Middle Level Waterway Management Operations

The Middle Level Commissioners (MLC) manages 120 miles of major waterways and 240 miles of banks in the Middle Level catchment. The primary aim of their work is to provide statutory navigation throughout their navigable water courses and convey water from the low-lying lands of the Fens, much of which is below sea level, and to pump it away in a timely and efficient manner. Water is pumped or drained by gravity into the major channels from around 30 internal drainage boards (IDBs) and eventually pumped into the Tidal River Great Ouse via the Wiggenhall St Germans Pumping Station near Kings Lynn.

The western area of the Middle Level where the former Whittlesey Mere existed is particularly low-lying. Booster pumps at Bevills Leam Pumping Station raise the water there high enough to let it flow to St Germans Pumping Station.

The waterways are also an important navigation route that links the River Nene system and beyond to the waterways of the South Level, offering relaxing recreational boating opportunities and providing access by boat to Ely, St Ives, Cambridge and Bedford.

These lowland waterways contain slow-moving water, rich in nutrients. They are effectively very long ponds and support a good variety of fish, birds, plants, insects and other wildlife.

Angling is a very popular pastime in the Fens and fishing rights are let by the MLC on extensive lengths of drains throughout the catchment.

The banks of the waterways provide extensive opportunities for walkers who enjoy the far-reaching views of Fenland open skies and sights of wildlife on the rivers and drains.

The Operations Engineering Department and the MLC labour force manage the waterways to ensure all these interests are accommodated in balance and without conflict. Priority is always given to flood protection but efficient water management can accommodate many features that encourage wildlife and provide breeding opportunities for many species.

Bank Mowing

The primary aim of the Middle Level bank mowing programme is to maintain good vegetation cover which is an important factor in stabilising the bank soil and avoiding bank slippages. It is carried out at different times and on three different zones of the bank in a way that provides biodiversity gains.

Three different vegetation cutting zones on the bank of Well Creek. The practise creates habitat diversity throughout the waterways of the Middle Level system.

<u>The top cut (or Health & Safety cut)</u> covers the top of the bank and one mower width down the slope. Its purpose is to ensure that when the time comes to carry out the main cut on the banks the operators can clearly see the top edge of the bank for safety reasons. There are several cuts of this zone during the growing season. The first cut is started early in the spring, before birds start nesting and is usually completed by the 7th of April. This ensures that no nests are damaged. While some birds such as mallards will have started nesting by 7th April they will always seek sites with longer vegetation (such as nettles or grass tussocks) rather than the bank tops and crests which are kept as short swards by regular mowing. The regular cuts not only ensure a tight sward and root structure, good in providing natural stability on this area of the bank, but it also provides short vegetation as feeding areas for small birds such as pipits, skylarks and wagtails. Shrews, voles and mice also feed in these areas of young grass and as a consequence it is a valuable hunting area for predators such as barn owls, kestrels and herons.

A top cut being carried out on the Forty Foot Drain bank.

If conditions are cold and there is no grass growth to cut, the completion date for the top cut may be put back a week or more, agreed by the Environmental Officer in discussion with the Operations Engineer.

The main cut on the banks is carried out on the middle zone of the bank, between the top cut and the marginal vegetation at the water's edge. Cutting is started from the 15th of July onwards, after the period when birds that may have nested in that area have fledged their young.

As there are 120 miles of Middle Level major drains with 240 miles of banks, the process of cutting them extends over the summer and produces a range of sward heights and diversity of structure in the vegetation as a result.

A main cut being carried out on the banks of the Catchwater Drain.

The third cutting zone is at the water margin. This is a key area both for bank protection and for wildlife. Emergent water plants provide breeding sites, food and cover for a great many different species including water voles, harvest mice, reed warblers, dragonflies and moths.

To avoid bushes or trees becoming established extensively in this marginal zone and make maintenance access difficult, it is cut in alternate years (sometimes at longer intervals).

By cutting this zone every other year instead of annually the vegetation not only provides good wildlife habitat, it also acts as naturally regenerating bank protection where finer grasses fail to grow. To avoid damaging late-nesting birds such as reed warblers, the marginal zone cutting does not start until 1st September.

Leaving a margin of vegetation at the edge of drains protects the bank and provides good wildlife habitat.

Reed warblers can have eggs or young in nests after 15th July up to the end of August and great crested grebes can have second broods with eggs still in their nests in mid or even late July.

