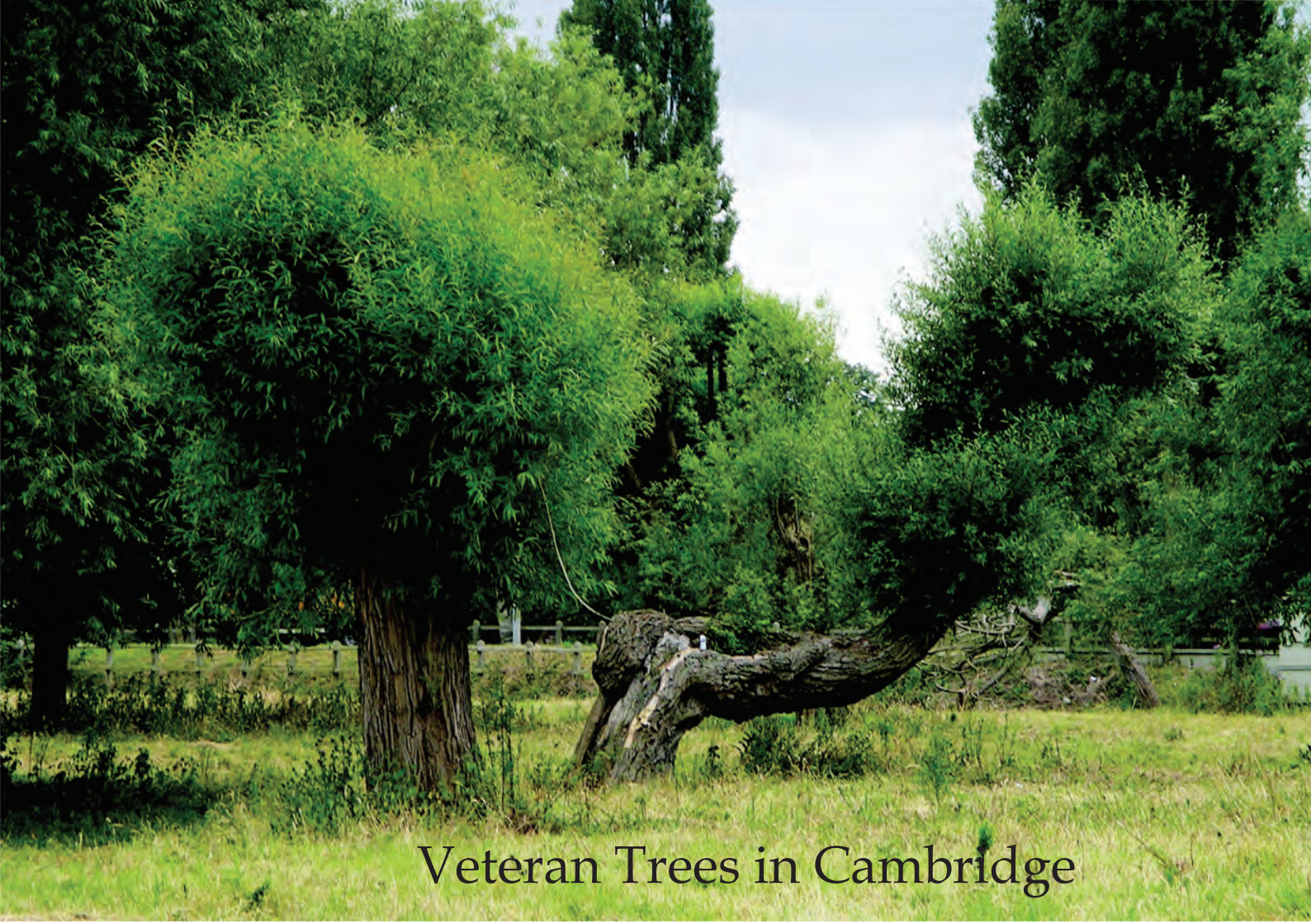

Veteran Trees in Cambridge

Prepared by
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Frequently overlooked and unappreciated, veteran trees are some of the most valuable trees in the landscape. Gnarled and aged in appearance they provide a sense of history, as well as adding aesthetic appeal. They are amongst the oldest living organisms in a locality where they may mark ancient boundaries, or reflect earlier forms of land use such as parkland, wood pasture or designed landscapes. Equally important is their value as a wildlife habitat for a wide range of fungal, plant and animal life, some of which is only found on ancient trees. Recognising these trees will help us to value and care for them so that they can continue to fulfill this important historical, cultural and biological role. Understanding what makes a veteran tree should also ensure that other aging trees are managed properly, surviving to become the next generation of veterans.

