

# ENSURING ANCIENT TREES FOR THE FUTURE

## GUIDELINES FOR OAK POLLARD CREATION

**Luke Barley** and **Jamie Simpson** provide a step-by-step guide on creating pollards from young and mature *Quercus robur* and *Q. petraea* in the UK.

It is well known that ancient and veteran trees are a major part of our cultural heritage and that they provide important habitats for a wide range of associates, including many very rare fungi, invertebrates and lichens (Alexander, 1999). Heightened awareness of their value, especially thanks to the efforts of the Ancient Tree Forum, has encouraged an increase in measures to attempt to prolong their lives (and thus the lives of the communities they host). Techniques such as ‘haloing’ and retrenchment pruning have become well-established parts of the conscientious tree manager’s vocabulary (Read, 2000; Alexander et al, 2010). But in this rush to save these connections to our past, has the future been forgotten? Are we creating and ensuring the ancient trees of tomorrow?

Some of our oldest trees are pollards, which can live longer than maiden trees due to their lower centre of gravity and physiological reasons explained by Lonsdale (1996). This article will focus on oak pollards, which due to their longevity and large girth support a wide range of wildlife that relies on the brown rot of oak heartwood created by fungi such as *Laetiporous sulphureus* (chicken of the woods) and *Fistulina hepatica* (beefsteak). While these conditions do occur in old maidens, pollards are particularly important due to their longer lifespan and their ability to live with decayed heartwood for many hundreds of years; pollarding may also speed up the development of important habitat. It has become accepted – although not always acted upon – that managers of veteran pollard sites should be creating new pollards from young trees in order to re-create those same rare conditions for the future, and to continue the cultural traditions of the location.

Methods of ‘veteranisation’ on mature trees have been suggested in an attempt to bridge the gap in time between the eventual death of current veterans and the development of decay in any new generation of pollards, which could be catastrophic for the populations of associates. This intentional damage can include wounding and ringbarking mature trees, and boring in to them to increase the likelihood of colonisation by heartwood fungi as well as creating habitat for birds, bats and invertebrates. An idea



Young pollard, first summer after winter cutting.  
Note foliage left onto all aspects and  
good regeneration from stem.

amongst some ancient tree professionals is that mature trees can be carefully pollarded too, even if that means cutting higher in the crown than a 'classic' pollard and at multiple points. This will promote habitat continuity and ensure the importance of pollard sites in to the future.

This article aims to do a number of things. Firstly, to bring together the recent history of pollard creation and examples of good practice. Secondly, it will expand on previous published material and relate the authors' experiences of successful pollard creation in terms of both young trees and mature trees, with the mantra in both cases being 'cut to the form of the tree,' in Ted Green's phrase (1996). We take 'cutting to the form of the tree' to mean treating each tree individually and looking at its growth pattern and features in close detail in order to cut in the places that will stimulate the best response. These features are listed in our guidelines. Finally, we hope to inspire others to get out there and look at trees carefully, and start cutting them accordingly. We would like to raise the profile of pollard creation as a major component of the management of veteran tree habitat.

### **What happened in the past? And what is happening now?**

Pollarding is a traditional management technique that provided a sustainable crop of small diameter (<20cm) wood products, which were used for many purposes including fodder, charcoal making, firewood and faggots (Green, 1996 & 2012). Trees were cut at a height to keep the young growth out of reach of grazing animals. The tools available for pollarding before the 1950s were obviously hand tools rather than power tools – something to bear in mind when choosing where to cut. After the industrial revolution many of the uses for pollard products were replaced by newer processes and materials (such as fossil fuels for energy or brick and softwood for construction). Changes in the management of livestock also stopped demand for tree fodder. People abandoned pollards; many were removed completely and the majority of the remainder have now developed huge, overgrown poles on their decaying bollings. The knowledge and skills needed to cut new and in-

rotation pollards were lost.

