Morning at Želnava. Photo Zdeněk Patzelt

Světlé hory. Photo Pavel Hubený

to degree of naturalness, natural woodland habitats are for 44% situated in the Natural Zone and for 29% in the Near-natural Zone. In the next zonation delimitation (in 15 years) we will thus be able to leave a full 73% of woodland habitats to natural processes. Two-thirds of all forest bogs, raised bogs and transitional bogs are also included in these zones. By contrast, 85% of submontane Nardus grasslands are situated in the Concentrated Management Zone and Cultural Landscape Zone, just as 66% of X-coded habitats (strongly influenced or created by man).

Will Quiet Zones bring peace?

They certainly will, although there will certainly be a lot of fuss around them before their designation. As already stated, Quiet Zones are not regulated by management – that is the task of zonation – but by visit rate. Freedom of movement is one of the basic civil rights, enshrined in the Charter of Fundamental Rights and Freedoms, so it can only be limited in justified cases. Our Quiet Zone proposal tries to get to the core. This means that Quiet Zones, which are according to law accessible only by routes and paths reserved by nature conservation authorities, cover 16.7% of the National Park area and represent only the most sensitive and threatened minimum. We concentrate especially on animal species, exceptionally also plants and peatbogs which are protected and easily disturbed. Conservation of the western capercaillie (*Tetrao urogallus*) will be the highest priority of the National Park in this. The sensitivity and population density of this bird has been dealt with in No. 1/2019 of this magazine. For its conservation we want to create, in collaboration with Bavarian Forest National Park, a compact joint area on both sides of the border to which the same rules will apply. We aim at maximum protection of the real core of the capercaillie population in the area of the Modrava moors and the border ridge between Prameny Vltavy (Vltava Springs) and Plesná. This area will have time-limited access and the density of access roads will be minimal. At the same time, hunting and forestry interventions will be banned on both sides of the border.

The second largest Quiet Zone area has been dedicated to the protection of the Eurasian black grouse (*Tetrao tetrix).* Its population is markedly smaller than that of the capercaillie and the situation is not yet improving. Grouses are not concentrated in a coherent territory, but inhabit plains in marginal parts of the National Park which are rather remote from each other. This fragmentation of its populations may be a great problem in preserving the species in the long term. At the moment, a DNA analysis of individuals, based on collected dung, is being completed. This year for the first time we will obtain detailed information on the real grouse population numbers, on relatedness of individuals and also on the question how far individual birds fly. Protection of its courting grounds and nesting habitats is today linked to the protection of nesting grounds of common crane (*Grus grus*), whose numbers in Šumava have slightly increased over recent years. We also have a plan to protect three territories which are permanently inhabited by reproductive lynx females. These areas are sufficiently varied, rocky and inaccessible, and have game concentrations which lynxes use for hunting. The territories include parts of the Vydra and Křemelná canyons and the scree forest at Medvědice. We further want to dedicate some small-scale quiet areas with limited access restricted to the spring months to the protection of peregrine falcon (*Falco peregrinus*). Moreover, the quillwort *Isoëtes echinospora* in lake Plešné jezero will be protected by disallowing entry into the lake, similarly to the protection of some peatbogs and wetlands situated close to paths where visitor numbers are extremely high.

The 2017 amendment to Act No. 114/1992 has brought really revolutionary changes. The separation of management, connected with the system of Nature Conservation Zones, from visitor regulation, which involves a system of Quiet Zones, is still strange and new. This has led to the creation of areas without human intervention which are however free to visit, and on the other hand, managed areas with temporarily limited access to visitors (historical courting grounds of black grouse on meadows). This change in the way nature is managed brings us closer to Western Europe, where this approach is common, and enables us to unify the practical approaches on the Czech and Bavarian side of the state border, making Šumava National Park and Bavarian Forest National Park speak a common language again.

Tree veteranisation, pollarding and girdling vs tree conservation

Selected issues of practical protected area management

Pavel Pešout, Jan Šíma, Linda Stuchlíková

We are currently observing changes in the landscape at an unprecedented rate. We do not have in mind here the often mentioned impacts of climate change, but particularly the consequences of changes in land use by man. A century ago, when a third of the inhabitants of the Czech Republic still made a living from agriculture and forestry and the average farm size did not even exceed 5 hectares (Kučera 1994), the landscape was in many ways exploited more intensively, but at the same time in a much more mosaic way. At present, only a tenth of them participate in land management, while industrialised farming takes place in large, consolidated areas and the management of economically marginal areas and traditional, more labour-intensive forms of farming have been abandoned.