Stages in the life of a tree

		THE VETERAN STAGES		
INFANCY TO FULL MATURITY	FULL TO LATE MATURITY	EARLY ANCIENT STAGE	LATE ANCIENT STAGE	SENESCENT
Young tree grows vigorously. Each annual ring contains more	Growth to peak crown size. Tree starts to lose limbs and the	Reduction of live crown and the amount of tissue in each annual ring starts to decline. The lower part of the crown grows with more vitality than the top.	Contraction of the crown becomes advanced. The annual rings show a net reduction of the annual increment. Extensive hollowing, crown collapse and declining vitality.	Continued decline results in the tree's death.

After Neville Fay 1997 and Helen Read 2000

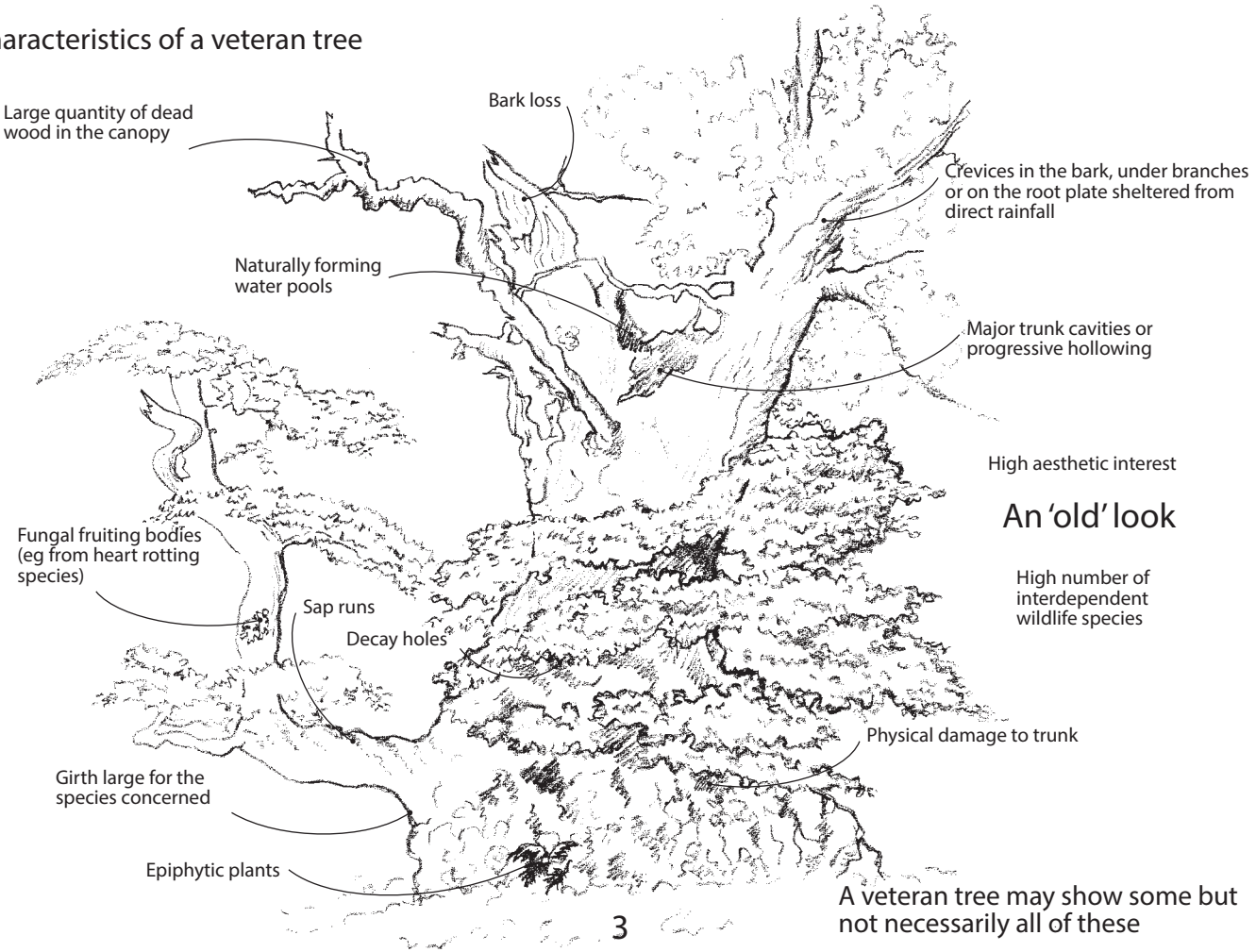
Recognising a veteran tree

Each tree species has its own natural size limit and normal life span. Thus relatively short-lived trees such as hawthorn, birch, willow or poplar may become veteran trees in 100-150 years, well before the longer-lived oak or yew. It is therefore important to have an understanding of the tree species concerned and to appreciate how each is likely to perform in the particular growing conditions of the area.

Coppicing (when all the growth is cut to the ground at intervals of about 10 years) or pollarding (when the growth is regularly cut back to a point on the trunk above which browsing animals cannot reach) are both methods of managing trees which can considerably extend their life span. Normally, conditions that enable a tree to grow well speed up the process of annual ring enlargement. However, coppicing and pollarding result in very narrow annual rings forming in the years immediately after the cutting back, when there are few leaves to manufacture the materials needed to make an increase in girth. As the tree puts on more branches and foliage, the rings gradually make the normal increase in their cross sectional area until the next cycle of cutting back takes place. The tree lives perfectly healthily but overall the trunk of a pollard grows much more slowly than that of an unpollarded tree. The process of periodically removing top growth from the tree therefore prolongs the youthful stage of the tree and postpones its decline. Thus, coppice stools and pollards can be of very great age without necessarily showing the characteristics of veteran status (opposite) that a similarly aged, uncut tree does.

