O.T2.5

STRATEGIES FOR ECOSYSTEM-BASED FORESTRY PRACTICES IN BUFFER ZONES OF WH BEECH FORESTS PAS

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1. Introduction

This output presents the results of project activities that dealt with sustainable forestry in buffer zones of World Heritage component parts.

Firstly, an overview of existing management practices (D.T2.3.1) in all project areas was prepared. Then a workshop was organized (D.T2.3.2), where project partners and outside experts presented best practice examples of sustainable forest management in World Heritage areas and elsewhere. This workshop served as a basis for further development of common guidelines for sustainable forest management in the landscape conservation buffer subzone, presented in a Guideline for Ecosystem-Based Forest Management in Buffer Subzones of World Heritage Beech Forests (D.T2.3.3). Besides knowledge from the workshop, literature research and consultations with outside experts were also used to develop the Guideline. All these mentioned activities were the basis for this Strategies for sustainable forestry practices in buffer zones of WH beech forests PAs.

The Guideline (D.T2.3.3) will help forest managers and planners to use and implement sustainable, ecosystem-based and close-to-nature forestry practices in their own area with the final goal to increase the resilience and naturalness of their area through reaching different indicators. The Guideline itself will also be used to conduct training for forest managers in ecosystem-based forest management practices (D.T2.3.4). The results of this training will be presented in a separate project output (O.T2.6). The training itself will be conducted on the basis of this Strategy document (O.T2.5) and Guideline (D.T2.3.3).

This output also comprises of developed strategies for ecosystem-based forest management. The defined strategies are seen as necessary for appropriate forest management in the landscape conservation buffer subzone. Each strategy includes various criteria that should be ensured for the strategy to be successful. Sustainability is vital to ensure the preservation of forests and their various ecosystem services, not just wood production. Buffer zones are vital in helping to preserve the Outstanding Universal Value of World Heritage component parts, therefore their appropriate management is vital, and should take into account the developed strategies.

Sustainable forest management, as a dynamic and evolving concept, is intended to maintain and enhance the economic, social and environmental values of all types of forests, for the benefit of present and future generations (FAO, 2021). It means the stewardship and use of forests in a way that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national and global levels, and that does not cause damage to other ecosystems (European Commission, 2021).

Table 1: BEECH POWER project deliverables, related to the present output

Type of project result	Code	Title
Deliverable	D.T2.3.1	Joint assessment of current forest management situation in buffer zones of target areas.
Deliverable	D.T2.3.2	Workshop on sustainable forest management practices to jointly develop common guidelines.
Deliverable	D.T2.3.3	Guideline for Ecosystem-Based Forest Management in Buffer Subzones of World Heritage Beech Forests
Deliverable	D.T2.3.4	Conduction of training for forest managers in close-to nature forestry practices.
Deliverable	D.T2.3.5	Coordination meeting for preparation of workshop D.T2.3.2 with WH coordination project.

2. Current forest management situation of WH buffer zone management (D.T2.3.1)

Joint assessment of current forest management situation in buffer zones of target areas (deliverable D.T2.3.1) produced a detailed analysis of forest management in the five project countries (Austria, Croatia, Germany, Slovakia and Slovenia). This framework defined the common categories, considered important for sustainable and close-to-nature forestry, which is the type of forest management that the sustainable forest management strategy supports. The aim was to provide the analysis of the present situation in forest management in buffer zones and surrounding forests (generally within the countries of the project), which will be the basis for comparisons of existing forestry systems in Central Europe and identify existing best practices and potential ways forward.

2.1. Grumsin (Germany)

The overall management responsibility for the component part Grumsin regarding the World Heritage is the Biosphere Reserve Schorfheide-Chorin. The buffer zone around the component part has a width ranging from 0 to 1000 meters. The buffer zone is mainly covered by close-to natural beech forests, but in some parts the buffer zone includes agricultural land (e.g. in the south an agricultural field and in the north grassland) covering 1-2% of the buffer zone area. In one location, the core zone touches agricultural land directly. 25 % of the buffer zone is strictly protected. In total, 51 % of the buffer zone is out of use. Other areas in private ownership have no data on intensity of forestry activities, but harvesting is allowed there, namely selective logging, shelterwood cuttings, and clear cuts of < 0,3 ha. Artificial restoration needs special permission. The collection of mushrooms, berries and medical herbs is also not allowed. Game management is allowed in the buffer zone. Specific data on deadwood is not known.

Hiking is only allowed on official roads and marked trails, while camping, making fire or bathing is not allowed.

German forest legislation is structured in two main parts, federal and state. The National Forest Act can be considered as a general framework and has the purpose to protect the forest because of (1) its economic use, (2) the significance for the environment, and (3) especially for the sustainable ecosystem balance, the climate, the water balance, pollution abatement, fertility of the soil, the landscape frame, agriculture and infrastructure as well as recreation of the population. The focal point is to ensure a balance between the interests of society and private forest owners. The second part is The Forest Act of Brandenburg relevant for Grumsin. The primary source of nature conservation law in Germany is the Federal Nature Conservation Act. The Federal Nature Conservation Act is supplemented in each of the sixteen German states by federal state level legislation that may vary in detail. It is therefore essential to consult the relevant nature conservation act in each federal state, i.e. Nature Conservation Implementation Law Brandenburg.

In terms of functions of the forests, all forest functions (water management, cultural heritage, protection, nature conservation, and forest use) should be conserved, but are mainly subject to personal assessment and point of view of the forester, if there are not legal limits e.g. through protected areas or water protection area. To the project knowledge there is no public consultation process for the elaboration of the forest management plans.

2.2. Kalkalpen (Austria)

The Buffer Zone of Kalkalpen National Park mainly represents the whole National Park area. Around 75 % of the buffer zone is covered by forests, mainly sub-mountainous and mountainous beech forest and some

mountainous spruce and mixed spruce-silver fir forests in higher altitudes. Non-forest areas in the buffer zone include rocks, alpine grasslands, and cultural landscape.

The buffer zone (and also the National Park area) does not allow any silvicultural utilization. Phyto-sanitary cuttings are only allowed at the border of the National Park, with strict guidelines. A strict proportion of dead wood has to remain in the forests. Next to roads and trails some trees are cut because of security measures. The WH core and buffer zone also contains hiking, biking and riding trails. Hiking and biking is allowed on some designated forest roads. These roads have to be maintained because they are essential for bark beetle management and cultural land use. Kalkalpen National Park is legally protected by the National Park Act. The Act decides between a nature zone and a conservation zone. Last one consists of cultural landscape and therefore allows measures to protect the high cultural diversity. 88 % of the park is owned by Austria (Austrian Federal Forests), 11 % is privately owned, 1 % is owned by local communities.

