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MENDELU Lesnická a dřevařská fakulta

NATURE AND LANDSCAPE MANAGEMENT STANDARDS

SPECIAL MEASURES FOR SPECIES PROTECTION SERIES E	TREATMENT OF TREES AS BIOTOPE OF RARE SPECIES OF ORGANISMS	SPPK E02 005: 2024

Péče o stromy jako biotop vzácných druhů organismů

Lebensraum Baum: Pflege um das Biotop seltener Organisme

This standard is intended as definition of procedures leading to support to rare and endangered species of organisms (primarily animals) bound to a wide range of microhabitats provided exclusively by trees. The standard specifies procedures used only in order to create or maintain microhabitats for endangered and rare animal species in situations where the target species is already present in or near the problem area and its survival cannot be assured by means of management specified in Series A standards (Arboricultural Standards).

Sources:

Act no. 20/1987 Coll. on State Heritage Management, as amended
Act no. 89/2012 Coll., the Civil Code, as amended.
Act no. 114/1992 Coll. on Nature and Landscape Protection, as amended.
Act no. 289/1995 Coll. on Forests and on amendment of certain acts (Forest Act).
Act no. 326/2004 Coll. on Phytosanitary Care and on amendment of certain acts, as amended.

Decree no. 189/2013 Coll. on tree protection and felling permission, as amended.
Decree no. 395/1992 Coll., executing some provisions of Czech National Council Act no. 114/1992 Coll. on Nature and Landscape Protection, as amended

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1. Standard purpose and contents

1.1 Standard purpose

1.1.1 The standard defines procedures leading to support to rare and endangered species of animals bound to a wide range of microhabitats provided exclusively by trees. Unlike SPPK A02 009 – Special tree treatment, they **may include measures leading to temporary or permanent damage to the tree; it is therefore always necessary to prove adequacy and benefits of the measure for biodiversity protection compared to the negative impacts of the intervention on other tree functions (see Chapter 5).**

1.1.2 Application of the standard while complying with all other requirements (see Chapter 5) is not limited to individual trees; the standard can also be applied to groups of trees and shrubs growing in and outside forest in which microhabitats necessary for survival or rare species are not present sufficiently or are completely lacking.

1.1.3 The standard is focused on supporting rare and endangered animal species with a defined connection to microhabitats provided by trees and shrubs to the extent of the state of the art, primarily support to invertebrates as well as bats and birds. The applicability to other categories of organisms has to be sufficiently supported with analysis of their Red List status and connection to the microhabitats potentially established under this standard.

1.1.4 The purpose of the standard is to define procedures leading to maintenance or increase in quality and quantity of microhabitats on a problem site, thus eliminating the risk of extinction of the target endangered and rare species.

1.1.5 Unlike Series A Nature and Landscape Management Standards (Arboricultural Standards), which deal with measures and interventions in favour of trees and shrubs and their existence on a site, the present standard describes greatly different measures, as it is primarily focused on the potential of trees as biotopes for rare species of organisms. Rules and procedures used in arboriculture practice defined by Series A standards are not part of the present standard.

1.1.6 Measures under this standard cannot be implemented on trees defined by Standard SPPK A02 009, Chapter 3.2 if sufficient quality and quantity of microhabitats on a site can be provided by another method (notably measures on younger trees and shrubs).

1.1.7 The standard **does not specify general practice freely applicable in management of forests, trees and shrubs or their growths outside forest**, but rather defines specialized procedures used only in order to create or maintain microhabitats for endangered and rare species in situations where the species is present in or near the problem area and its survival **cannot be assured using normal management methods specified in Series A standards.**

1.2 Qualifications of persons

1.2.1 Designing interventions in trees in order to promote or create biotopes is a **highly specialized activity** and it is therefore necessary that they be made by qualified persons. The most important parameter is provable qualification of both the intervention in the tree pursuant to this standard and the execution of all the related

dendrological and biological surveys (see Chapter 5). Such persons may include experts pursuant to Act no. 254/2019 Coll., with specializations including tree status assessment, nature protection or similar, holders of special authorization from the Ministry of the Environment pursuant to Section 45i, Para. 3 of Act no. 114/1992 Coll. and Decree no. 468/2004 Coll. on authorized persons under the Nature and Landscape Protection Act, graduates from study programmes of faculties of forestry, horticulture, natural science, etc., with provable practice in the associated issues (e.g., dendrology, nature protection, zoology, phytopathology, etc.).