Tree girdling has been maintained until today and is applied in many European countries. This traditional technology is now gradually being applied in the Czech Republic again, not only by nature conservationists in special interventions for the benefit of saproxylic species, but in certain situations also by foresters. Photo Karel Kříž

High stumps were often left in coppices, so coppicing mostly fluently passed into pollarding. Restoration of a formerly trimmed oak. Photo Karel Kříž.

Trimming of pollard willows is best carried out in regular, roughly five-year intervals in a way that the heads do not break apart under the weight of the branches. Pictured: willows in Křivé jezero National Nature Reserve. Photo Vladan Riedl

The result is a progressing homogenisation of the landscape, changes in and loss of many habitats and communities, and an alarming overall decline in and extinction of many species. If we want to face this trend, nature conservation must make an effort to restore historical forms of management or their effects by realising appropriate compensatory measures. By default, efforts to restore grazing at suitable sites, mowing in a mosaic way (grassland cutting differentiated in time and space) attempting to compensate for the diversity that small-scale farming had naturally generated, etc. have already been included into 'conservation management'. Also a wide range of other activities take place in the landscape, including many different forms of utilisation of trees and tree parts. Measures for the support of biodiversity must include the restoration of these historical management methods and compensatory procedures for the initiation and creation of habitats for species (particularly saproxylic insects) specifically bound to such habitats. In this contribution, we will have a look at special treatment of trees growing outside forests.

Before the advent of fossil fuels, wood was a much demanded energy source. It was even obtained at remote sites and hardly accessible places in the easiest possible way. At the same time, forests were exploited as a source of various materials, and all kinds of tree stands were used as a source of complementary biomass. Particularly municipal pastures, somewhere also mortuary lands and open-canopy forests, were used intensively for grazing. Commonly coppicing was practised here, branches were trimmed, etc. Also use was made of dry twigs and shoots and tree debris. In the case of trees growing along roads, in hedges and on land boundaries, pollarding was often practised. At the same time, trees were exposed to cattle activity and, last but not least, also to fire. These activities, together with more age- and species-differentiated forests and a higher percentage of old-age solitary trees (incl. old fruit trees) in the landscape, guaranteed permanent suitable conditions for the presence of saproxylic insects and other organisms bound to sunlit trunks, cavities, cracks and other microhabitats typical of senescent trees. Today, former municipal pastures, tall standard-tree orchards and coppices densely encroached with trees and shrubs, are often reclassified as woodland and managed as clearings, or are protected woodland left without deliberate felling. Pollarding and other ways of obtaining wood have been abandoned (Szabó 2010).

Compensatory measures for habitat creation

Many animal and plant species are existentially dependent on habitats through traditional management forms (Šebek et al. 2013). This is apparently related to the fact that at least some of these forms are similar to natural processes which used to have an impact on trees even without man. Tree trimming or pruning may be similar to the effects of large mammals, while girdling and coppicing create habitats similar to fire. All the more problematic is the fact that trees treated in this way gradually disappear from the landscape. Sites indispensable for the survival of many endangered organisms inevitably decline due to this (Čížek et al. 2016). Modern nature conservation is therefore searching for ways to compensate for traditional management forms with the aim of preserving conditions necessary for a favourable development of populations of various endangered species and communities. Such approaches include controlled veteranisation and other sorts of interventions on trees, which make it possible to accelerate the creation of habitats linked to more advanced tree development stages, i.e. aging and decay (for a detailed description of different methods, see Box). With regard to the degree of threat of different species bound to dying trees (or their parts – cavities), their usually slow development and low population dynamics (e.g. in the beetles *Cerambyx cerdo*, *Osmoderma barnabita* and *Lucanus cervus*, having a development cycle of several years) and also with regard to the uneven representation of trees of the appropriate age and condition, it is necessary to create habitat conditions with a relatively long-term perspective. This cannot be limited to just a preservation of the actual, often residual condition, which would also mean the loss of populations of species bound to it after death and decay of even well-maintained trees. Unfortunately, such a threatening scenario can be expected in many cases and will often be difficult to prevent (e.g. species associated with allees and similar groups of trees, some of which fall under the Natura 2000 network). The more important is the implementation of measures in areas which have a potential for maintaining particular species and their habitats in the long term. In many states of southern and western Europe, traditional management forms have partly been maintained to this day, while in other (e.g. northern) countries, restoration of these forms, initiated by nature conservation, has been practised for years (Alexander 2012, Cavalli, Mason 2003, Speight 1989, Read 1996, Unrau et al. 2018, Vignon, Orabi 2003).