Some activities are legally allowed in Kalkalpen National Park's buffer zone. The National Park Act is not that restrictive – many of the allowed activities are not used by the Park Administration. Kalkalpen National Park has some problems with the subdivision of the buffer zone to protective and landscape subzone. The UNESCO core zone should be surrounded by the protective buffer zone, which is not possible, as in some cases cultural landscape (landscape subzone) is neighbouring the WH area.

The legal framework for forest utilization in Austria is the Forest Act 1975, which firstly introduced new aspects like the conservation of the forests functions. Clearcutting of more than 2 ha is illegal in Austria, whereas felling areas larger than 0,5 ha requires approval by forestry authorities. Clearcuttings are not allowed in stands younger than 60 years. As a big exception in Austria, Kalkalpen National Park has an exemption from the Forest Law on 79 % of its area. This means that bark beetle combating only has to take place on the borders of the National Park to prevent the surrounding forest owners from negative impacts. 82 % of forests are privately owned. Forest management planning is only done by big forest owners like the Austrian Federal Forests. Every ten years they make an inventory and develop a forest utilization plan, which has to be approved by the responsible forest authority. Kalkalpen NP has no forestry use, so there is not forest planning, except bark beetle management. Austria has nine different Nature Conservation Acts, Kalkalpen falls under the Act of Upper Austria. The National Park Act replaces the Nature Conservation Act in the protected area. As Hunting and Fishing is not allowed in Kalkalpen National Park, the National Park Act also substitutes the Hunting Act as well as the Fisheries Act.

The protection for the WH-site Kalkalpen is given by the National Park Law, the Natura 2000 Directives, and the management plan directive, which have been in place before the UNESCO nomination. A national steering group is established for Austrian parts of this UNESCO Site.

2.3. Slovakia

The boundary modification of the Slovak component parts has been carried out in order to consistently capture all the highly valuable areas that are necessary for the expression of the OUV. In general, the boundaries were modified in order to adjust them to existing strict nature reserves (in most of the cases, this included their enlargement compared to their delineation from 2007, as in case of Stužica, Udava, partly in Vihorlat), and also in order to add new parts of natural forests that have not been systematically included in the nomination dossier from 2007.

2.3.1. Poloniny cluster

The whole area of the component cluster is covered by forest, apart from small plots with inconsiderable area. Pure beech forests dominate in the whole region. Silver fir occurs at more humid sites.

Buffer zone around Component part Rožok is mostly even aged forests with different age younger than the forest in the core zone. Clear cutting and shelterwood systems in stripes contributed to the quite uniform forest stands.

Buffer zone around Component part Stužica also includes forest stands that include non-natural coniferous species and also some stands with their prevalence. The buffer zone here also consists mostly of even aged forests of different ages (same as Component part Rožok). The same can be said of the buffer zone around Component part Udava and Component part Havešova.

There are forest roads and skidding trails present in the buffer zones along with some small meadows, but the meadows are also present in the core zone.

2.3.2. Vihorlat cluster

The beech forests here are characterised by the absence of both spruce and fir, while maple and ash can appear due to the substrate type.

Component part Vihorlat has a buffer zone of mostly younger even aged forests.

The amendment of the Act on Nature and Landscape Conservation brings several changes to the system of nature protection in Slovakia and strengthens competencies of the State Nature Conservancy. From 1st January 2020, larger clear-cuts or shelter-wood cuts are forbidden in national parks, the only allowed type of management is close-to-nature forest management. Any so-called salvage logging (in case of calamities) larger than 0.3 ha must be firstly approved by the State Nature Conservancy. The forest management plans in protected areas must be prepared in cooperation with the State Nature Conservancy. In the landscape conservation buffer sub-zone, only close-to-nature forest management can be applied, because the buffer zone is located in a national park/protected landscape area. Management shall include natural regeneration of all tree species of potential natural forest type, regular distribution of dead wood, uneven-aged forest stands and continuous change to selective logging.

The management of forests in Slovakia is under purview of different Ministries. Ministry of Agriculture and Rural Development is the supreme national authority on forests. In military forests (Vihorlat cluster) and forests important for national defence, the Ministry of Defence executes the state supervision through its Forestry and Hunting Office. The State Administration on Forests (under the Ministry of Interior) deals with approval of forest management plans, conducts supervision of forests and hunting activities. Natural WH is under responsibility of the Ministry of Environment, alongside with Ministry for Foreign Affairs. In the field, two bodies of the State Nature Conservancy (under Ministry of Environment) manage the WH clusters: National Park Poloniny and Protected landscape area Východné Karpaty (in part) in the Poloniny cluster, and Protected landscape area Vihorlat in the Vihorlat cluster.

National Forest Centre specialises in the framework for management planning. Private companies prepare FMPs according to NFC standards and guidelines. Every forest owner must contract a licensed forest manager to work according to the management plan and legislation.

Public consultation and participation is enabled through the entire process of management planning. Game management is organised separately from forest management.

2.4. Slovenia

2.4.1. Krokar buffer zone

The buffer zone of Krokar is the Forest Reserve Borovec, which includes mainly fir-beech and beech forests, which are typical for this area. The composition of forest stands is relatively diverse, with all developmental phases. Old-growth characteristics are typical in the buffer zone. Changed or altered tree species forests are not present in the reserve. The whole reserve is covered by forests.

The only allowed activities in the buffer zone are: maintenance of two existing educational trails, infrastructure supplementing the trails (only with special permission), hiking on trails. There is no hunting, logging, or any other extracting activity allowed.

Only the protective buffer zone is designated for Krokar.

The buffer zone and the core zone are entirely state-owned. The buffer zone is small, but surrounded by vast Natura 2000 forest complexes.

2.4.2. Snežnik buffer zone

Montane and subalpine beech forests prevail here. Mature, even-sized stands prevail, while they are uneven-aged, with significant proportion of beech pole stands. Part of the buffer zone is covered with even-sized and even-aged beech pole stands. Forests in the buffer zone are entirely conserved natural forests, which were always regenerated in a natural way.