1.2.2 The recommended qualification for persons carrying out designed measures is secondary, higher vocational or university education in arboriculture, or other recognized national or international proof of expert knowledge in arboriculture. If justifiable in terms of the designed interventions, the person carrying out the interventions also has to possess qualifications for safe movement in the tree crown using climbing equipment or a raising platform. The qualifications of persons carrying out measures should match the complexity of their implementation.

1.2.3 Practice and continuous education for persons carrying out proposed measures can be verified with expert references in the area of tree pruning in the last 3 years and proof of continuous education in arboriculture in connection to tree pruning. Some certification schemes (such as ETW, ČCA, VETcert, ISA, etc.) automatically prove this requirement and confirm in to the extent of validity of certificates and their recertification.

1.3 Legal framework

1.3.1 The fundamental aspect for assessing the possibility of an intervention is whether the site for the target species is situated on land intended for performance of forest functions, or in non-forest trees or shrubs.

1.3.2 On land intended for performance of forest functions, measures can be implemented so as not to disrupt the performance of forest functions defined in Act no. 289/1995 Coll. (Forest Act).

1.3.3 Non-forest trees and shrubs are protected from damage and destruction by Section 7, Para. 1 of Act no. 114/1992 Coll. Unpermitted interventions in trees and shrubs are defined in Section 2, Para. 1 of Decree no. 189/2013 Coll. as such damage or destruction to trees and shrubs which lead to substantial or permanent reduction in their ecological or social functions or cause their immediate or subsequent death.

1.3.4 Unpermitted interventions in non-forest trees and shrubs exclude cases of one of the types of interventions defined in Section 2, Para. 2 of Decree no. 189/2013 Coll. Specifically, they are interventions made:

a. in order to maintain or improve some of the tree's functions;
b. as part of management of a specially protected plant or animal species[1];
   These are cases where the ecological function of the tree as a biotope for a specially protected species is evidently superior. The intervention should be made in accordance with a rescue programme pursuant to Section 52 of Act no. 114/1992 Coll. or an expert position statement of an applicable nature protection authority on special species protection.

[1] specially protected plant and animal species are defined in Annexes II and III to Decree no. 395/1992 Coll.

c. as part of management of specially protected sites, Sites of Community Importance or Special Protection Areas in accordance with a management plan.

This involves cases where tree functions are subordinated, as part of ecological function preference, to interests of management of specially protected sites and Natura 2000 sites (their object of protection), which may in certain cases contravene interests of (general) tree protection (e.g., habitat or species management). Interventions have to be defined in an approved management plan.

The subject matter of the present standard is interventions made for the reasons defined above (in the case of the first reason, only for improvement to the biotope function).

1.3.5 Given the nature and localization of measures specified in this standard, their implementation may endanger other interests protected under Act no. 114/1992 Coll. (see points 1.3.6–1.3.14). In such cases, the necessary decisions have to be acquired from the applicable nature protection authority before implementation of any planned measures. For the sake of legal certainty, it is recommended in the case of doubt to request the applicable nature protection authority for preliminary information pursuant to Section 90, Para. 24 of Act no. 114/1992 Coll., i.e., information on what nature protection interests are affected by the planned measure and which administrative documents have to be acquired under Act no. 114/1992 Coll. prior to its implementation.

1.3.6 In case implementation of measures on trees and shrubs that are part of a prominent landscape feature (PLF) might lead to damage or destruction of the PLF or endanger or weaken its ecological stabilization function, approval from a nature protection authority under Section 4, Para. 2 of Act no. 114/1992 Coll. is necessary.

1.3.7 The measure has to be implemented in a form that rules out any possible disruption to protection of wild birds under Section 5a, Para. 1 of Act no. 114/1992 Coll. If the implementation of an intervention may damage or destroy active nests and eggs or removal of nests of wild birds living on the territory of European Union member states, and/or disturbance of such birds, the applicable nature protection authority has to define a deviant procedure under Section 5b, Para. 1 of Act no. 114/1992 Coll.

1.3.8 If the implementation of a measure may reduce or change landscape character (by reducing its aesthetic and natural value), approval from a nature protection authority under Section 12, Para. 2 of Act no. 114/1992 Coll. is necessary.

1.3.9 Implementation of measures has to comply with basic and detailed protection requirements for specially protected sites (SPS) and their buffer zones under Act no. 114/1992 Coll. In case the implementation of a measure may disrupt the basic protection requirements of an SPS, an exemption under Section 43 of Act no. 114/1992 Coll. is required. In case the implementation of a measure is an activity bound to approval under detailed protection requirements of an SPS, an approval under Section 44, Para. 3 of Act no. 114/1992 Coll. is necessary.