Channel Maintenance – Weed cutting

The primary aim in aquatic plant management with weed cutting boats is to maintain an open central channel to ensure the movement of water is not impeded at times of high flows and to prevent propeller fouling problems for boat owners where navigation takes place. The aim is also to retain a meter width margin of emergent vegetation at either side of the channel as a natural protection to the bank edge. This natural fringe of vegetation is an important element in protecting the bank at its most vulnerable point, where water and bank meet. Many of the Middle Level drains are straight and align with the prevailing south-west winds. Marginal vegetation holds floating debris away from the river edge where, combined with wave action, it would otherwise wear away and undercut the bank. It is also a valuable wildlife habitat that many species benefit from.

When placing weed cuttings on bank sides with the weed rake boats, gaps in the reed margins are selected to avoid possible damage to late-nesting reed warbler nests in the river edge reeds. The cut material is left close to the water's edge, allowing invertebrates or small fish that may be trapped in it to escape and return to the water. The piles of cut vegetation on the bank sides become a micro-habitat themselves and are used by small mammals, insects, grass snakes and even otters as temporary resting places.

Channel Maintenance - Herbicides

The growth of some emergent aquatic plants, particularly common reed and waterlilies, is so vigorous in fenland drains during the summer that the mechanical weed cutting cannot keep pace with it over the 120 miles of waterways. To keep the navigation and water management routes open, water plant monocultures are treated with Glysophate herbicide, under licence conditions from the EA, to check their growth. This is invariably less damaging and invasive to the associated wildlife than mechanical cutting would be.

Channel Maintenance – Dredging

Channel dredging is required periodically when silt builds up. It is also carried out to obtain local material for bank building where bank top levels have settled and need to be raised. Dredging is usually carried out during the autumn and winter. Material is taken from the centre of the channel and does not affect the margins.

If the dredged material is required and suitable for bank raising it will be stored behind the bank for up to a year while it becomes dry enough to be added to the bank top. Newly profiled banks are sown with a grass seed mixture that includes white clover to benefit bees and other pollinating insects.

Bank Revetment and Coir Rolls

The soil types present throughout the Middle Level area vary in their strength and ability to withstand erosion on our waterways. Where weak soil structures give way and cause, or threaten to cause, bank slips it is necessary to undertake measures to strengthen the bank at the water's edge, known as revetment. Traditionally this involved hard engineering techniques using timber, stone or steel materials. In bad cases this is still the only course of action but in many cases it is possible to use 'soft' engineering methods that also benefit wildlife.

Coir rolls installed on the Sixteen Foot Drain near Bedlam Bridge in 2009. The purple loosestrife flowers attract pollinating insects.

Coir rolls that have been pre-established with water plants are installed at the water margin instead of steel or timber piles. Coir is the outer part of a coconut and it is made into rolls that are three meters long and 300mm diameter. The water plants grow and create a living barrier to erosion that is self-renewing. The plants include yellow flag and purple loosestrife that add colour to the bankside and benefit pollinators.

Tree Management and Bush Cutting

Trees are always an attractive feature of the landscape but without management, waterside trees and bushes could present access problems for carrying out maintenance work on drains and rivers. Trees are relatively infrequent on the banks of Middle Level waterways and where they occur the policy is to pollard or trim them so that they enhance the landscape without presenting a hazard to navigation or maintenance.

Pollarded willows historically were a typical element of the Fenland scene as they provided a renewable source of valuable materials including thatching pegs, hurdles and fuel. When pollarded at intervals of five to ten years trees do not become top heavy and it gives them a greatly extended life.

Riverside pollarded and coppiced trees are a particularly valuable habitat. They provide nest sites for ducks and owls, fishing perches for kingfishers and roosting sites for bats and many other species.

As part of their Biodiversity Action Plan, MLC are aiming to find suitable sites for black poplars, the UKs rarest timber tree. A native tree that was once widespread in wet locations, it develops many crevices and hollows that offer sites for birds, bats and insects. Cuttings from local black poplars that have been DNA tested to establish they are pure non-hybrid stock are planted at suitably damp sites in drainage board districts.

Pollarded willows are a traditional feature of fenland waterways and extend the life of trees such as willows that are relatively short-lived.

They also provide valuable sites for mammals, insects and birds such as (left) this kingfisher that has found a favourite fishing perch under a pollarded willow on Well Creek.