The allowed activities in the buffer zone are: maintenance of existing educational trails, infrastructure supplementing the trails (only with special permission), hiking on trails. Hunting is also allowed in the buffer zone. Phyto-sanitary cuts, hunting and collection of forest food are allowed where the buffer zone extends into protective forests.

Only the protective buffer zone is designated for Snežnik.

The buffer zone and the core zone are entirely state-owned. The buffer zone is small, but surrounded by vast forest complex managed in close-to-nature FM system for many decades.

The main piece of legislation regulating forestry practices in Slovenia is the Forest Act, which stipulates the preparation of National Forest Programme, which is prepared by the Ministry of Agriculture, Forestry and Food. The Forest Law also establishes public forestry service, which is comprised of Slovenia Forest Service and Slovenian Forestry Institute.

Slovenia Forest Service works on all forests, regardless of ownership. Its main activities are preparing forest management plans, silviculture, forest techniques, rural development, forest wildlife and hunting, public relations and promotion of forests. It does not carry out any harvesting or economic activities. There is **public consultation process** for the elaboration of the forest management plans.

Forest management planning that is provided on state level by Slovenia Forest Service, with forest owners having to comply with relevant forest management plans. Forest management plans in Slovenia are also considered as Natura 2000 management plans for forest species and habitat types. Slovenia's Nature Conservation Act and Natura 2000 Decree are tightly integrated into forestry planning. Forest management acquires guidelines from nature conservation, cultural conservation, and water management authorities, which are integrated into forest management plans and game management plans. The guidelines are used for determinations of the management goals and direct the planning of measures

Different decrees and rulebooks complement the Forest Act and detail specific actions (Rules on forest and hunting management, Rules on forest protection, Decree on protective forests and forests with special purpose).

Natural World Heritage is under the responsibility of Ministry of Environment and Spatial Planning. Specific management of UNESCO sites is not yet established and is currently under authority of Slovenia Forest Service as part of regular forest management planning. UNESCO forest sites in Slovenia are protected as forest reserves, where no forest management is allowed. A National Steering Group has not been formally established. A National WH Committee exists with members from all WH management bodies and ministry representatives.

2.5. Paklenica (Croatia)

WH component parts, as well as the buffer zones are located completely within the Paklenica National Park.

It is estimated that about 55 % of the Park area is covered with forests and meadow habitats, and 45 % is covered by rocks and cliffs. Paklenica buffer zone area is covered with forests, namely oak forests, and thermophilous and submontane beech forests.

Forests and forest land within the National Park are managed through Action Plan for forest ecosystems developed within the Management Plan. The Program of protection, tending and restoration of forests determines interventions on forests and forest lands within protected areas or natural values protected. This program is currently in development for Paklenica. Phyto-sanitary cuttings and collecting of non-timber forest products are not allowed in the National Park. Game hunting and the establishment of hunting grounds in National Park is forbidden. There are 150 km of trails in the Park, of which close to 46 km in the area of component parts and the buffer zones.

The Public Institution Paklenica National Park is currently in the process of developing the new management plan in which a special effort will be put to align the National Park management zonation with the UNESCO WH zonation.

Ministry in charge of the UNESCO WH Sites in Croatia is Ministry of Culture and Media. Nevertheless, the Ministry of Economy and Sustainable Development coordinates the work of Public Institution Paklenica National Park including all the obligations regarding the UNESCO WH. Both UNESCO WH components are a part of protected area in category national park and also a part of the UNESCO Velebit Mountain Biosphere Reserve, which is managed by Coordinating Council consisting of representatives of Public Institutions (PI) Velebit NP, Paklenica NP, Northern Velebit NP and Local Action Groups.

The main legislation regarding forest in Croatia is the Forest Act and National Forestry Policy and Strategy. Different ordinances supplement these two documents (Ordinance on Forest Management, Ordinance on The Type of Forestry Works, Minimum Conditions for their Performance and Works that Forest Owners Can Perform Independently). Hunting Act regulates game management. Nature Protection Act is the fundamental legislation governing the conservation of biological and landscape diversity. In cases when Natura 2000 sites overlap with forests, forest management plans must integrate Natura conservation guidelines into the Forest management program with ecological network management plan (relevant legislation is the Regulation of the Ecological Network).

Croatian Chamber of Forestry Engineers and Wood Technology is an independent professional organization that performs the public powers entrusted to it. Forestry and wood technology engineers who perform professional tasks in the field of forestry, hunting and wood technology must be associated with the Chamber.

2.6. Overview and conclusions

While this analysis produced an overview of the forestry situations in the buffer zones of only the project pilot areas, which are a small subset of all the component parts and clusters of this World Heritage property it is clear that the differences among the countries are quite stark. Several main differences emerge:

1. Land ownership (and use of forests in the buffer zones)
2. Size of the buffer zone (and subsequent subdivision into protective and landscape conservation buffer subzones)
3. Naturalness of the forests
4. Forestry systems in use in the wider areas (outside of buffer zones)

Land ownership opens up the first major point of difference. While buffer zones in Slovenia, Austria and Croatia are almost entirely state-owned and/or under firm management authority of the protected area management, the German component part's buffer zone is largely privately owned. Slovakia resolved a similarly difficult situation with the boundary modification proposal, with which private properties were excluded. Private ownership is not an issue by itself, however it is common for forest owners to want to have economic benefit from their forests. In the absence of appropriate compensation schemes and lacking monitoring of harvesting activities, such situations can lead to commercial use of protective buffer zones and thus affect also the WH property, which is what the buffer zones should be protecting. According to the Guideline for Ecosystem-Based Forest Management in Buffer Subzones of World Heritage Beech Forests, protective buffer zones should be free of commercial forestry use, with only minimal measures, if at all, allowed. Among the areas studied in this assessment, only Slovak components have additional landscape conservation zone, all other component parts only feature protective buffer zones.

The sizes of the buffer zones also differ quite significantly among countries studied. Buffer zones at studied sites in Slovenia and Germany currently do not fully meet the minimum size requirements discussed within the framework of Joint Management Committee. While both component parts in Slovenia are surrounded by vast unbroken forests, that are managed for many decades in close-to-nature way, the studied German component is more exposed, as agricultural and other non-forest land areas are close-by on three sides, making the component part into a forested peninsula in the landscape. Even so, there are some procedures in place to increase the buffer zones in Slovenia, to comply with international guidance. The buffer zones in Slovakia and Croatia were recently modified along with other boundary modifications and follow the guidance provided. Slovakia and Austria also feature by far the largest buffer zones among the studied areas. While Slovakia had with the boundary modifications already defined both protective and landscape conservation buffer subzones, such a need is also expressed in Austria, however the processes have not started yet in earnest.