1.3.10 Measures should not be implemented on trees declared monument trees under Section 46, Para. 1 of Act no. 114/1992 Coll. If no other alternative can be chosen and measures would concern a monument tree in exceptional cases, an additional exemption under Section 56 from the ban in Section 46, Para. 2 of Act no. 114/1992 Coll. is necessary.

1.3.11 In case a measure would concern specially protected tree species[1] which do not comply with requirements for a legal exemption from the ban to damage such trees specified in Section 49, Para. 2 of Act no. 114/1992 Coll., or are critically or seriously endangered species (Section 49, Para. 4 of Act no. 114/1992 Coll.), an exemption under Section 56 of Act no. 114/1992 Coll. is necessary.

1.3.12 In case the implementation of a measure may lead to disruption of basic protection requirements for a specially protected species[1] defined in Section 49, Para. 1 and Section 50, para. 2, an exemption under Section 56 of Act no. 114/1992 Coll. is necessary.

1.3.13 In case the trees are situated in a Special Protection Area and the measure is an activity bound to approval pursuant to any of the Government Regulations defining the Special Protection Areas, an approval under Section 45e, Para. 2 of Act no. 114/1992 Coll. is necessary.

1.3.14 In case the implementation concerns trees growing in protected heritage buildings and zones that are cultural monuments, or on property that is not a cultural monument, but is situated in heritage reserves, heritage zones or within the protective zones of immovable cultural monuments, immovable national cultural monuments, heritage reserves, or heritage zones, it requires approval from a heritage management authority (see Section 14, Para. 1 of Act no. 20/1987 Coll.)

1.3.15 When implementing measures under this standard, everybody is required to act so as not to cause any damage to health, property, nature or the environment beyond the scope of the submitted and approved project application or plan (see Chapter 5).

1.3.16 Implementation of measures requires consent to the owner of any affected non-forest trees and forest.

2. Organisms bound to trees

2.1 Trees may host a very wide range of organisms, including fungi, invertebrates, vertebrates, bryophytes, lichens, algae as well as bacteria, for example. This standard deals primarily with saproxylic animal species, i.e., organisms bound in any part of their life cycle to dead or dying wood material or to organisms directly bound to them.

2.2 The standard focuses on groups of saproxylic animals for which sufficient knowledge is available concerning their ecology, biotope demands, distribution, etc. It does not, for example, concern insects that are bound with respect to food, development or ecology to assimilation organs of trees, i.e., the majority of butterflies, phytophagous beetles, etc.

2.3 The majority of the country's birds have some connection to trees (food, tree and shelter or observation point, nesting) and so have bats (year-round use of shelters in trunk or branch cavities or bark cracks, food biotope). Therefore, when designing measures to support invertebrates, the needs of these two groups have to be taken into account so that implementation of measures do not damage them (see Chapter 5.6).

3. Tree as specific type of natural habitat

The standard views the tree as a set of microhabitats for endangered species. In most cases, increasing age and volume of a tree increases its importance for maintaining local biodiversity and reduces the need for actively creating new microhabitats.

3.1 Microhabitats for organisms bound to trees

Specific microhabitats for saproxylic insects bound to trees are listed below (Table 1).

Table 1: Specific microhabitats for saproxylic insects bound to trees

Id. no.	Name	Optimal parameters*	Species examples	Comments
1	Near-ground cavity	Cavity at the tree base in contact with the ground; diameter > 10 cm (partly enclosed cavity with constant microclimate, not experiencing major environmental changes – humidity, temperature, etc.).	*Violet click beetle (Limoniscus violaceus)* *Click beetle sp. (Ischnodes sanquinicollis)* *Stag beetle (Lucanus cervus)* *Hermit beetle (Osmoderma eremita)* *Click beetle sp. (Lacon querceus)*	It involves all cavity succession stages from an initial shallow one, with compact wood still occurring at the bottom, to advanced stages, where a significant part of the cavity is filled with detritus and earth.
2	Cavity	Cavity in the tree trunk or branch; diameter > 10 cm (partly enclosed cavity with constant microclimate, not experiencing major environmental changes – humidity, temperature, etc.).	*Click beetle sp. (Elater ferrugineus)* *Scarab sp. (Protaetia aeruginosa)* *Hermit beetle (Osmoderma eremita)* *Longhorn beetle sp. (Rhamnusium bicolor)* *Longhorn beetle sp. (Necydalis ulmi)* *Noble chafer (Gnorimus nobilis)* *Click beetle sp. (Lacon querceus)* *Bee beetle spp. (Trichius* spp.)	It involves all cavity succession stages from an initial shallow one, with compact wood still occurring at the bottom, to stages where a significant part of the cavity is filled with detritus.