Recognising a veteran tree is further complicated because damage to younger trees may also result in some of these diagnostic characteristics. However, the more of these features that a tree possesses, the more likely it is to be a veteran (H. Read 2000). Usually a combination of characteristics and an understanding of the tree's former management will give the surveyor confidence to place it in the correct category.

Characteristics of a veteran tree



A veteran tree may show some but not necessarily all of these

The biology of veteran trees

When a tree's protective bark is damaged, the wood underneath is exposed to the drying effects of the air. This can create the conditions suitable for colonisation by decay fungi and other microorganisms either present in the air or already waiting in the wood. The tree is often able to wall off the invasion by laying down new wood. Sensitive to the changes in mechanical strength of the tree, this new wood can compensate with relatively wide growth rings that maintain stability even if the central heartwood of the tree has rotted away. These processes can occur in all trees but it is the cumulative effects of damage from storms and disease, successfully overcome through a long lifetime, that distinguishes a veteran from a younger tree which may succumb to an earlier death.

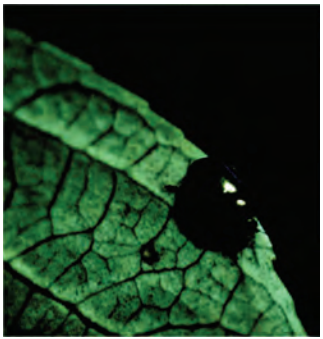
Fungal mycelia around the roots assist in making nutrients from the soil available to the tree throughout its life. However, there are also associations between these soil- inhabiting fungi and the fungi involved in the decay of the tree. So, in the veteran stage, nutrients from the decomposition of the tree's own heartwood are recycled back to the tree via this network of different fungal mycelia. Despite this hollowing, a tree can still be strong and maintain its structural and physiological integrity.

The hollowed-out trunk and limbs supported by healthy sap wood contain decay products from the heart wood, leaf litter and other decomposing matter, creating an environment where a wide range of specialist organisms can thrive. This veteran stage can be the longest phase in the life of the tree giving it great biodiversity value.