In the early publications on veteran management in the 1990s, a number of articles discussed attempts at pollard creation (Atkinson, 1996; Coleman, 1996). These often meant cutting trees – young and mature – at an arbitrary height (often 2 or 3m), which was deemed to be the 'correct' height for a pollard. Success rates were not great (Atkinson found 17 oak trees failed from 30 cut, although these were older trees; Coleman found 6 died from 13 cut at one site, although only 2 out of 20 died at another).

Read (2008) and Green (1996) have written since about the creation of young pollards, recommending techniques that lead to increased success rates, such as trying to cut trees with a DBH of less than 20cm, cutting above a fork, and leaving some branches on. These techniques allow for better callus formation around wounds and better regeneration from dormant buds in the bark. Leaving some foliage allows the tree to photosynthesise at the first opportunity and helps its system to start running productively again.

Forbes and Clarke (2000) provide a useful account of their experiments cutting semi-mature trees at Hatfield Forest that introduces the idea of 'phased pollarding', or height reduction in successive stages. They also advocate cutting to the form of the tree rather than to an arbitrary height, and cutting only into young growth where possible (as well as leaving stubs, to increase the chance of good regeneration from dormant buds).

In terms of work on the ground, a few sites, such as Hatfield Forest and Burnham Beeches, have an active, formalised and monitored program of pollard creation, but at most sites the process is still ad hoc at best.

### **Cutting young trees**

The ideal method of pollard creation is on young maiden trees. This is how pollards are likely to have been created historically. It is the easiest and least dangerous method and gives the best chance of success. Examples using the guidelines below can be seen at sites such as Richmond Park and Knepp Castle. The mantra is 'cut to the form of the tree.'



Pollard creation in action. Note the higher cutting point because of location of fork and smooth bark, and stubs left above unions.

## Guidelines on cutting young trees

1. *Before you cut - look.* Observe the tree the summer before cutting, if possible – trees with low vigour (poor crown density or odd leaf colour, for instance) are less likely to respond to pollarding. Trees with healthy foliage and good inner crown growth should respond best.
2. *Cut in summer or winter – not spring or autumn.* As long as you leave plenty of foliage on, trees can be cut in summer as there is a lot of energy production. Traditionally, this would have been the only time it was possible to cut trees for fodder.
3. *Cut in areas that are open and have good light.* If you have to clear scrub from around the trees first, leave them for as long as possible (at least one growing season) before cutting to avoid sun scorch and shock. Exposure to the south is especially important.
4. *Don't cut to a prescribed height.* 'Classic' pollards may have been cut at 2 or 3m, but we need to cut to the form of the tree and decide where it will respond best. It is also important to remember the original reason for pollarding rather than coppicing: if you are going to graze under the pollards, make sure re-growth is out of reach of livestock!
5. *Always leave some foliage on.* Leave a minimum of 30% foliage on the tree to maintain photosynthesis and allow the tree to respond with vigour to the cutting. Normally we'd cut the biggest branches and leave smaller ones on.
6. *Leave stubs.* Don't target prune – the best re-growth is likely to be epicormic growth from stubs. The length of the stub should be determined by the point above (the form of the tree) but aim for between three and five times the diameter of the branch (Read, 2010). The cone of decay formed from the wound will also not affect the next existing lateral, maintaining structural stability.
7. *Cut just above a fork if possible.* The stems are likely to be thinner, the bark smoother, and there is a higher chance of dormant buds around the union.
8. *Look for nodes, buds and swellings in the bark.* These are other key parts of cutting to the form of the tree. These subtle details on the bark can indicate where the best growth from dormant buds will come from – it's best to keep them on the tree!
9. *Try to cut in to smooth bark.* It is harder for dormant buds to emerge through fissured bark – aim for smooth bark, especially when it's purple or crimson. This may mean cutting higher in the tree. Think outside the box: if the bark is fissured at 3m but there's a fork with smooth bark at 5m – cut there!





Left: A fresh stub in winter showing smooth bark, swellings and nodes from which dormant buds are likely to emerge. Right: The same stub in the second growing season after cutting.