3	Dying/dead bark with phloem	Dying or dead strip of bark and phloem; width > 10 cm, length > 2 m.	*Longhorn beetle sp. (Saperda punctata) Great capricorn beetle (Cerambyx cerdo) Jewel beetle sp. (Poecilonota mirifica) Jewel beetle sp. (Anthaxia hackeri) Flat bark beetle (Cucujus cinnaberinus)*	
4	Dying/dead branch covered with dying/dead bark and phloem	Dying or dead branch; diameter < 10 cm, length > 0.5 m.	*Longhorn beetle sp. (Purpuricenus kaehleri) Jewel beetle sp. (Anthaxia manca) Jewel beetle sp. (Anthaxia tuerki)* and other members of *Anthaxia* on elms	
5	Exposed wood	Area without bark; width > 10 cm, length > 2 m.	*Longhorn beetle sp. (Megopis scabricornis) Rosalia longicorn* (*Rosalia alpina) Jewel beetle sp. (Eurythyrea querceus)*	This concerns a one-off tearing of bark caused, e.g., by another tree collapsing, abrasion during floods, etc.
6	Wood covered with dying/dead bark/fractures.	Dying or dead body; diameter > 10 cm, length > 0.5 m.	*Longhorn beetle sp. (Megopis scabricornis) Rosalia longicorn (Rosalia alpina) Great capricorn beetle (Cerambyx cerdo) Jewel beetle sp. (Poecilonota mirifica) Longhorn beetle sp. (Saperda punctata) Jewel beetle sp. (Eurythyrea quercus)*	Includes wood covered with dying or dead bark on wood bodies without direct contact with soil substrate. Present mostly on thick primary branches, fractures and around cavities.

7	Decayed wood/ wood undergoing natural decay/ decaying wood	Diameter > 30 cm, length > 1 m	*Stag beetle (Lucanus cervus)* *Variable chafer (Gnorimus variabilis)* *Flat bark beetle (Cucujus cinnaberinus)* *Wrinkled bark beetle sp. (Rhysodes sulcatus)* *Stag beetle sp. (Aesalus scarabaeoides)* *Stag beetle sp. (Ceruchus chrysomelinus)* *Ground beetle sp. (Carabus irregularis)* *Ground beetle sp. (Carabus variolosus)*	Includes dead wood in contact with soil substrate, involving a number of succession stages from one where bark is still present on the wood, via stages where the wood is still compact but the rot has advanced deep into the trunk, to final succession stages when the trunk is falling apart and can be taken apart by hand.
8	Dying/dead roots in contact with soil substrate	Stump diameter > 30 cm, height < 1 m	*Stag beetle (Lucanus cervus*)	Suitable biotope (microhabitat) for sites of *Lucanus cervus* in parks as an alternative to milling away.

* Optimal parameters of microhabitats aimed at when created artificially.

4. Measures

4.1 Measures to support occurrence of microhabitats implemented by deliberately damaging trees

The purpose of these measures is to provide presence of a biotope for endangered species on sites where lack of suitable microhabitats means a risk of their extinction, or where disruption in the continuous presence of suitable microhabitats might mean their extinction in future.

Table 2 Measures to support occurrence of microhabitats implemented by deliberately damaging trees

Intervention*	**Execution**	**Target microhabitat (see Table 1)**
Removing bark; damaging trunk base	Removing or damaging bark and live tissues in sapwood from the base up to 1 m of height. Can be done on a larger scale in one place or on a smaller scale in multiple places. The extent of the damage should not exceed 1/3 of the trunk circumference; it may be less than 1/4 of the circumference only in sufficiently large trees	Dying/dead bark with phloem Exposed wood Near-ground cavity
Creating a near-ground cavity	Creating a cavity at the trunk base level. Decaying remnants of wood, detritus and earth can be placed in the cavity. The entrance opening can be reduced once created.	Near-ground cavity
Disrupting a root beginning or primary root	Mechanically disrupting a root beginning/root by cutting (e.g., straight or V-shaped).	
Removing bark from trunk and primary branches; damaging trunk (above 1 m in height)	Removing or damaging bark and live tissues in sapwood. The extent of the damage should not exceed 1/3 of the trunk/branch circumference; it may be less than 1/4 of the circumference only in sufficiently large trees. Can be done on a larger scale in one place or on a smaller scale in multiple places.	Dying/dead bark with phloem Wood covered with dying/dead bark/fractures Exposed wood Cavity
Creating holes imitating nesting holes	Drilling a hole approximately 8-15 cm wide and 10-20 cm deep, ideally 4 m above ground. Removal of bark around the hole to prevent ingrowth is possible. Larger holes can also be partially filled with decaying wood or detritus to promote cavity formation.	Cavity