While the situation regarding the naturalness of the forests vary among countries, especially if we compare the general forest areas outside of buffer zones, most countries exhibit close-to-natural and undisturbed forests within the buffer zones of their component parts. There are some altered forests in the German buffer zone (monoculture plantations), as well as a significant proportion of forests in the buffer zones (and also some in the core zones) of Slovak components were recognized as modified to different degrees. Sustainable and ideally close-to-nature forestry should be implemented in landscape conservation buffer subzone.

One of the great current challenges of the stakeholders involved in this UNESCO World Heritage property is to reach a common understanding among foresters from the involved countries. The present analysis from five (Austria, Croatia, Germany, Slovakia, Slovenia) of the 12 currently involved countries, demonstrates

significant differences in how forestry is practiced across Central Europe (D.T2.3.1). While all involved countries strive towards sustainable forestry, the use of different forestry systems varies considerably (clearcuts, shelterwood cutting, close-to-nature, etc.). Slovenian and Croatian systems appear closely related and oriented very specifically towards selective cuts and groups selection, while clearcutting is in some cases still practiced in other three countries.

The definition for close-to-nature forestry has to be agreed upon. For example, close-to-nature forestry is a term used in Slovenia, Croatia, and Slovakia, yet each country defines and implements it differently. In this case, Slovenia and Croatia have a relatively similar definition, while Slovakia differs.

We support the use of Slovenian definition of close-to-nature forestry. Contemporary close-to-nature (CTN) forestry in Slovenia combines different silvicultural tools that can be broadly classified into three silvicultural systems: selection, irregular shelterwood and free-style silviculture (Čater in Diaci, 2020b; after Mlinšek, 1996). In strict compliance with the principle of tending, the free combination of different types of felling is permitted, so the silvicultural system is adjusted to a unique combination of the site's requirements, stand conditions and the silvicultural goals. Nevertheless, several guiding principles are applied: the use of natural regeneration and native tree species, following natural processes and mimicking historical disturbance regimes, favouring complex vertical and horizontal forest structures, as well as respecting tree individuality (Čater in Diaci, 2020b).

3. Workshop on sustainable forest management practices (D.T2.3.2)

The workshop on sustainable forest management practices took place in March 2021 and was aimed at developing common guidelines for sustainable forest management of buffer zones in World Heritage component parts. It was attended by around 70 individual participants. The workshop itself was divided into two days, each day with different forestry experts presenting forest management practices in different European countries and specificities of old-growth beech forests. The agenda was meant to present an overview of the management situation of buffer zones in different countries, from which best practices could be extracted to develop common guidelines for WH buffer zones.

The first day of the workshop consisted of 6 main presentations, alongside introductory talks and presentations by the organisers. The first topic was presented by Caroline Celis (WH Beech Forest Coordination Office). She talked about the Guidance document for buffer zone management, that is in development at the Coordination Office. The second topic was presented by dr. Pierre Ibisch (Eberswalde University for Sustainable Development, Centre for Econics and Ecosystem Management) on forest management's impact on forest microclimate. The third topic was presented by Knut Storm (Natural Forest Academy) on forest management in Lübeck in Northern Germany. The fourth topic was presented by dr. Aleš Poljanec (Slovenia Forest Service) on forest management in Slovenia. After this presentation, dr. Andrej Bončina (Biotechnical faculty - Department of forestry) talked about beech management and ecology. The last talk of the day was given by dr. Thomas Nagel (Biotechnical faculty - Department of forestry). He talked about old-growth forests and forest reserves.

The second day of the workshop started with a presentation by Ivor Rizman (National Forest Centre Slovakia), who talked about forest management in Slovakia. The second topic was presented by Frederik Vaes (Brussels Environment) on forest management in the Sonian Forest in Belgium. Next followed a talk by Špela E. Koblar Habič (Slovenia Forest Service) on forest management in high-karst fir-beech forests around Snežnik component part in Slovenia. The last presentation of the workshop was given by dr. Susanne Winter (WWF Deutschland) on forest management in northeast Germany.

The basics of March's workshop were used to start developing the Guideline for Ecosystem-Based Forest Management in Buffer Subzones of World Heritage Beech Forests. The first draft version was presented in an additional workshop that took place in June 2021. We focused on a smaller number of experts to review the draft version of Guideline. Additional discussions took place on which management aspects to focus on, which topics to present, and how to formulate the Guideline and its strategies on sustainable forest management.

4. Guideline for Ecosystem-Based Forest Management in Buffer Subzones of World Heritage Beech Forests (D.T2.3.3)

The purpose of the Guideline on Ecosystem-based Forest Management in Landscape Conservation Buffer Subzones of World Heritage Beech Forests is to support forest managers in applying present best practices of forest management.

Based on the principle of ecological functionality (according to the Code of Quality Management, D.T3.3.3) the Guideline presents criteria for ecosystem-based forest management, which can be incorporated in landscape conservation buffer subzones of UNESCO WH beech forests. Good practice examples are included in special grey text boxes.

The Guidance document on buffer zone management and buffer zone zonation (JMC, 2021) differentiates between two possible buffer subzones: protection and landscape conservation buffer subzone. Since protection buffer subzones have mainly non-intervention regimes (except for interventions to preserve the OUV), this document is intended for the landscape conservation buffer subzones, where different activities and interventions are allowed.

The main principles are sustainability, ecosystem approach, and close-to-nature forestry. Sustainability is vital to ensure the preservation of forests and their various ES, not just wood production. The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. It requires adaptive management to deal with the complex and dynamic nature of ecosystems. Close-to-nature forestry tries to mimic natural processes of forests to a full extent, in order to preserve ecological, production and social functions of forests.

Forests provide many important ecosystem services (ES) for humankind, including biodiversity, climate regulation, soil protection, water regulation and different cultural services. Therefore, ecosystem-based forest management is necessary to protect and ensure the functioning of all of these services.

A management plan is a necessary prerequisite for effective forest management. It should serve as the basis for all activities undertaken inside a forest area. Forest management of the landscape conservation buffer subzone should be adaptive and based on natural processes of forest ecosystems. Constant monitoring of forest conditions should provide data to guide decision-making.