BOX: Methods of tree treatment for habitats

Coppicing, high-stump felling

Coppicing is one of the oldest methods of restoring tree stands, in which stumps (often relatively high) were left to rejuvenate. Many existing forests on slopes, particularly those formed of oak, hornbeam, but also lime trees and other species, are former, so-called reserved coppices, where coppicing was abandoned mostly after World War II. Stumps, especially the high ones, rapidly became a habitat suitable for saproxylic insects and other organisms. Coppicing is recommended in certified methodologies of the Ministry of the Environment in order to maintain populations of endangered species (Čížek et al. 2015 and 2016).

Girdling (ring-barking)

Girdling used to be applied particularly in connection with timber harvesting. The farmer or shepherd removed a band of bark from a tree trunk, interrupting the conductive tissue (phloem) and waited for the tree to dry. After that he cut off the dry part, which he used as fuel. The dry wood was lighter and easier to transport. This method of 'gradual timber harvesting' is practised until today in the Balkans. In the Czech Republic, girdling is especially applied in the elimination of black locust (*Robinia pseudoacacia*) (Pergl 2014). Recently it has locally also been applied in tree (e.g. pine) stands which were being thinned in an effort to prevent the stand from deteriorating, or which were being restored (Kozel 2010). In other countries it has been applied in oak forests as well as other forest types for many years (Noel 1970, Ford et al. 2012, Percival & Smiley 2015).

Dry twigs, branch trimming

In the past, there was often a lack of forage, particularly among small farmers and cottagers. They therefore obtained fodder from all kinds of sources, one of them being dried twigs and trimmed branches including leaves, which were used directly to feed livestock or dried for the winter. Dry twigs include cut vegetation on clearings consisting of brambles, shoots of non-target trees, graminoids, ferns, etc. The harvesting of dry twigs maintained sunlit rejuvenating stumps and branch trimming increased the insolation of tree trunks and caused minor wounds, initiating the creation of drywood habitats.

Pollarding

This was the most common management method in combination with coppicing in the past. Top branches or shoots were trimmed or cut, which was physically easy and sustainable. However, not every tree species withstands repeated trimming (Krása 2015). A common type of pollarding is the trimming of willow twigs ('rods'). When trimmed repeatedly, trees react by making a dense head (as in pollard willows) with many cavities. A trimming method similar to pollarding is applied in the modelling of trees, e.g. lime trees, horse-chestnuts, plane trees, etc., in landscaping and urban areas (Kolařík et al. 2003).

Veteranisation

Veteranisation includes a set of measures carried out with the aim of accelerating the formation of microhabitats (cavities, cracks, barkless spots, fractures, etc.) important for the settling of here saproxylic and other groups of organisms bound to such habitats (Krása 2015, Bengtsson, Hedin, Niklasson 2012). Also a combination of the abovementioned methods, such as pollarding and girdling, is regarded as veteranisation. Since applying these methods may mean a curtailing of the tree's lifespan or at least a deterioration of its condition, veteranisation is used exceptionally at small sites of an endangered species, lacking a tree generation able to replace senescent specimens after they decay, meaning a risk of interruption in the continuity of the habitat. If such a site is isolated from other ones, veteranisation of a required number of trees may be the only way of securing occurrence of the species in the long-term. As isolated spots with species bound to senescent trees are often found in castle parks and other monumental gardens, careful preparation, consultation and compliance with monument care is always necessary.

A small-leaved lime tree can survive for centuries thanks to coppicing. Its stump may reach a diameter of even 10 m and is a suitable habitat for many species. The photo is from Děvín National Nature Reserve. Photo Vladan Riedl.

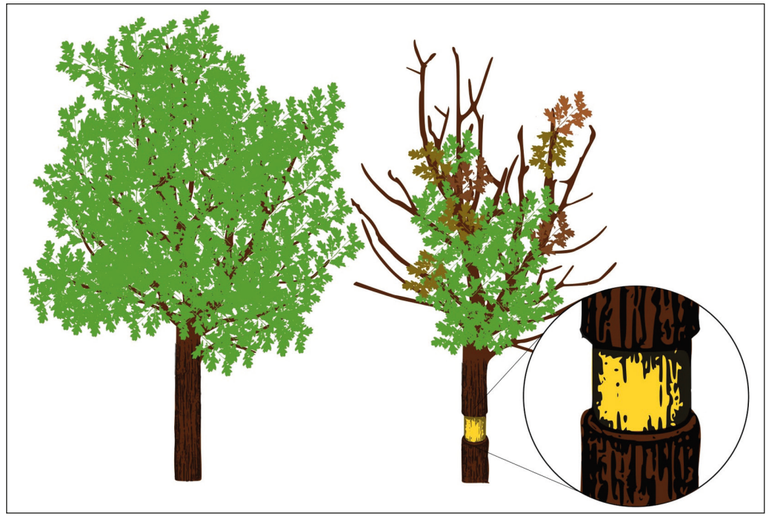
Creating habitats does not mean damaging trees