Sawing a wedge in the trunk	The bottom of the wedge is removed, thus an entrance hole is made in it, then the wedge is replaced as a lid (to produce an open space inside the trunk). The lid should be 7-10 cm thick. The wedge should be secured against movement. The entrance hole can also be made by drilling a hole in the wedge. The bottom edge of the wedge should ideally be 4 m above ground. The width should not exceed 1/3 of the trunk diameter; it should be at least 10 cm; the ideal depth is 50 cm. The entrance hole should be circular, approx. 5 cm in diameter, and located in the upper part of the lid. The bottom of the hole should be inclined away from the trunk (to ensure a higher level of moisture). The hole can be filled with a mixture of sawdust, leaves and little twigs.	Cavity
Mechanically disrupting, damaging bark	This results in an interruption or tearing of the bark and conductive tissues in the trunk or primary branches (the intervention covers no more than 1/3 of the wood body circumference). Gradual dying of the bark and phloem follows.	Dying/dead bark with phloem Exposed wood Wood covered with dying/dead bark/fractures
Mechanically tearing off a strip of bark	A strip of bark with phloem is mechanically removed/damaged. This can be done as either one large wound in one place or small wounds in multiple places.	Exposed wood Cavity
Controlled necrosis of a strip of cambium (sun scald)	Intensive and sudden brightening of the crown, causing overheating and subsequent death of cambium and bark with gradual peeling. Can only be done in taxa with a thin bark.	Dying/dead bark with phloem Exposed wood Cavity Wood covered with dying/dead bark/fractures
Partial or full banding of trunks and branches	Partial or full circumferential interruption/removal of conductive tissues (bark and phloem) approximately 20 cm wide (but no less than 5 cm) so as to interrupt the assimilation flow. The taxon and trunk diameter have to be taken into account.	Dying/dead tree or part of tree covered with dying/dead bark and phloem
Making V-shaped cuts	Mechanical damage to trunk or primary branches by a deep incision.	Exposed wood, dying bark/phloem, cavity Wood covered with dying/dead bark/fractures

Cutting branches to promote presence of microhabitats	As part of promoting the formation of microhabitats, branches can be sawn off regardless of the cutting technique and wound size defined by SPPK A02 002 Pruning of trees. The most common cuts include: a) Cutting a branch behind a branch collar. b) Deliberate "blind" cutting even on branches that can be shortened by cutting to a side branch or cutting to a bud. c) Cutting a branch exceeding 100 mm in diameter. d) Removing a branch exceeding 1/3 of the trunk or primary branch diameter. e) Artificial fracture	Exposed wood Cavity
Climbing with crampons	Point disruption of bark and trunk sapwood by climbing into the crown. Used as a supplement to other measures.	Dying/dead bark with phloem

* Most of the interventions shown in Table 3 promote, in the long run, formation of decaying and rotting wood.
Note: An intervention in a tree may lead to a significant reduction in its stability. Therefore, consider the suitability of the site and the size of the tree in which the intervention is made.

4.2 Measures to support occurrence of microhabitats implemented by specific management and non-invasive activities

These measures are defined below (Table 3). The objective of these measures is to provide conditions on the site leading to natural formation of microhabitats.

Table 3: Specific measures to support endangered species at a site level

Creating torsos	A tree torso is produced by removing a substantial portion of or the whole primary tree crown. A torso may form naturally (failure of primary branches or trunk by fracture or fragmentation) or artificially (deliberate human removal of parts of the tree). The following two types of torsos are recognized in practice: • crown torso – stubs of original primary branches, several metres long, and the trunk are retained; • trunk torso – only the trunk is retained, while the entire original tree crown is removed. Moreover, torsos can be divided into the following categories: • Living torso – the tree can survive in the long run due to its vitality and taxon properties. It gradually offsets the loss of assimilation organs with