The following criteria are defined as necessary for appropriate forest management in the landscape conservation buffer subzone:

- Maintenance of natural forest structure
- Promotion of natural regeneration
- Avoidance of non-native tree species
- Optimization of growing stock
- Maintenance of diverse forest edges

- Maintenance of farmland forest elements
- Conservation of biodiversity
- Protection of intangible benefits
- Species management
- Sustainable visitor management

The strategies that follow in Chapter 6 of this document are based on the criteria developed in the Guideline.

5. Ecosystem-based forestry practices in buffer zones

Sustainability is commonly defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs (IISD, 2021). Sustainable forest management, as a dynamic and evolving concept, is intended to maintain and enhance the economic, social and environmental values of all types of forests, for the benefit of present and future generations (FAO, 2021). It means the stewardship and use of forests in a way that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national and global levels, and that does not cause damage to other ecosystems (European Commission, 2021).

Sustainable Ecosystem-based forest management is vital to ensure the preservation of forests and their various ecosystem services for the wellbeing of future generations. It can be measured by different criteria, which define the state of the forest area and processes that are evolving within.

There exist different forestry practices across Europe that try to take into account all the functions that forests provide. Here we present the most common ones.

5.1. Sustainable Forest Management (SFM)

The concept of sustainability in forestry was developed from the concept of sustained yield, which refers only to the forest's productive function. In its broadest sense, SFM encompasses the administrative, legal, technical, economic, social and environmental aspects of the conservation and use of forests (FAO, 2021). SFM should not only focus on maintaining a constant amount of wood stock (e.g., by replanting or allowing natural regeneration). Such an approach, focused mainly on wood production, neglects a variety of different forest functions and leaves room for mismanagement, such as clearcutting (Čater and Diaci, 2020a). It is interesting to note that even SFM certification schemes like FSC and PEFC do not reject clearcutting or mentions its negative consequences (FSC, 2021; PEFC, 2018). Different countries also have different definitions and criteria for SFM (Holvoet and Muys, 2004).As such, this term is not used in this document, we instead use the term ecosystem-based forest management.

5.2. Ecosystem approach

The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. It is based on the application of appropriate scientific methodologies focused on levels of biological organization which encompass the essential processes, functions and interactions among organisms and their environment (CBD, 2021).

It requires ecosystem-based management to deal with the extremely complex and dynamic nature of ecosystems. Despite constant data gathering and research, management always makes decisions with the

absence of complete knowledge or understanding of ecosystems' functioning. Ecosystem processes are often non-linear, and the outcome of such processes often shows time-lags. The result is discontinuities, leading to surprise and uncertainty. Management must therefore be adaptive to be able to respond to such uncertainties. Management must contain elements of "learning-by-doing" or research feedback. Measures may need to be taken even when some cause-and-effect relationships are not yet fully established scientifically (SCBD, 2004).

The comparative analysis of SFM and the ecosystem approach made by FAO (Food and Agriculture Organisation) found out that the concepts were very similar and should be integrated and mutually supportive at all levels (SFS, 2008).

5.3. Multi-functionality of forests

Forests provide a plethora of functions, important for human society. The principle on forests' multi-functionality aims to quantify all the functions forests provide us. One vital factor in the principle of multi-functionality is that all the described forest functions are absolutely equal to one another. Therefore, forest management must take into account all the various functions when preparing management actions, because performing one function should not threaten the forest's ability to perform other functions as well.

Forest functions can be defined by legislation as such (Act on Forests, 2016):

- **ecological functions** (protecting forest stands, preserving biodiversity, hydrological function, climatic function)
- **social functions** (protecting infrastructure, recreation, tourism, education, research, health function, protecting natural and cultural heritage, defensive function, aesthetic function)
- **production function** (wood and timber production, hunting, production of other forest goods)

5.4. Close-to-nature forest management

In Slovenia, the "classic sustainable forest management system" is not enough to address all aspects of forest functions. If we want each forest area to have suitable ecological, production and social functions, we have to go even further from sustainable forest management system into a close-to-nature management system where we try to mimic natural processes of forests in full extent.

Close-to-nature forestry is based on forest management plans adapted to individual site and stand conditions as well as forest functions (integration of different aspects, e.g. biodiversity conservation, protection of natural values), and considering natural processes and structures specific to natural forest ecosystems. Forest structure is adapted to site conditions and its climate. Natural processes are altered as little as possible and mimicked as much as possible, while still maintaining the financial profitability and social sustainability of forest management. Similar to natural processes, close-to-nature forestry also contains inbuilt mechanisms for continual internal checks (so-called control method) providing and adaptive management approach to modify measures in accordance with developmental characteristics of single forest stands and forest as a whole. Close-to-nature forest management uses natural regeneration and mimics natural disturbances and processes. In this sense, it combines the principles of sustainable forest management and the ecosystem approach (Čater and Diaci, 2020b).

The extraction of wood and other forest goods and the use of forests must be in accordance with the potentials and capacities of forests, which are determined by the natural development of forest communities. Forest management measures are adapted to forest dynamics, which ensures the preservation

of the natural composition of forest habitats and their biodiversity, and strengthens the comprehensive resilience of forests and their ability to realize the productive, ecological and social functions of forests.

Replacing intensive forest management by close-to-nature, extensive forest management (e.g. selective logging) is also in line with the principle of ecological functionality. There is a variety of different extensive forestry techniques, with the main purpose of maintaining uneven-aged stands and mimicking natural processes.

Close-to-nature forest management is one of the few activities that organically connects economic activity with nature conservation. Such forest management is professionally demanding, so all measures in forests must be carefully planned. With the spatial planning system, which determines the intended use of land, forests are included in spatial plans at the national and local level. Management of stable and healthy forests, is less expensive than cultivation of artificial stands which can be quite productive on a short-term basis, but are hard to preserve in the long term, due to their higher vulnerability in comparison with natural forests (SFS, 2008).

6. Strategy for ecosystem-based forest management in landscape conservation buffer subzones

Many component parts of the WH beech forest property have large buffer zones. Their management is an important factor regarding the state of the forests in terms of ecosystem functionality both in buffer zones and within component parts. If we want to ensure component parts do not suffer any negative impact of human activity in surrounding areas (buffer zones and the wider landscape), we have to adapt the forest management system towards an ecosystem-based approach in order to protect the forest ecosystem integrity Outstanding Universal Value (OUV) and. We use the term ecosystem-based forest management to describe the syntheses of different forestry practices that resulted in the following strategies.