Legal limitations concerning the protection of non-forest greenery in the Czech Republic are based in the embellishment movement of the

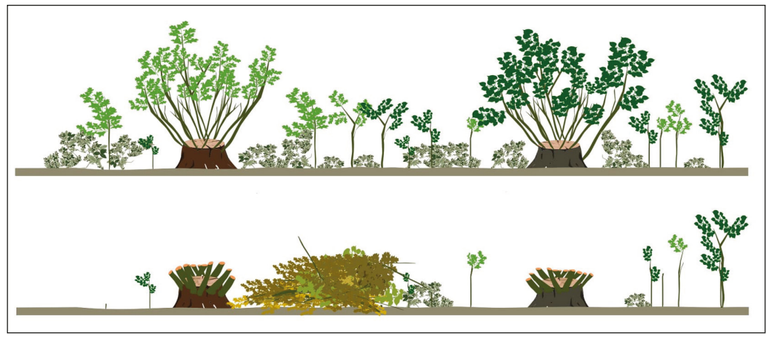
first half of the 20th century. It was a reaction to the then overexploited landscape (grazing, but also unregulated tree felling) aimed at maximum enforcement of tree preservation.

Current legislation (Act on Nature and Landscape Protection, since 1992) generally prohibits the 'damaging and destroying' of trees. At the same time, it empowers the Ministry of the Environment to define in an implementing legal regulation which interventions are or may be 'damaging' or 'destroying' and must thus be regarded as 'illegal'. This empowerment makes it possible to define species or cases of such interventions also 'negatively', i.e. to determine in which cases an intervention may be legitimately considered permissible. The Ministry of the Environment has taken into account current expertise and conservation needs of endangered species and, in Act No. 189/2013, on the protection of trees and authorisation of tree felling, constitutes that "an intervention is permitted if it is performed with the aim of preserving or improving particular functions – for the treatment of a protected plant or animal species, as part of protected area management performed in accordance with the management plan or management principles, or as part of the management of a European Site of Community Importance (SCI) or Special Protection Area (SPA) performed in accordance with the set of conservation measures." Thus, whereas planning documentation, i.e. management plans or sets of conservation measures are the basis of the management of protected areas, SCIs and SPAs, the regulation on the 'treatment of a protected plant or animal species' is not bound to any other formal condition (not even that the protected species in question should occur at a site before an intervention).

In the case of protected animal or plant species, procedures must be based on expert documents, which may not only be rescue programmes or regional action plans, but also expert proposals as part of particular projects or measures (see below). Generally, in each individual case it must be assessed whether the legal principle of proportionality is maintained, i.e. whether an intervention is appropriate (if it can create the conditions necessary to enforce the populations of target species at a site), necessary (no alternative measures can achieve comparable objectives with regards to the



Girdling (ring-barking) consists in removing bark all around the tree trunk, thus interrupting the conductive tissue (phloem). Delineated by Vladan Riedl

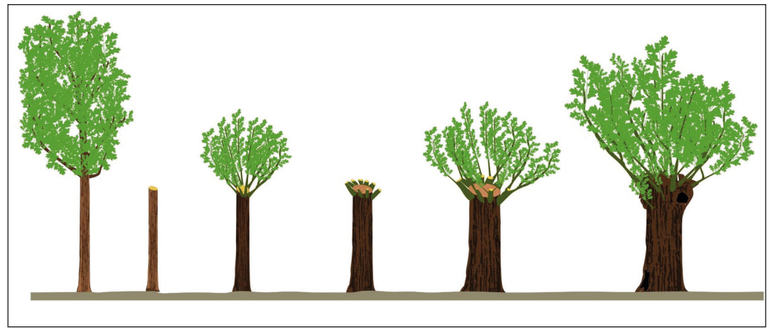


Dry twigs are intended to feed livestock and are obtained by cutting vegetation on clearings consisting of brambles, shoots of non-target trees, graminoids, ferns, etc. Delineated by Vladan Riedl