10. *Take out the leader.* This should be your first cut (and sometimes the only one). Be aware that on very young trees, a new leader may develop and you might have to cut it again to get a pollard form.
11. *Cut older/larger growth.* Select branches that are dominant and appear to be the oldest and largest on the tree. We normally cut most branches thicker than our forearm back to a stub.
12. *Balance the crown.* Once you have removed the largest branches, prune the rest to ensure a fairly even shape from all sides. If necessary, prune the centre of the tree to ensure a consistent density that is quite open to allow light in to all areas on the stem.
13. *Prune all branches off the stem up to about 2m.* Target prune all lower growth to discourage regeneration down here and promote regeneration in the crown.
14. *Record the location of cut trees and dates and details of work.* It is absolutely key to plan cyclical cutting of pollards into management plans and work programs.
15. *Ignore these guidelines.* There are other ways to create pollards. Experiment, look at trees in detail and develop (and record) your own experience.

#### Health and safety

Pollard creation on young trees is generally a safer operation as it requires only hand tools such as a good quality pruning saw, billhook or pole-saw, and is often possible from the ground. Great care should be taken with falling branches and any use of ladders. Any work with chainsaws or off the ground should only be conducted by trained and experienced practitioners.

### Ongoing management of young pollards

It is expected that the first return visit to a new pollard would be after 3-5 years but, again, there is no prescription. Look at each tree individually and decide if it is the right time to cut again based on the tree's response. Normally 3-5 years will have allowed good regeneration of young material from dormant buds on the stubs and around unions, and the branches left on will have grown.

The next operation would be to remove the oldest growth in stages to further encourage the new epicormic growth. Cut the biggest few branches back to stubs and aim for smooth bark, nodes and swellings. Leave all the new growth on! The tree should hopefully then be on the way towards being in a working pollard rotation, with the largest diameter wood being cut at each operation.

Once the trees are in rotation, the periods between cuts are likely to be longer, depending on their response (it may be anything up to a twenty year cycle). At Burnham Beeches the return period is ten years (Read, pers. comm.). It may be most efficient to create compartments of pollards and return to the whole group on a given cycle; returning to individual scattered trees can be extremely time-consuming. Compartments also allow lots of light in to all the new pollards. The guidelines above should be followed at each cut, always leaving at least a third of the foliage on and cutting to the form of the tree.

### Cutting mature and semi-mature trees

When mature trees are suitable for pollarding or need to be cut in order to halo veterans, they can be pollarded in a phased manner in order to reduce mortality rates and increase their chances of offering habitat continuity for the specialist communities using older trees. The term for the process of performing upper crown reductions on mature trees surrounding a veteran is 'high haloing', as opposed to simply 'haloing', which refers to felling competing vegetation at ground level. When attempting to create a pollard-style tree from a mature tree, veteran tree managers usually talk about a staged reduction, or phased pollarding.

These ideas are a very clear progression from

the work of Forbes and Clarke at Hatfield Forest, and are often reflected in recommendations by consultants specifying work on veteran trees, such as at Ashted Common. These plans often specify staged reductions to mature trees surrounding veterans, taking 2 or 3m off in each of a number of operations. A target, final height is often specified but, importantly, it is clear that subsequent reductions must depend on monitoring the responses of the tree and neighbouring veterans. Initial observations after performing this work have shown that trees cut as high, phased pollards often respond with good vigour while achieving the objective of increased light to the veterans; any that don't respond provide valuable standing decay habitat.

As many sites are committed to veteran management for the foreseeable future, the opportunity is available for further cutting to these trees according to their response, when returning to the veterans they accompany. This



'High halo' work to allow light into a veteran pollard, with the early-mature tree having been cut following the guidelines. Picture taken first summer after cutting. Note stubs and lower foliage.



can include re-pollarding to create knuckles or cutting lower again to growth that encourages a lower crown. Many of the pruning wounds made in this process will not occlude, allowing colonisation by decay fungi – this is embraced as providing habitat continuity with the hope that many of the trees will be stable and vigorous enough following reduction to live a very long time with decay.