Invasive Non-native Species

Invasive non-native water plants (INNS) can transform a waterway that has a good diversity of native species to a monoculture of alien plants that blanket the channel, closing out light and restricting habitats for a range of species. There are several INNS that are extremely difficult to eradicate once they become established but the Middle Level catchment is thankfully free from the worst of them at present.

The key to keeping this good situation is early identification and treatment of INNs and making the public aware of the problems that can be caused by something as simple as putting the contents of an aquarium or a fish pond down a drain or into a ditch or channel. Two invasive species have been identified at an early stage at housing estates in the Middle Level area where New Zealand Pygmyweed *Crassula helmsii* and Parrot's Feather *Myriophyllum aquaticum* were unwittingly added to a pond and a drain. These and other invasive non-native plant species are now banned from sale at garden centres but may still be present in many garden ponds or fish tanks. It is important to bury any plant material deeply if a fish pond is being cleared out. Further information and identification guides to invasive species can be found online at www.nonnativespecies.org.

New Zealand Pygmyweed *Crassula helmsii* completely filling a drain.

American mink are invasive non-native mammals that have escaped or been released from mink farms in the past and caused significant declines in the populations of several native species, especially water voles. Over thousands of years water voles had evolved strategies that enabled them to escape native land predators such as weasels and stoats.

As a predator that is equally at home on land and water, mink are able to attack them on the water and hence water voles distribution has declined by 90% nationally. Surveys have shown that the Middle Level area remains a stronghold for water voles, partly because of the very extensive network of drains and ditches. To maintain that population and reduce the impact on water voles and other wildlife, a Mink Control Scheme has been set up in the Middle Level catchment. Live-catch mink traps can be loaned. Further information and advice is available from the Middle Level Environmental Officer.

The absence of moorhens or coot in a locality can be an indication that mink are active in the area.

Illegal Netting and Fishing

Angling is carried out on the majority of Middle Level waterways and is one of the most popular activities in the Fens. However, illegally set fyke (eel) traps without otter guards and gill nets set across channels are a threat to fish stocks and other wildlife such as grebes, water voles and otters. All users of our banks and rivers are asked to report any suspicious activity immediately to the Environment Agency hotline on **0800 807060** or to the Middle Level Environmental Officer on **07765 597775**.

Deoxygenation

In certain conditions oxygen levels in drains and rivers can become very low and pose a lethal threat to fish. The first indications of a problem are usually small fish gasping at the water surface. The causes are often a combination of prolonged hot conditions and low water flows and levels. In some cases it results from sediments being disturbed from the river base by boat propellers. The organic sediment is activated and depletes oxygen rapidly from the water.

Sudden de-oxygenation can also occur during periods of thundery weather and low atmospheric pressure. These conditions can produce an effect known as inversion, or water turnover, even when no management work is being carried out. During thundery weather the conditions can be warm and then cool down quickly resulting in the air temperature becoming lower than the water temperature. This can then cause the upper water level in the drain to become cooler than the water in the bed. As the warmth from the bottom of the drain rises, it can take organic matter from the bed with it. The fine organic matter suspended in the water decomposes causing oxygen levels to drop and fish to suffocate. In cases like this the steady introduction of oxygen-rich water into the area is the desirable action

Early recognition of de-oxygenation problems by reporting fish showing signs of stress as soon as possible can allow action to be taken before the situation develops into a major fish kill. In severe cases the Environment Agency can use hydrogen peroxide to quickly restore oxygen levels.

All users of our banks and rivers are asked to report any signs of stressed fish or *several dead fish immediately to the Environment Agency hotline on **0800 807060** or to the Middle Level Environmental Officer on **07765 597775**.

*(A few fish die of natural causes after spawning each spring and would not normally indicate a problem. Four or more fish casualties in a small area are more likely to be of immediate concern).

Biodiversity Action Plans

The Middle Level Commissioners aim to fulfil their duty to have regard to the conservation of biodiversity in all their functions, mainly via Biodiversity Action Plans. They include actions to support specific species including water voles, otters, bats, eels, kingfishers and barn owls. More information is available on the Conservation page of the Middle Level web site.

In conclusion

The Middle Level system offers many opportunities for people to enjoy the wide open vistas of the Fens, whether they are boating, fishing, dog walking or just staring at clouds. We ask everyone to respect the needs of others and exercise tolerance and patience.

The Fens are a unique landscape that takes time to get to know, perhaps summed up in the quote ‘Anyone can enjoy the Lake District; it takes a connoisseur to appreciate the Fens’