The presented strategies are comprised of assembled best practice examples, mainly by using data from the Joint Assessment of Current Forest Management Situation in Buffer Zones (D.T2.3.1) and the Workshop on Sustainable Forest Management Practices (D.T2.3.2). Alongside those deliverables, we also used information gathered from interaction between project partners and further experts. We also gathered information by doing a survey of existing literature.

6.1. Vision and Goals

Forest management in landscape conservation buffer subzones of World Heritage beech forests is organised in a way that follows the principles of sustainability, ecosystem approach, close-to-nature practices and the multi-functionality of forests.

The implementation of different practices and strategies in landscape conservation buffer subzones has a positive impact on the naturalness of the forest, its resilience and adaptive capacity to climate change, biodiversity conservation, preservation of intangible benefits, species and visitor management and other important aspects that can impact ecosystem integrity and OUV of component part itself. Positive changes are not seen only in landscape conservation buffer subzone, protective buffer zone and component part itself, but also in surrounding managing forests that provide social, environmental and economic benefits for the wider region.

The overarching goal of the strategies is for WH managers to have an overview of strategies and strategic actions that ensure that management of buffer zones follows the principles of so-called ecosystem-based forest management.

6.2. Strategic objectives

We have designed 6 main strategic objectives for ecosystem-based forest management in landscape conservation buffer subzones of WH beech forests. The strategic objectives and actions are related to the criteria and indicators, which are presented in detail in the Guideline for Ecosystem-Based Forest Management in Buffer Subzones of World Heritage Beech Forests (D.T2.3.3). While this output presents an overview of the strategic objectives the Guideline for Ecosystem-Based Forest Management in Buffer Subzones of World Heritage Beech Forests Is to be consulted by forest managers for practical use. .

6.2.1. Maintaining a natural forest structure

The goal of this strategy is to develop and maintain forests with a natural structure. Such forest structure is vital for a healthy and ecologically balanced forest ecosystem that performs the whole variety of ecosystem services (e.g. carbon sequestration, nutrient cycling, water retention, erosion prevention, biodiversity conservation…), not just wood production. It is more resilient towards (climate) change and extreme weather events, and means an overall healthier ecosystem.

- Strategic action 1: Maintaining a natural forest structure

A natural forest structure means a variable forest, with a diversity of both horizontal and vertical structures and the diversity of tree species – indigenous tree species. It is important to have good knowledge of species types. The result is mostly uneven-aged stands with different developmental phases and mixed species of trees, where conditions allow mixed stands. Prohibiting clearcutting is the biggest step towards ensuring continuous forest cover. Forest stands should be heterogeneous and uneven-aged, with a variety of trees and other plant species. Trees should be diverse in size and age classes. The promotion of local tree species is a must, the managers need to avoid allien and non-native tree species at all costs. Forest cover based on past data is maintained or increased in the long-term. Forest areas are functionally connected between each other.

- Strategic action 2: Natural regeneration

All tree species in the beech forests of landscape conservation buffer subzones should ideally be naturally regenerated. If natural regeneration is not possible (e.g. due to climate change / game grazing etc.), these negative impacts have to be solved. Artificial regeneration can be used only where, despite efforts, natural regeneration cannot be achieved and only as a help of natural regeneration so both artificially and naturally developed seedlings should be included in future stands. Artificial seedlings must have genetic material from the same or adjacent beech forest region where regeneration is taking place (JMC, 2021). The percentage of tree regeneration that is natural should be monitored.

- Strategic action 3: No non-native tree species

Non-native tree stands can change the soil structure, decomposition processes and the biocoenosis of soil organisms (Winter et al., 2020). Non-native tree species have the potential to spread from the buffer zone inside the component parts, which can threaten the OUV of the property. Management plan should forbid the promotion of non-native tree species inside the buffer zone, and define a strategy for restructuring existing non-native stands into natural native stands.

- Strategic action 4: Optimising growing stock

Purposefully increasing growing stock per hectare ensures a higher level of CO_2 uptake, which increases the carbon sequestration function of forests. Forests have a great potential in absorbing CO_2 emissions and mitigating effects of the climate crisis. The increase in biomass also makes forests more resilient to environmental changes, e.g. extreme weather events. Increased biomass is also important for biodiversity. The final goal is not only increasing growing stock, but **optimising** it to balance different forest functions. Forest management should optimise growing stock according to site conditions and risks from climate change. Reference values should be taken from undisturbed core zones, as those are the natural cycles we are trying to imitate.

- Strategic action 5: Diverse forest edge

Forest edge might seem unimportant from a forest management perspective, but it is a vital transitionary habitat between forests and open country. As such, it supports a high variety of species and is important for preserving forest biodiversity (Papež et al., 1997). Forest edge should be heterogeneous and diverse in structure and plant species. It should extend both inside the forest stand and in the open country. It should be composed of a high variety of tree species, herbaceous plants and shrubs. The outer edge should ideally border on an extensively managed grassland with hedges, patches of trees and schrubs and solitary trees, to further improve connectivity between forest areas and open country (Winter et al., 2020). It should support a variety of site-appropriate plant and animal species.

- Strategic action 6: Maintaining farmland wooded elements

Certain landscape conservation buffer subzones are not composed only of forests, but also include cultural landscapes, e.g. farmland and pastures. Area managers should cooperate with relevant stakeholders to ensure preservation of traditional cultural landscape elements. A diverse structure of open country in the landscape conservation buffer subzone should be maintained. Hedges and small tree patches should remain present in the landscape and be ecologically connected between each other and the bigger forest area. Old individual trees should be protected.

6.2.2. Conserving biodiversity

Forests are home to most of the world's terrestrial biodiversity. As such, they are a vital instrument in stopping the loss of biodiversity. Biodiversity loss has big impact on reduction of the resilience of forest and surrounding ecosystems. The following four actions aim to present measures to increase and conserve forest biodiversity. Since 25 % of forest biodiversity is connected to deadwood (Larrieu et al., 2012), this is a major stratey.

- Strategic action 1: Optimising deadwood

Standing deadwood (snags) and fallen deadwood (coarse woody debris) are vital parts of a healthy forest ecosystem. The goal is at least 30 m^3/ha or 10 % (based on total amount of wood stock) of standing and fallen deadwood (JMC, 2021). Managers need to take into the account that amount of deadwood which can be reached (and is also optimal) can vary from specific site to site. Standing deadwood has to include diverse diameters of tree trucks, but is it important to reach sufficient amount of trees bigger than 40 cm dbh (diameter at breast height) where natural conditions allow for such sizes. Fallen deadwood made up of a variety of all size classes.