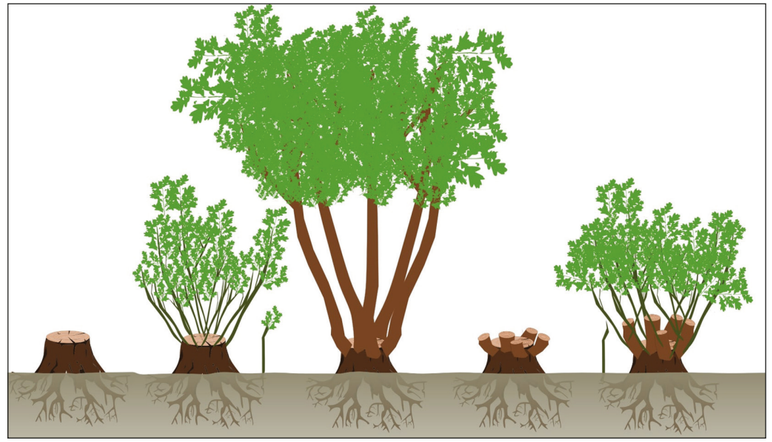
treatment of a certain species at a site) and proportionate. The expert documents should thus provide information to answer these questions. It is, of course, also necessary to assess the needed measures with regard to the trees in question. In most cases, the benefit of saving a species will be considered greater than the damage caused to common tree species, but opposite situations may occur (extraordinarily robust trees, trees of high cultural value, etc.). If the measure is not initiated by a nature conservation authority, it is appropriate that the need and expertise of the proposal be approved by the relevant nature conservation authority, so that the initiator of the measure is certain that the interventions will not be evaluated as undesirable and disproportionate by supervisory bodies. It can therefore be recommended to pre-discuss a measure with the Czech Nature Conservation Agency, being the official nature conservation authority, and with the relevant regional authority responsible for species conservation outside protected landscape areas and national parks.

Do not underestimate project preparation

If a measure does not follow from nature conservation planning documentation (management plan, set of conservation measures,



Pollarding in combination with coppicing used to be a common management method in which top branches and shoots were trimmed and cut. Delineated by Vladan Riedl



Coppicing is one of the oldest methods of restoring tree stands. Stumps (often relatively high) were left to rejuvenate. Delineated by Vladan Riedl

rescue programme), it is effective to make a project from which the objective of the measures, the necessity and the way effectiveness will be monitored are evident. It also needs to be assessed if a project requires other appraisals and permissions (e.g. exemptions in protected areas or because of the presence of a protected species) and whether the trees in question are not subject to heritage protection (e.g. in a castle park). As for tree protection, permission to perform particular inventions is not issued in accordance with Act No. 189/2013 (it is not felling). It is however advisable to inform the local municipality and also the wider public of the interventions in an appropriate way, in order to secure the necessary acceptance. In case a tree is located at the site of a protected monument, agreement must be reached with monument care authorities[1].

A project may be based on existing professional methodologies, see e.g. 'Conservation of saproxylic insects and measures for their protection' (Krása 2015) issued by the Czech Nature Conservation Agency and 'Methodology for the conservation of selected beetle species and their habitats' (Konvička et al. 2017), and on methodologies for saproxylic beetle species important in the European context (Čížek et al. 2015), certified by the Ministry of the Environment. At present, a standard titled 'Treatment of trees as a habitat of rare species' (Pešout, Štěrba 2013) is being compiled. Also consultations with specialists are advisable because recommended approaches may have to be modified or specified according to the needs of a particular species.

Necessary change in approach

Just as land use by man changes, also the tools of contemporary nature and landscape conservation must develop. In this particular case it is obvious that the conservative conservation of trees outside forests and a range of woodland conservation instruments from the times of the Austro-Hungarian Empire have become outdated in many aspects. It is necessary to respond to the current state and utilisation of the landscape, the impacts of climate change, new challenges and current knowledge.

It is also clear that for reasons of capacity and economy, planned tree habitat treatments as indicated will always be realised to a very limited extent and especially in protected areas. However, protected areas will not save the existence of many animal species even with the best care. Traditional land use forms, which can be realised economically by farmers and foresters, need to be supported by adjusting subsidy instruments or also by legislation to be applied on a larger area. Further, environmental education can help improve the situation by informing the public on the need of leaving fractures and other tree damage not jeopardising its stability untreated.

A list of recommended literature is attached to the web version of the article at www.casopis.ochranaprirody.cz

Note

1 Examples of areas where monument care and nature conservation interests are concentrated and where the methods of tree treatment had to be agreed on (incl. treating senescent trees, restoring tree stands, securing continuity of saproxylic insect habitats, etc.) are the horse-breeding farm at Kladruby nad Labem (Beneš et al. 2018) and the castle park in Vlašim (Hejda, Kříž, Pašek 2017).

Acknowledgements

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