Dryad's Saddle fungus

Elder seedling rooted in a rot hole

Chicken of the Woods fungus



Poplar leaf beetle

Puss moth caterpillar

Lichen growing on a willow trunk

Some of the wildlife that may be found on the poplar and willow veteran trees on Sheep's Green and Coe Fen. They are not necessarily specific to veteran trees.

The 2004 survey

Recognising that the value of veteran trees was not understood as widely as it might be, the City Council commissioned a survey to establish whether there were any veteran trees in Cambridge, and to determine their species and locations. It was felt that when trees became old and showed signs of decay, there had been a tendency to tidy them up so that they lost much of their biodiversity value. In some cases, trees were even removed unnecessarily when they first showed signs of being in decline. There has been a lack of appreciation that this stage is just part of the continuum of aging that leads eventually to a tree becoming a veteran.

University and College land was surveyed, along with local authority and major areas of private agricultural land. However domestic properties were not covered and it is possible that there may be veteran trees in private gardens. Information was collected using the English Nature Level 1 Survey Method and the findings have been forwarded to English Nature to contribute to their national database.

The survey found that there are few veteran trees on University or College land and those on public land are largely growing in Cherry Hinton and on common land such as Sheep's Green and Coe Fen. A significant number of veterans are found on private farm land and along the River Cam. The absence of veteran trees from most of the more public and accessible parts of the city is an almost inevitable consequence of the need to give priority to health and safety.

An old pollard marking a parish boundary

Another reason why there are few very old trees on public land is because the current layout of the city's parks is relatively recent. The lime trees on Christ's Pieces were planted in 1896 and it will be at least another hundred years before they are likely to be considered as veterans. The horse chestnut avenue along Victoria Avenue only dates from 1890 and although not all these trees are in particularly good condition, they are also a long lived species and would not achieve veteran status for many decades.

A well-intentioned desire to carry out regular maintenance has sometimes resulted in work being carried out that was actually harmful to trees, and certainly to the development of their value as veterans. It was once normal practice to clear out cavities and remove all decaying wood. Damaging flush cuts to the trunk and main branches prevented the natural wound healing process. These cuts and old natural wounds were painted over, preservatives were pumped into the heartwood of the tree and cavities filled with a variety of materials. The result was that much of the decayed material was removed in the urban tree population. Subsequent research has shown the harm of these particular techniques and they are no longer practiced by reputable tree surgeons.

Two Cambridge trees have been chosen to illustrate in more detail the biodiversity value that is associated with our local veteran trees. The first is a willow (Salix alba) growing on Sheep's Green (west of the main river) north of Fen Causeway. The second is a field maple (Acer campestre) on Cherry Hinton Recreation Ground.

Willow on Sheep's Green

This tree may be one of the twelve willows planted by the Darwin Family on Sheep's Green on 13 March 1903, referred to by Margaret Keynes in her book, A House by the River, p136-137. The willow was formerly pollarded but this form of management has lapsed in the last twenty or so years, allowing the tree to form a tall crown. The characteristic shape of the pollard trunk is still visible.

Rot holes formed when small side branches died back. A tree creeper will use a crevice much as it is, but the great spotted woodpecker modifies it to make a hole for a nesting place. Bats will also roost in holes.

A sycamore has seeded itself into the top of the old willow pollard trunk and is growing as an epiphytic plant rooted in the rotted debris that has collected between the branches.

Birds such as tits and warblers forage for invertebrates on the foliage, while tree creepers gather their prey from the external surfaces and shallow cavities of the tree. Woodpeckers break into decaying wood searching for food. The invertebrates rely on the action of fungi to break down the wood so that they can exploit it as places in which they can lay their eggs. Some invertebrates will live specifically in fungal fruiting bodies and their exit holes can sometimes be seen peppering the surface.

A great spotted woodpecker

Mark Hamblin rspb-images

Field maple on Cherry Hinton Recreation Ground

The tree appears to be a single old specimen that has split in two as the centre has rotted out. Fire in the trunk has also contributed to this separation. The field maple is located in the hedge at the east end of the recreation ground. This was probably part of a much earlier field boundary that existed long before the park was created.