Confirmed presence of indicator species for old-growth beech forests is a good indicator for appropriate deadwood volume. Indicator species should be site-specific, based on available data, e.g. Natura 2000 species.

- Strategic action 2: Quiet zones for species

Quiet zones are wider areas of forest, where activities are limited in order to not disturb or endanger wildlife. Quiet zones limit disruptive human activities, such as logging, wood transport, and recreation activities. Limitations can either be spatial or temporal (e.g. seasonal, periodical), depending on the species targeted (Žitnik et al, 2018). They are a useful tool in helping to protect nesting areas and dens of endangered species (spatial quiet zones) or restrict forestry activities while certain species are most vulnerable (temporal quiet zones). Quiet zones should be established according to monitoring data, where human activity is limited. Locations of possible quiet zones should be mapped.

- Strategic action 3: Habitat connectivity within forests

In order to provide connectivity between late-successional structural elements and late forest development phases (JMC, 2021), a functional network of old-growth habitats within forests should also be established. Two ways to do this are old-growth patches and habitat trees. Such elements should ideally be distributed over the whole buffer subzone as much as possible.

Management should establish a matrix of old-growth patches. 3 % or 10 % of the buffer zone area, depending on the size of the buffer zone in relation to the component part, should be established as patches (refer to Guideline for Ecosystem-Based Forest Management in Buffer Subzones of World Heritage Beech Forests). Patches should be properly marked and mapped, and at least 5 ha in size.

At least 5 selected and properly marked habitat trees per hectare should be selected. Selected habitat trees should be of a variety of different sizes, tree species, shapes and microhabitats (e.g. presence of tree fungi and cavity-dwelling species).

- Strategic action 4: Terricole structures

Terricole structures are naturally formed ground structures, such as large boulders, root plates, etc. that should be preserved by management. Different terricole structures support different species, but are mainly vital for the propagation of fungi, moss, and lichen (Winter et al., 2020). Management plan should acknowledge the importance of terricole structures and set guidelines to preserve them.

6.2.3. Preserving intangible benefits

The strategic actions for intangible forest benefits mainly focus on soil and water quality. These are vital elements for a healthy forest ecosystem, but they also provide very important benefits for humankind. Beside water storage, forests have important filtration, regulation, recharging and absorbing function. Forest ecosystems play a crucial role in building and maintaining soil fertility all over the world. If trees are cut and forests cleared, the land is exposed to soil degradation and erosion. This can, in a worst-case scenario, lead to desertification and land's inability to support agriculture and forestry.

- Strategic action 1: Maintainance or increase of soil productivity, minimalisation of soil erosion and contamination

Soil protection includes maintaining constant forest cover and measures against clearings that could promote unwanted erosion processes. Forestry should focus on small-scale actions and maintaining a heterogeneous forest structure and promoting the protective function of forests (SFS, 2011). Measures to protect soil from compaction, erosion, etc. while harvesting, with the use of appropriate logging techniques and machinery, must be established by management. It is important to use different management techniques in a way to prevet soil contaimination.

- Strategic action 2: Maintain or increase the quality and quantity of water from forest ecosystems

Water retention is provided by a rich forest undergrowth that increases water storage capacity. Due to this, a heterogeneous forest structure should be maintained and forest cover increased. Deadwood and growing stock also increase water retention. Water should be retained in forests as much as possible. Wetlands and water bodies should be preserved. Springs should be especially protected, by avoiding logging in their vicinity, avoiding draining or tapping the spring and by not modifying their structure (Winter et al., 2020). Water quality should be defined according to local/national biochemical criteria. Healthy and stable forest ecosystem have important role in filtration and extraction of different elements from water in order to keep high water quality.

- Strategic action 3: Avoiding the use of biocides or fertilisers

Biocides and fertilisers have a serious impact on forest communities. They can also pollute water bodies, degrading water quality for wildlife and human use. Management plan should forbid the use of biocides and fertilisers for forestry and farmland in the landscape conservation buffer zone. Stakeholders (e.g. private owners) should be made aware of the limitations and the reasons for them.

6.2.4. Adapted species management

Active species management is sometimes necessary for preserving a forest's health and, in the case of World Heritage, for preserving the Outstanding Universal Value. The strategic actions here describe measures against overabundant game species and invasive alien species. These are the biggest biological threats facing healthy natural forests and our World Heritage.

- Strategic action 1: Hunting guidelines and restrictions

Hunting guidelines and restrictions in the buffer zone should be defined in the management plan. They should be planned according to the size of the buffer zone. Monitoring of wildlife and game impact should be established. The harmonization of herbivorous game populations with the environment must be maintained or established.

- Strategic action 2: Invasive species management

Invasive species can have serious adverse effects on their invaded habitats, with major economic and environmental damage. Active management (e.g. removal) of invasive species and human introduced pests to protect the OUV and integrity of the property is possible in the buffer zones (JMC, 2021). Management staff should be educated on invasive species in their area and appropriate actions to limit their spread. A

database of invasive species, their numbers, locations of spread and damage caused should be established. A prepared action plan for rapid response to located invasive species should be developed.

6.2.5. Applied visitor management

Poorly managed tourism or excessive visitor numbers at a site can pose major threats to OUV (Stolton et al., 2012). Visitor pressure is one of the main anthropogenic threats to the stability of our protected areas. In this document, strategy for visitor management is only briefly mentioned, since we know that this chapter is very important in the aspect of sustainable forestry practices in buffer zones and we should not forget on this topic. However, more specific, detailed and explained strategies for visitor management, can be found in the BEECH POWER document called Strategies for visitor management and knowledge transfer in buffer zones of WH beech forest PAs.

- Strategic action 1: Sustainable visitor management

Appropriate visitor management is vital to improve positive aspects of forest management (safeguarding the OUV, protecting species, sustainable income…) and lessen the negative aspects of tourism and visits (site degradation, forest disturbances, damage to the OUV). A visitor management plan should provide plans for sustainable visitor management that ensures the protection of the forest ecosystem. Visitor pressure is monitored and field control must be established.