	secondary growth (crown). This produces the microhabitats of exposed wood and cavity. • Dying torso – the tree can survive in the short run due to its vitality and taxon properties. This produces the microhabitats of exposed wood, dying bark with phloem, dead/decaying wood and cavity. • Dead torso – made from a dead tree or a tree that dies very soon after the torso is made due to its vitality and taxon properties. This produces the microhabitats of dead/decaying wood and cavity. Making a torso from a living tree almost always entails an extensive disruption of the tree's physiological and mechanical functions. At the same time, it opens a gateway for infection by wood-decaying fungi and subsequent worsening of the tree's health and prospect. If the objective is to create a necessary type of microhabitat on the site or promote a target microhabitat by brightening the surroundings, making or torsos or leaving tall stubs is appropriate. This measure produces microhabitats 1, 2, 3, 4, 5, 6, 7 and 8.
Treetop (chopping) management	This is successful particularly in trees with a high rate of trunk and crown rejuvenation. It involves periodic cutting or chopping of secondary branches (leaders) and their top shoots in treetops (heads) every few years. This results in the formation of swollen heads with open cavities, water and bark pockets and other defects, which produce important microhabitats. The result is a headed (stunted) tree. Unlike the head pruning cut (S-RTHL), however, this arboricultural measure has a different objective. It is established on trunks, branches or shoots with an optimal diameter of 25-50 cm. The pruning repetition cycle then depends on the tree species and the pruning purpose (e.g., 1 year for osiers, 1-3 (5) years for livestock fodder, 7-15 years or more for firewood). It uses either standard pruning techniques, or pruning is done deliberately so as to damage the base of the leader being removed at the swollen head, producing large cut wounds and injuries besides promoting new secondary shoots. If the periodic cycle is interrupted, trees with an overgrowing secondary crown are formed. Such trees can again be used for treetop management, but first a gradual reduction is advisable according to SPPK A02 002 Pruning of trees (secondary crown stabilization S-SSK). Treetop (chopping) management is also advisable for trees already reduced to a torso. This measure produces microhabitats 2, 5 and 6.
Coppicing	Coppicing is shoot management in which trees are felled and send out shoots from stumps, trunks or roots. The shoots are typically cut every 7-40 years. Coppices are usually divided into parts, with one (or more) parts felled every year. The number of parts equals the felling interval, so that coppices produce a forest mosaic in various stages of growth, from fresh clearings with exposed soil to dense, canopied growths. The periodic rotation of extraction of the shoots results in periodic presence of all forest succession stages, or tree stages, in the different parts, with the ratio of light and dark succession stages permanently balanced overall. This measure produces microhabitats 1, 3, 5, 7 and 8.
Growth brightening	This measure aims at significant brightening of growths with positive or negative tree selection. This measure can be implemented using most of the interventions shown in Table 3 herein and tree felling. This measure produces microhabitats 3, 4, 5 and 7.

Felling to tall stumps	A tall stump is a compromise solution between making a torso and felling a tree to a normal stump (the height of a tall stump is such that the tree can be felled safely from the ground). This measure is intended in particular as part of forest stand clearance, where compared to normal stumps, it significantly increases the amount of dead wood left on the site, or also for non-forest trees (if there is a serious reason for removing them and making a torso is not possible). In the case of making tall stumps out of living individuals of deciduous trees, the stump can be expected to rejuvenate (especially in tree species with good regeneration ability). In that case, the intervention result will be very similar to a head cut (see below), which usually provides various types of microhabitats in the long run, thus conditions for development of numerous species with different requirements. This measure produces microhabitats 3, 5, 7 and 8.
Installation of beetle boxes	The optimal size of beetle boxes is 2.5 - 3 m x 0.5 m x 0.5 m; they are installed at the foot of a suitable tree. At the top on one side is an access opening, also suitable for birds (circular opening approx. 5 cm in diameter); the other side has an access opening lower down, also suitable for bats (longitudinal opening 30 x 250 mm). The box is filled to approximately 3/4 with suitable substrate (mixture of sawdust, leaves, bits of wood or other organic material of sufficient moisture). The upper part is partitioned into halves (area for birds and area for bats). The partition has to be long enough to still functionally divide the space after the organic material settles down. The area for the bats is then filled ideally with slat walls (approx. 50 cm x 70 cm) with a spacing of 2-5 cm. The slat walls are installed above the bat entrance. The walls are wrinkled for better bat attachment. The roof of the box has X-shaped grooves with holes 10-12 mm in diameter at the end of the grooves to introduce rainwater into the box. Water-impermeable material is placed at the bottom of the box to retain more water. Deformation of box walls due to changing wood humidity has to be expected, and boxes have to be periodically checked. Technical drawings are available at: https://bibliografie.nature.cz/dokument/15109 (The attachment is available after login.)