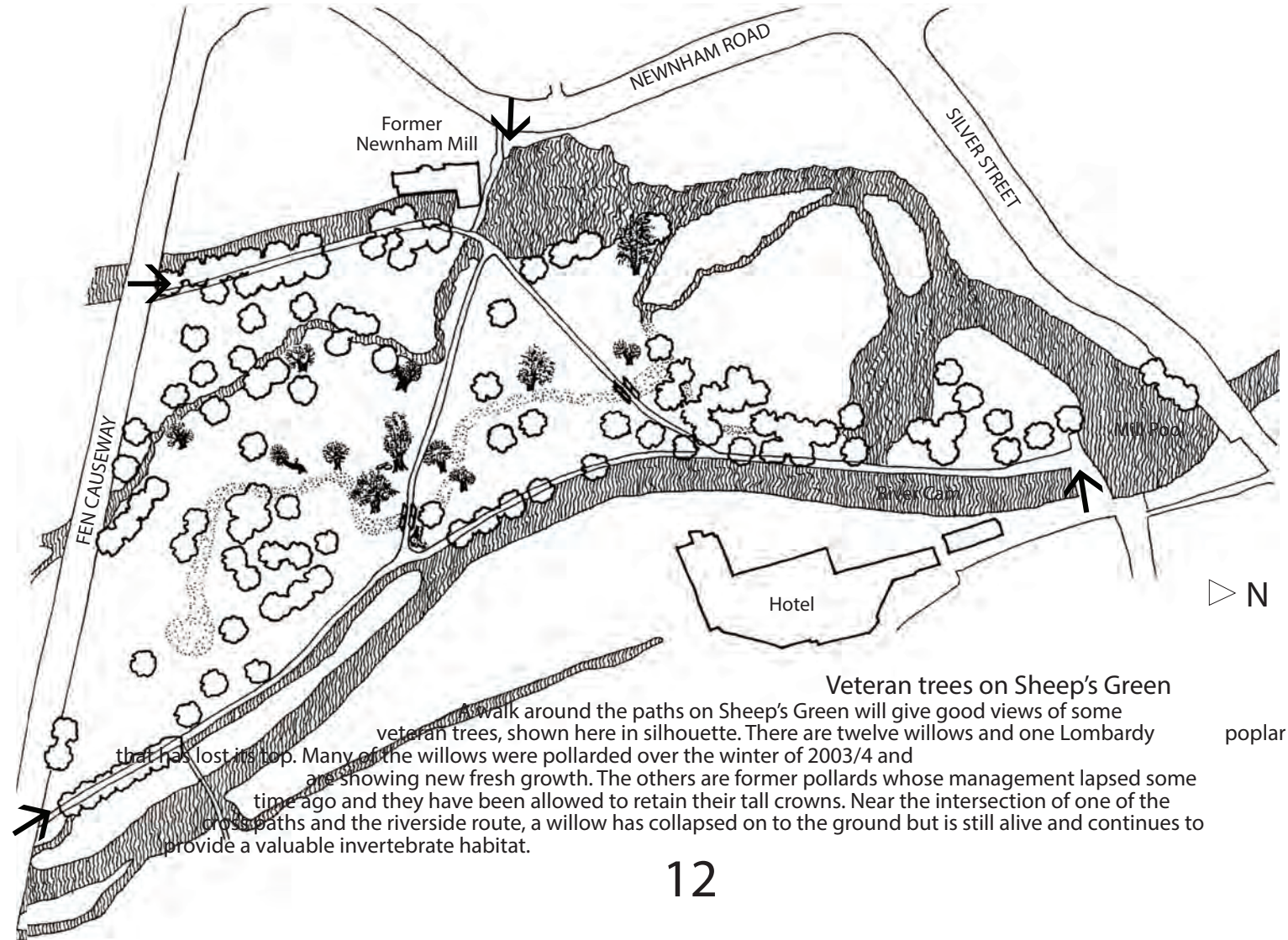
The branches that carry the current leaves are not particularly old. The field maple is an example of natural pollarding where new branches develop in response to a period of retrenchment when many of the branches die back. This is caused by the tree suffering a significant set-back that is not sufficient to kill it, sometimes due to a severe drought, or in this case perhaps the fire damage. Trees that are best at recovering from such events usually naturally generate new shoots from their trunks (epicormic shoots). These are able to develop into the branches that go on to help the trees recover and continue their lives. Such trees are therefore more adaptable to periodic stressful events and this may be one of the reasons they go on to become long-lived veterans.