This is not necessarily an alternative to other veteranisation techniques as in practice they go side by side (and this should in fact be considered a form of veteranisation). Trees that look like they will respond to phased pollarding can be cut as such, while trees that look unlikely to respond could be cut more brutally, monolithed, or wounded as another way to create habitat.

### Which trees will respond best? Features to look for when choosing trees to phased pollard.

- How adjacent trees will affect the tree in future (i.e. will they ‘overtop’, touch or out-compete it?).



More high halo work (veteran pollard in background). Note good regeneration from stubs and extensive lower foliage left on. Picture taken two growing seasons after cutting.

- Good existing light conditions.
- Existing epicormic growth, especially lower down the crown and on the main stem, means the chances of the tree responding well to cutting are much higher.
- A good existing lower crown. Much like retrenchment pruning on veterans, if you can cut to an existing lower/inner crown you are not reliant on the tree’s ability to respond from dormant buds.
- Existing storm damage showing good regeneration.
- Smooth bark lower down the tree.

These features should be considered as making trees more preferable candidates for phased pollarding, but don’t rule out other trees – they may respond just as well. During a high halo operation, look closely at all the trees and use judgment to decide which trees to phase pollard, which to veteranise, and which to fell.

### Guidelines on cutting mature trees

1. *Follow all the guidance given for young trees, above, but bear the following in mind as well.*
2. *Don’t cut to a prescribed height.* Avoid cutting to an arbitrary point such as 3/6/9/12m. Cut to the form of the tree and create pollard points wherever is appropriate.
3. *Always leave some foliage on.* Remove between 30 and 50% out of a mature tree, although take more if you need to meet light objectives for a neighbouring veteran. Normally we’d cut the upper crown and leave lower laterals on.
4. *Try to cut in to smooth bark.* Fissured bark is unlikely to produce growth from dormant buds – look for smooth bark, especially when its purple or crimson. This wood may be too high in the crown for the intended operation but, if possible and appropriate, cut there.

## Health and safety

Reductions to mature trees should only be undertaken by trained, qualified and experienced practitioners. Even experienced contractors who are not accustomed to veteran tree or pollarding work might also require further training and supervision.

5. *Take some height out.* Cut vertical stems back to stubs. Often there are main unions high in the crown that are obvious points to cut to.
6. *Leave horizontal branches on.* Aim for a lower, spreading form. Horizontal branches exposed to light often throw out lots of regeneration growth, and the tree will be more stable and in good condition for further pollarding or reducing.
7. *Balance the crown if necessary.* Try to achieve a crown shape and density that will allow all branches equal access to light and maintain stability.

## Ongoing management of mature trees

We have little experience of performing second cuts on mature, phased pollards yet, but expect that, once the final height has been achieved, many of the same principles will apply as to younger trees. We won't return for five or six years (which is also normally specified by a consultant's schedule) and will then judge each tree individually depending on its response and its relationship with other trees, such as nearby veterans. Some trees may have put on growth lower down the crown via epicormic or existing branches, and these could be potentially reduced further in height to further increase their stability for longevity. This would be the true 'phased pollard'. Others are likely to respond better from the first cutting points, higher in the crown, and these could be treated as high pollards

and the largest new growth cut back to stubs. Other trees may not respond well at all, and decisions will need to be made whether to reduce them further (and accept their potential decline) or leave them as they are.

## Inspiration – and where to create pollards

Pollards were historically created in many locations, according to peoples' needs. Today, the largest concentrations of pollards exist in hedgerows and wood pasture (on former common land or in deer parks and royal forests). They exist occasionally in ancient woodland, especially on woodbanks, where they were created as marker trees. Similarly, they are found on parish and other rural boundaries as markers. As previous landscapes have been eroded by development, veteran pollards can now also be found in urban gardens, streets, and even shopping centres – places where they (and their associates) are particularly vulnerable to poor management, environmental impacts and habitat fragmentation. In all of these locations, new pollards can be easily created. There are usually young trees present, whether through natural generation or planting, and the creation of young pollards is straightforward. In urban environments, pollarding trees can also reduce their impact on buildings and roads, and increase their safety as part of risk management. All it takes is the interest and the will to look closely at a tree – managers of veteran pollards, go out and create the veteran trees of the future!