Fig. 1-4: Beetle box (Source: BANELIENĖ, A. et al. (2022). Broučí budky: Rychlý průvodce použití a konstrukce.

5. Preparation and conditions for measure implementation

5.1 Intervention need analysis

5.1.1 The objective of interventions made under the standard (while respecting legislative limits) is to maintain, restore or create conditions necessary for survival of populations of specific specially protected animals pursuant to Act no. 114/1992 Coll., or endangered animals[2]. Another motivation may be an endeavour to connect locally isolated populations of said animals.

5.1.2 Before planning interventions and developing a proposal, a need analysis has to be made, including:

- what microhabitats the target species use(s);
- main cause of its endangerment;
- assessment of species situation on the concerned site, in broader surroundings and nationally;
- modelling of target species population development (see 5.2).

5.1.3 For an intervention based on creating a new biotope, aimed at ensuring the presence of microhabitats on the site that only exist to a minimal degree, the application needs to include a biological survey, containing information about all the rare and endangered species that can potentially be affected by the intervention. The size of the population of the target species on the concerned site does not have to be surveyed in detail; documentation of its (their) presence is sufficient. However, the extent of presence of their microhabitats or trees has to be estimated as accurately as possible (Chapter 3).

5.1.4 Implementation of measures hereunder can be considered for ensuring long-term survival of populations of target animal species on the site. In the case of species whose living strategies do not permit long-term existence on the same site, or that are immediately endangered with extinction in the Czech Republic, measures leading to short-term support of populations can be taken, and metapopulation strategies of species can be taken into account when planning creation of substitute habitats in the surroundings.

5.2 Modelling site development (temporal point of view)

5.2.1 The future development of the target animal species population has to be estimated. At the same time, it has to be assessed whether the type and extent of the proposed measures can be expected to provide a long-term supply of suitable microhabitats on the site.

5.2.2 The basis for the modelling is a dendrological survey (see below). If historic data on the number and character of trees on the site are available, the probable past population development is illustrated and future trends indicated. A comparison of historic and current aerial photographs can be made to document a decrease in solitary trees or extent of bright forests, thus also the situation of organisms bound to

[2] HEJDA, R.; FARKAČ, J.; CHOBOT, K. (eds.) (2017). Červený seznam ohrožených druhů České republiky. Bezobratlí. 1. Praha. 611 pp. Příroda, 36. ISBN 978-80-88076-53-7.

them (e.g., the hermit beetle in swollen-headed willows, great capricorn beetle in oaks).

For organisms bound to elderly forest stands, the problem can be demonstrated by a comparison of historic and current age structure of the stands. Documented or probable ways of using the trees in the past have to be taken into account.

5.2.3 Modelling of the target species habitat status is made in both short and long run. The short run hereby refers to a period of up to five or ten years. The long run refers to longer periods.

5.3 Contents of proposal of measures and implementation timetable

5.3.1 A proposal of measures shall contain an analysis section, including results of the intervention need analysis under 5.1 and site development modelling under 5.2 hereunder. The analysis and modelling results always have to clearly show the necessity of the planned intervention for maintenance of the target species on the site.

5.3.2 Moreover, the analysis section of the proposal of measures shall contain a biological survey with a list of all the identified taxa with precise dates and places of observation. The applicant shall register the list of taxa in the Species Occurrence Database (NDOP). The survey does not have to be made if sufficiently detailed data are available for the site already registered in the NDOP or if the interventions are directly derived from documents such as management plan, species action plan, regional species action plan, etc.

5.3.3 The proposal of measures shall describe in detail all the considered interventions in specific trees in a form that enables identification of the target trees on the site.

For non-forest trees and sites with solitary trees or tree landscape vegetation of a linear nature, such as avenues on LIPFF category land, bank vegetation, etc., the application shall include a dendrological survey and a detailed plan of interventions for each of the trees on the site (as per SPPK A 01 001 Tree assessment or SPPK A 02 008 Planting and management of woody plant growths).

For interventions in larger areas, the application shall include a specific delimitation of areas intended for the intervention in a map annex together with information about the intervention type and numbers and species of trees (by area) concerned by the intervention. If the intervention includes invasive methods potentially leading to death of trees, or it death of a part of the present trees is even one of the objectives of the intervention, the proposal has to be explained thoroughly in the application, elaborated and explaining why the animal species protection interest outweighs the tree protection interest.