Amongst the shiny ivy leaves are some of the field maple's epicormic shoots that could develop into branches in the future.

A bumblebee emerging from a hole that has formed in the trunk of the field maple. Traces of white fungal mycelia can be seen. A member of the cow parsley family has seeded into the same hole. Dead leaves have accumulated around the entrance contributing to the build up of material inside the cavity.

Half of the rotted out field maple trunk with its young branches and epicormic shoots. Mosses are growing on the trunk.

Beetle galleries and exit holes are exposed as the tree heartwood continues to rot.



Veteran trees on Sheep's Green

A walk around the paths on Sheep's Green will give good views of some veteran trees, shown here in silhouette. There are twelve willows and one Lombardy poplar that has lost its top. Many of the willows were pollarded over the winter of 2003/4 and are showing new fresh growth. The others are former pollards whose management lapsed some time ago and they have been allowed to retain their tall crowns. Near the intersection of one of the cross paths and the riverside route, a willow has collapsed on to the ground but is still alive and continues to provide a valuable invertebrate habitat.

Management advice for veteran and other trees, what to do and what not to do

- ŸCheck whether the tree is in a Conservation Area or is protected by a Tree Preservation Order.
- ŸIf you think it may be a veteran tree, seek specialist advice before embarking on any maintenance.
- ŸDo not make dramatic changes in the environment of the tree. For example do not let it become overwhelmed by other competing vegetation, but at the same time do not strip away plants that are providing shade to the roots and shelter from strong winds.
- ŸAvoid compacting the soil around the roots, by storing materials on it or by trafficking over it. Remember that vital fungal mycelia are very fragile and roots are much closer to the surface than most people realise. (Think how reluctant you would be to let even a bicycle run over your foot.)
- ŸOn agricultural land, do not plough or spread fertiliser within 5m of the edge of the canopy to avoid damaging roots and fungal mycelia.
- ŸDo not attempt to re-establish management of a lapsed pollard without seeking the advice of an expert.
- ŸIf it becomes necessary to remove dead wood, try to leave it close by. This will enable those organisms reliant on dead wood such as some fungi and insects, to re-colonise parts of the tree when future dead wood develops. The tree will also be easily accessible when both live and dead material are necessary for the completion of life cycles.
- ŸEnsure that pollarding is carried out on a staggered rotation so that not all the trees are pruned at one time, maintaining the continuity of habitats close by for mobile wildlife to migrate to.
- ŸTry to establish what wildlife value the tree has in a non-invasive way. Remember that investigation may actually damage some of the habitats that are so valuable.
- ŸConsider whether the tree should be managed for a particular organism. Be aware that there may be a conflict between the requirements of different forms of wildlife.
- ŸDetailed advice is available in H.Read Veteran Trees, a guide to good management 2000.

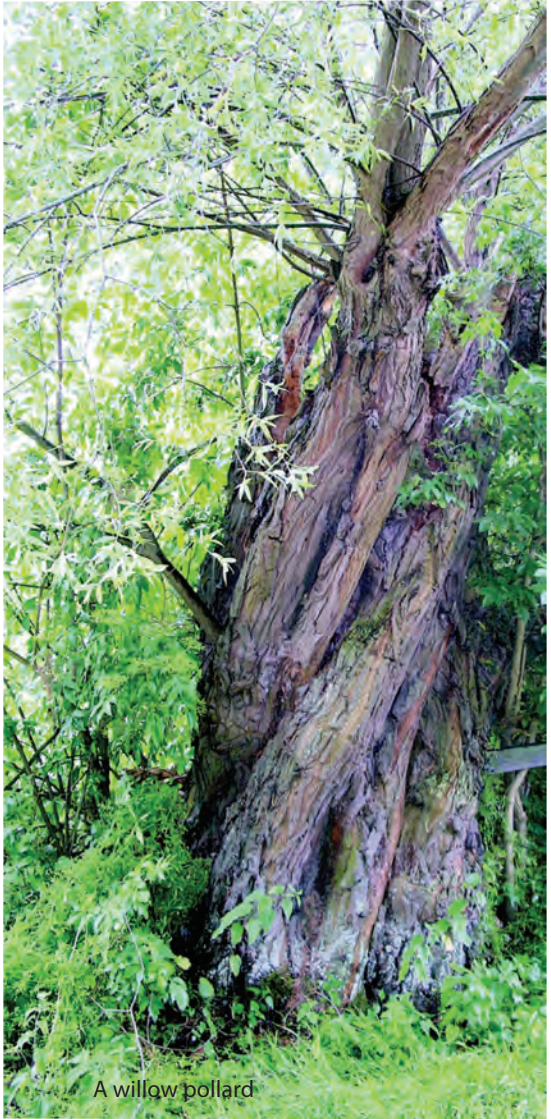
Action for the future:

Management specifications for current veteran trees
There will be a more detailed evaluation of selected trees and individual management specifications written for them, in order that the history of their management is understood by successive staff as well as setting out guidance for their future care.

Explore the extent of veteran trees in private gardens
Owners of possible veteran trees in private gardens are encouraged to seek confirmation from the Council's Tree Officers.

Future monitoring
The 2004 survey will give baseline information so that the process can be repeated in 5 years. It will be possible to assess how many of the current veteran trees have survived and to see how many additional trees have been recruited into this group. It will also be an opportunity to assess the effects of management on veteran trees in different parts of the city.

Further study of Cambridge's veteran trees
It is hoped that the willow and field maple case studies could become a focus for an archive of knowledge about local veteran trees. Ideally this information would be accessible through a biological records centre for further study at all levels of ability.



A willow pollard

New tree planting

An understanding of veteran trees could also influence the way new trees are planted. There is no reason why they should not feature in built up areas. Pollards are particularly suitable for this setting because they can be regularly managed so that any dead wood is relatively small. Such trees develop character and can become focal points even where space is limited. The best pollards are managed in this way from their youth. Limes, planes and sycamores respond very well to this treatment.

Whether the intention is to grow pollard or maiden trees, new development sites should be designed so that the trees have room to grow to their full, mature stature and also for them to be allowed with proper management to decline safely. With some species living as long as 1000 years, their aesthetic contribution could well outlive many buildings and successive phases of redevelopment that might occur around them. These trees can form anchors in the history of a place. They will not happen by themselves, so they have to be planned for and given space in this time of increasing building densities.

It is worth remembering that veteran trees in close proximity to each other are of greater biodiversity value than the same number in scattered, single locations. So, in designing new open spaces, provision also needs to be made for larger, mixed age groups of trees, including empty spaces for future planting.

Planning for future veteran trees
Not only do we have to plan the protection and management of existing veteran trees to prolong their lives, but achieving the next generation of veterans also has to be considered. Trees at their maturity have to receive the continued care that will enable them to survive into the veteran stage.

Cambridge is famous for its historic buildings but nothing complements this historic character better than very old trees. It is impossible to acquire such trees ready made or to speed up the process of aging. Only respect for their needs over time scales long beyond the influence of individual managers will achieve this relationship.

'ANCIENT TREES ARE PRECIOUS. THERE IS LITTLE ELSE ON EARTH THAT PLAYS HOST TO SUCH A RICH COMMUNITY OF LIFE WITHIN A SINGLE LIVING ORGANISM'

Sir David Attenborough (2002)

The horse chestnut tree next to Kings College Chapel.

References
Fay, N. 1997. Veteran Trees Initiative: Specialist Survey Method. English Nature.
Read, H. 2000. Veteran Trees: a guide to good management. English Nature.
Keynes, M. 1984. A House by the

Further information is available on:-
Http://www.english-nature.org.uk
Http://www.woodland-trust.org.uk
Http://www.ancient-tree-forum.org.uk

A parish boundary marker tree. The circumference of the old oak pollard's trunk at chest height is 6 metres.

The full 2004 Veteran Trees Survey is available from the Cambridge University Botanic Garden, Cory Lodge, Bateman Street, C Cambridge City Council, The Guildhall, Market Square, Cambridge CB