value to wildlife (the trunk or *bolling* is the most important wildlife asset, so taller is better).



Sarah Wroot

A new young pollard cut one year ago, with older trees in the background. Not all branch stubs produce growth, but those that do make up for all the others.

Branches are removed in sections, working in from the tip of the branch to avoid the weight of the branch ripping it from the trunk and damaging the tree. Freshly cut wood is extremely heavy.



Always cut in two stages. First, make a cut on the underside of the branch, slightly closer to the trunk than you want to sever the section. This ensures a clean break when the second cut is completed.

The final cut must avoid the bark ridge and branch collar (swelling at the base of the branch) that mark the join with the trunk. Never cut flush with the trunk: this damages the tree. The surface of the final cut should be at an angle to allow rainwater to run off the cut surface.

Planting new willows

Planting new willows has excellent results!

Some points to consider before you start:

- ❖ Using cuttings taken from local stock will preserve local varieties of willow. It's cheap and easy to take cuttings from local trees, but always ask the landowner's permission first.
- ❖ With luck your tree will be in residence for a long time, so choose its position carefully. Think about how big it will be when mature, and consider the shade it will cast.
- ❖ Don't plant willows near buildings, or where their roots could reach a water pipe.
- ❖ Think before planting close to a pond: large numbers of dead willow leaves falling into the water can be very harmful to fish and other aquatic life.
- ❖ You must obtain permission from the Environment Agency before planting a tree next to a river or stream:

Environment Agency
Bromholme Lane, Brampton, Cambs PE28 4NE
Tel. 08708 506506
www.environment-agency.gov.uk

Plant in January/February when the soil is wet, but before leaves appear on the trees. Take cuttings about 2.5cm thick at the base and plant in moist soil in a prepared hole about 45cm deep where the tree is to grow. Don't just shove them into the ground, as this will damage the cut end and lead to infection. Water well in dry summers.

Old willow trees are a significant feature in our landscape. They thrive in wet soils, and their roots help stabilise river banks.

Willows are important to wildlife. Of British trees, only the oak will support more insects, providing food for birds and other animals. Bats as well as birds find homes in the holes and hollows of old willows.

Old wood itself is the most important and special feature that willows offer to wildlife. The most threatened invertebrate communities in Europe are those that live in dead or dying wood at some stage in their lifecycle. Many are found only in the mouldering interiors of old pollards, and some have such specialised requirements that at any one time they live only in a tiny proportion of the trees on a site.



Pollard willows are famed for the number of different plants they support. One hundred and fifty different plants (including mosses and lichens) have been found growing in or on the riverside willows of Cambridge. Along one stretch of the Cam there are about 800 willow trees, of which 70% are mature. These all require regular management if they are to continue their special contribution to the local flora and fauna.

Warning! Re-pollarding of old willows is extremely dangerous and should only be undertaken by trained operators. Always consult a tree surgeon, and remember that trees may be protected by Tree Preservation Orders, so check with your Planning Authority before undertaking any work. Remember to look for wildlife that might be living in the tree – and get professional advice if you find bats: they are protected by law.

If you would like any advice or information about obtaining grant aid for care of willows please contact:



The Cambridge Green Belt Project
The Wildlife Trust for Cambridgeshire
The Manor House, Broad Street
Great Cambourne
Cambridge CB3 6DH
Tel. 01954 713500

The Cambridge Green Belt Project works with local communities in Cambridge and the surrounding area to help people to enjoy, discover and protect local wildlife and the countryside.



Cambridgeshire's Biodiversity Partnership promotes the importance of conserving our species and habitats. Cambridgeshire local authorities, English Nature, RSPB, the Wildlife Trusts and Anglian Water are all members of this Partnership. Biodiversity is described as 'the WOW factor – the Wealth of Wildlife that surrounds us'.

The Biodiversity Partnership has prepared Biodiversity Action Plans for our species and habitats in Cambridgeshire. These plans include actions agreed to be undertaken by organisations to help preserve our wildlife. Willows enter into several action plans as they are important for so many species. See www.cambridgeshire.gov.uk/environment/countryside/biodiversity/partnership