The perfect scenario? A veteran pollard in need of haloing, mature trees ready for staged reductions, and young trees ripe for pollarding – one already cut.

One thing to bear in mind is that open grown maidens are also a very important type of veteran tree; even on pollard sites, well spaced open grown young trees with good, spreading lower growth should be left to become 'classic' field oaks. Similarly, on veteran sites without pollards, other techniques will be needed to ensure habitat continuity and pollarding may not be appropriate.

This is also a call to all land managers and arborists involved with veteran tree management to use their imagination and employ some long term thinking when managing programs of haloing and pollard creation. A combination of veteranisation and phased pollarding can fulfill the goals of reducing competition for ancient trees and providing habitat continuity without the need for clear felling or the potentially fatal reduction of trees straight down to 'classic' pollard height.

### Problems to be aware of

New growth can be greatly damaged or even completely destroyed by pest and diseases species such as oak powdery mildew (*Microspheera alphitoides*) or green oak tortrix moth (*Tortrix viridana*) larva, as well as severe frosts or hard winters. Monitoring the tree's growth is essential in influencing decisions on the next phase of cutting. Some pollards will fail, for these reasons or many other factors, known and unknown – another reason why its important

that pollard creation should not just be undertaken on a small, experimental scale.

### The future

We are well aware that some may not agree with our ideas, and to others we have been stating the obvious. We simply want everyone to share experiences gained in pollard creation and veteran management, and to promote ideas about the possibility of creating pollards from mature trees when haloing. We want to promote debate and spark interest in pollard creation and a less prescriptive approach to management. We welcome all comments, ideas and feedback, especially from people already involved in pollard creation on oak, or the process of high haloing. Unless everybody involved starts documenting and monitoring work better, our trees and their associated biodiversity will suffer. All veteran tree managers can learn from each others' experiences and share successes and failures.

### Unanswered questions – can you help?

- Should we be using natural fracture pruning during pollard creation? Or during high haloing?
- Does the tool used affect the chance of success?
- Do new pollards respond better in groups?
- How does the geography of the UK affect the success of pollards?

### Storm damaged trees

Much of the inspiration for the pollarding techniques described before has come from the observation of storm damaged trees; these are natural pollards. Where an oak stem has broken off, the regrowth is often vigorous. The experience of storm damaged trees has shown us that stubs and natural fracture pruning can promote better regeneration than target pruning (Finch (1996) and many others in the ancient tree world since).

In pollard creation on mature trees (whether during high haloing or not), the authors would always see a storm damaged tree as a superior candidate to achieve the objective of a successful pollard; there is often smooth, young growth lower in the crown and the break and regeneration often creates obvious pollarding points and sometimes a classic pollard shape. We can learn a lot by studying storm-damaged trees.



- Do trees pollard better in wetter areas, i.e. the bottom of slopes?
- What is the effect of oak powdery mildew on regeneration?
- We think stubs produce better regeneration than target pruning – do they? And why?
- Why does some regenerative growth appear to have been nibbled, even when it's above the browse line? What is doing this? Grey squirrels? Parakeets?
- Does the aspect affect them as much as we think? Do they put on the majority of new growth to the south?

And that's just a taster! The only way to answer these questions is if people get out there and cut some trees – there's no time to waste if we are to bridge the gap between the ancient trees of today, and those of tomorrow.

### Conclusion

The experience of previous writers, along with that of the authors, has shown that a high success rate can be achieved when creating pollards from young trees as long as you 'cut to the form of the tree'. A good success rate can also be achieved by applying this principle to mature trees (including when haloing veterans) and we feel that the creation of phased pollards will lead to better habitat continuity.

Pollard creation is the future: get out there and cut some trees!

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