6.2.6. Ensuring forest role for rural and regional development

There are many countries in Europe where WH beech forests are located in remote rural areas (especially in case of large forest areas), with their inhabitants having lower incomes and are generally less prosperous than their urban counterparts. Because of this, governments often attempt to promote rural development through the development of natural resources such as forests. WH beech forest regions are special examples in that aspect since component parts are surrounded by buffer zones where regimes about possible activities in forests are much stricter than in other non-protected ones. Some countries (e.g. Romania, Slovakia) have very big buffer zones and are therefore further divided into protective buffer subzones (protection is the main function) and landscape conservation buffer subzones (low-impact human-related activities are allowed inside). Forests have an important role in rural and regional development, since economic status of local people can be improved through different activities and not only woodcutting and selling wood – e.g. tourism, recreation or education.

- Strategic action 1: Promote and ensure sources of income from forest resources

Regional or local actors have to make sure to design and promote only those activities from forest ecosystem services that are allowed and do not have a negative impact on buffer zone and component part. Activities can be designed and promoted in a way to follow the rules of social and economic equality and justice.

- Strategic action 2: Provide support to forest owners and managers as well as their associations

National and regional stakeholders should provide support to the forest owners and managers through different mechanisms and programmes. The most valued and important ones are financial (co)funding, administrative support and educational seminars (workshops, lectures, etc.). Forest owners and managers should be proactive in seeking support from national and regional authorities.

- Strategic action 3: Reducing the problems associated with land ownership fragmentation

Land ownership fragmentation is often a problem in terms of efficient management of the area. While component parts of WH beech forests are mostly state-owned, areas inside buffer zones (especially in the case of big buffer zones) can be privately owned. Privately owned land is often subject to further fragmentation which causes additional problems to efficient management of the buffer zone (and therefore also the component part). The best solution is to present different financial mechanisms to prevent further fragmentation, to implement financial bonuses to private owners to manage their forest in an ecosystem-based way, which has positive effects on climate change mitigation and strengthening the local forest ecosystem from outside threats. If the area is not completely state-owned, then we suggest to offer a private owner two options: either the state buys off the area or the owner agrees to follow the guidelines for WH buffer zones management. If none of the mentioned options can be achieved and the owner does not follow the principles of WH buffer zones management, a re-zonation and boundary modification has to be implemented in these areas and the private forest owners have to be excluded from the UNESCO property.

- Strategic action 4: Enforce the forest law with particular attention to combating illegal logging and associated trade

National and regional authority have to pay specific attention into implementation of legislation that addresses illegal logging and associated trade and other activities that are causing (potential) damage to buffer zones and prevent or decrease the main task of buffer zone – protecting the component part.

- Strategic action 5: Implement rules about collecting non-wood forest products

In the landscape conservation buffer subzone it is possible to collect mushrooms, berries and medicinal herbs, but only for personal use. The long-term goal is to avoid collection of mushrooms, berries and medicinal herbs in the property and protection buffer subzone. Exception is allowed for the collection by owners for personal use only and if it is allowed by the legislation of the State Party. Commercial use is not allowed (JMC, 2021). In many areas, collection of non-wood forest product presents important additional income for local people. Local people should be educated about the rules and be suggested other areas where the collection is allowed.

- Strategic action 6: Developing and spreading the use of systems of payment for ecosystem services

Payment for ecosystem services (PES) policies compensate individuals or communities for undertaking actions that increase the provision of ecosystem services such as water purification, flood mitigation or carbon sequestration (Jack et al., 2008). Tourism and recreation are also two very important ecosystem services that bring additional income in the regions where WH beech forests are located. National and regional stakeholders can present the legislation where some portion of income made with the use of ecosystem services in buffer zones of WH beech forests is invested back into the WH site in order to increase the resilience of the site and implement climate change mitigation measures.

7. Conclusion

World Heritage component parts are presenting the last remnants of areas with high biodiversity levels and the complexes of ancient and old-growth forest areas where there were the countries have their forest management organised in specific way. In most cases this reason was hard accessibility of the area which played an important role in preservation of intact forest areas for centuries. In past decades several

countries were started to recognising the importance of these “less-intensively managed areas.” In the aspect of climate changes and adaptation and mitigation to them, biodiversity preservation and importance for protecting and using all forest functions for different humanity-related benefits, many countries recognised (are still recognising) the importance of managing their forests in closer-to-nature way by using different adaptive (ecosystem) based solutions.

World Heritage component parts and their buffer zones are in this aspect an even more important and the management has to be done in a way to support ecosystem integrity and preservation of OUV. Component parts (core zones) have non-intervention regime. There exist a variety of differences between buffer zones of different component parts in our WH Site. Some of the more pronounced differences are land ownership, with some component parts having a sizable part of their buffer zone under private ownership; the size of buffer zones also differs greatly, with some component parts having big enough buffer zones to necessitate subdivision into landscape and protection subzones, and others having a problem of buffer zones being too small to meet even the minimum size requirements. Landscape conservation buffer subzones are therefore the only areas where some forest management is allowed (there can be located villages, infrastructure, agricultures, etc…in some countries).

Most countries exhibit close-to-natural and undisturbed forests within the buffer zones of their component parts, but the use of different forestry systems and terminology varies considerably. The definition for close-to-nature forestry has to be agreed upon and we support the use of Slovenian definition of close-to-nature forestry.

These Strategies for sustainable forestry practices in buffer zones of WH beech forests PAs (O.T2.5) was designed in a way to be implemented in WH beech forest regions in order to help managers design their management system to comply with closer-to-nature forestry practices. A process was started to define common management guidelines for all buffer zones, starting with the workshop on sustainable forest management practices, to gather knowledge and best practice examples from across Europe. This knowledge was supplemented with additional consultations with forestry experts and literature research. The culmination of this process is the Guideline on Ecosystem-based Forest Management in Landscape Conservation Buffer Subzones of World Heritage (WH) Beech Forests (D.T2.3.3), which is meant to support forest managers in applying present best practices of forest management. The guideline defines different principles of appropriate ecosystem-based management, based on widely-used principles of sustainable forest management, ecosystem approach, close-to-nature forestry, and multi-functionality of forests. The Guideline offers management approaches in the form of various criteria and indicators.

These criteria presented in Guideline (D.T2.3.3) have been further organized into 6 strategies in this document that are presented with different strategic actions and offer an overview for management actions, while detailed actions are present in the Guideline.

The strategy document is designed to be applicable in WH beech forest regions, but also in wider forest areas. Since many approaches are based on close-to-nature forestry system, which Slovenia is practicing on national-wise level, the strategies can also be adopted on state level. But in this case we need to point out again, that this document was developed for the purpose of forest management in buffer zones and is concentrating only on these forest areas.

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