5.3.4 Each planned sub-measure shall include a timetable for implementation with a view to potential implementation limits (e.g., bird nesting).

5.3.5 The proposal of measures has to include a detailed plan for monitoring the effect of implemented interventions and informing the public on the implementation site.

5.3.6 Moreover, the proposal of measures has to contain basic information about the possible (notably negative) impact of the intervention on other (non-target) species present on the site.

5.3.7 An integral component of the proposal of measures is a description of forms and methods of working with the public, particularly explanation of the reasons for and necessity of the intervention.

It is particularly recommended to place information signs and leaflets right on the site near hiking and other trails, introduce the intervention on the municipal website, etc.

5.4 Consultation of proposal of measures

5.4.1 The whole proposal of measures has to be continuously consulted with the owner or tenant (lessee) of the concerned non-forest trees or land intended for performance of forest functions (LIPFF), already in the preparatory phase. The proposal of measures requires the owner's/tenants written consent before implementation.

5.4.2 It is recommended to submit the proposal of measures to a locally applicable regional office of NCA CR for an expert assessment. It is recommended to consult the proposal of measures with nature protection authorities of local and factual jurisdiction, in order to rule out potential exceedance of legislative limits defined in Chapter 1.3 (Legal framework).

5.4.3 If measures are not implemented on LIPFF, a precondition for implementation according to the proposal of measures is to comply with all legislative requirements and to have an approving position statement from the nature protection authority of local and factual jurisdiction for special species and territorial nature protection (regional authority, NCA CR, national park administration, military territory authority, MoE CR), conforming completeness and quality of the proposal, necessity and efficiency of measures and assessing compliance with species and territorial protection requirements, i.e., the fact it is not an unpermitted intervention in trees pursuant to Section 2, Para. 2 of Decree no. 189/2013 Coll. This condition does not apply if the proposed measures explicitly follow from relevant documentation approved by a nature protection authority (management plan, etc.) or if the measures are implemented under standard SPPK A02 008 - Special tree treatment.

5.4.1 The whole proposal of measures has to be continuously consulted with the owner or tenant (lessee) of the concerned non-forest trees or land intended for performance of forest functions (LIPFF), already in the preparatory phase. The proposal of measures requires the owner's/tenants written consent before implementation.

5.5 Biological supervision and rescue transfer of invertebrates

5.5.1 If the nature of measures poses a risk of damage to microhabitats for specially protected invertebrate species, the implementation of measures has to include presence of a biological supervisor with a focus on the target organisms.

5.5.2 If a microhabitat is damaged (e.g., emptying of a cavity in a branch being removed) and if adults or developmental stages of concerned species are found on the spot, the biological supervisor has to take action in accordance with NPD instructions to minimize the risk of death of the individuals and ensure their rescue transfer to the nearest suitable microhabitat.

5.6 Considerate measure implementation with respect to birds and bats

5.6.1 When implementing measures to support saproxylic invertebrates connected with interventions in adult trees, it is always necessary to adhere to an appropriate timetable and procedures with respect to other categories of specially protected animal species, notably bats and birds (while other vertebrate species can be affected as well).

5.6.2 As concerns bats, the most appropriate period for felling and pruning trees is from 15 September to 15 November. Another appropriate period as concerns bats is from 15 March to 15 April. Before spring felling, make sure that the tree is not used by nesting birds, and do the felling or pruning ideally at daytime temperatures higher than approx. 10°C.

5.6.3 For trees with cavities, make the cut through expected healthy wood above and below the cavity, and lower the removed part of the tree (branch) with the cavity carefully to the ground (e.g., using a platform or rope and, if possible, in horizontal position) and leave it in a safe place for at least 24 hours with the access opening uncovered (so the bats can abandon the shelter).

5.6.4 If any bats are found in a tree (unless they leave by themselves), stop working immediately and contact the nearest animal rescue station.

Annex 1: List of Nature and Landscape Management Standards– Series E (Special Measures in Species Protection)

02 001 Installing and operating mobile seasonal barriers along roads to protect amphibians
02 002 Permanent measures to provide roads with permeability for amphibians
02 003 Measures to provide roads with permeability for the Eurasian otter (Lutra lutra) and other small mammals
02 004 Measures for protecting birds and other animals on power lines
02 005 Treatment of trees as biotope of rare species of organisms
02 006 Livestock herd protection against large carnivore attacks

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