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European World Heritage Beech Forests

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Table of Content

1 Summary	3
2 Zusammenfassung	5
3 Background	7
4 Project goals	8
5 Methodology	8
5.1 Current distribution of European beech forests	9
5.2 Definition of European Beech Forest Regions	10
5.3 Identification of ancient beech forest areas and data collection	10
5.4 Analysis of identified ancient beech forest areas	11
6 Project course and work flow	13
6.1 Project organisation	13
6.2 Project procedure	13
7 Results	16
7.1 Current distribution of European beech forests	16
7.2 European Beech Forest Regions	18
7.3 Identification and analysis of ancient beech forest areas	22
7.4 Feedback from government level	24
7.5 Technical elements for the nomination process	24
7.5.1 Draft Statement OUV	25
7.5.2 Tentative List – common text parts	25
7.5.3 Candidate area fact sheets	25
8 Recommendations for the further process	26
9 References	27
10 Acknowledgement	29

List of Figures

Figure 1: Methodology of the screening, evaluation and selection process	9
Figure 2: Project procedure	14
Figure 3: Current and potential beech forest distribution in Europe	17
Figure 4: Current beech forest distribution in Europe and Beech Forest Regions	21
Figure 5: Current beech forest distribution (relative conservation value index), BFRs and identified ancient beech forest areas	23

1 Summary

The Research and Development project “World Heritage Beech Forests” was commissioned by the German Federal Agency for Nature Conservation with funds from the German Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) and implemented by the Centre for Economics and Ecosystem Management (CEEM) at the Eberswalde University for Sustainable Development. With this project Germany followed the recommendation by the World Heritage Committee in the context of the inscription of the “Ancient Beech Forests of Germany” to the World Heritage List as extension to the World Heritage property “Primeval Beech Forests of the Carpathians (Slovakia, Ukraine)” in 2011. The State Parties of the trilateral World Heritage property were advised to apply a comprehensive approach to secure the protection of the unique ecosystem of European beech forests by exploring the potential for a finite European serial World Heritage nomination of beech forest.

The overall goal of the project was the scientific, technical and organisational support of a process on expert and governmental level aiming at a serial transnational nomination to extend the trilateral World Heritage Property to fully represent the history of post-glacial beech forest distribution and the high diversity of this forest ecosystem in terms of altitudinal range, climate and soil conditions as well as the resulting variety of beech forest communities.

For this purpose a screening process was conducted in cooperation with a large network of beech forest experts from all over Europe. The screening process comprised a bottom-up and a top-down approach. It included the identification of suitable beech forest areas with the help of country experts and a spatial analysis of the European beech forests. More than 100 ancient beech forest areas were identified. Based on a jointly agreed methodology the areas were further analysed according to their potential to fulfil the requirements for an extension nomination of the existing property. These requirements include the contribution to the Outstanding Universal Value (OUV) – here criterion ix, integrity, and adequate protection and management. In a stepwise procedure of identification and analysis the results were discussed and revised at three international expert meetings with 58 participating experts from 20 countries and accompanied by additional research and communication activities.

Furthermore the (interim) results of the project were presented at three meetings on Nature and Biodiversity directors’ level with participants from 15 countries to coordinate the process on the decision-making level and to ensure the continuation of the process after the project.

The overall result of the project has been reached by presenting a final list of 46 candidate areas, which represent a proposal on expert level for the scope of an extension nomination to the existing World Heritage property. Furthermore, a draft statement for the OUV of a finite European property was developed and the roadmap for the nomination process was set. The representatives of Nature and Biodiversity directorates of 14 countries confirmed the participation in the further extension nomination process, which will be led by Austria. The jointly agreed roadmap is

aiming at the inscription of the suggested candidate areas to the World Heritage List as extension to the existing trilateral World Heritage property in 2017.

2 Zusammenfassung

Das Forschungs- und Entwicklungsvorhaben „Europäisches Welterbe Buchenwälder“ wurde aus Mitteln des Bundesministeriums für Umwelt, Naturschutz, Bau und Reaktorsicherheit finanziert und vom Bundesamt für Naturschutz (BfN) in Auftrag gegeben. Das Centre for Ecomics and Ecosystem Management (CEEM) an der Hochschule für nachhaltige Entwicklung in Eberswalde (HNEE) wurde mit der Durchführung des Projektes betraut.

Mit der Umsetzung dieses Vorhabens kommt Deutschland der Empfehlung nach, die das Welterbe Komitee im Jahr 2011 im Zusammenhang mit der Einschreibung der „Alten Buchenwälder Deutschlands“ als Erweiterung des Weltnaturerbes „Buchenurwälder der Karpaten (Slowakei, Ukraine) an die beteiligten Länder ausgesprochen hat. Es wurde empfohlen, mit Hilfe eines umfassenden Ansatzes das Potenzial für eine endgültige serielle Nominierung der europäischen Buchenwälder zu erforschen um den Schutz dieses einzigartigen Ökosystems zu gewährleisten.

Das Hauptziel des Vorhabens war die wissenschaftliche und organisatorische Unterstützung eines Prozesses auf Experten- und Regierungsebene, um eine serielle transnationale Erweiterungsnominierung zum bestehenden trilateralen Weltnaturerbe zu initiieren. Diese Erweiterungsnominierung soll die Geschichte des nacheiszeitlichen Ausbreitungsprozesses der Buchenwälder in Europa darstellen und die damit verbundene Vielfalt dieses Ökosystems im Hinblick auf das Vorkommen in unterschiedlichen Höhenstufen, unter verschiedenen klimatischen und standörtlichen Bedingungen und somit die daraus resultierende Vielfalt der unterschiedlichen Buchenwalgesellschaften in Europa abbilden.

Um dieses Ziel zu erreichen wurde in Zusammenarbeit mit einem umfangreichen Netzwerk von europäischen Experten ein Screening-Prozess geeigneter Buchenwaldgebiete durchgeführt. Dieser Prozess beinhaltete einen Bottom-up und einen Top-down Ansatz. Im Rahmen des Bottom-up Ansatzes meldeten die beteiligten Experten potenziell geeignete Buchenwaldgebiete, während durch den Top-down Ansatz die Buchenwälder Europas mittels einer räumlichen Analyse untersucht wurden. Mehr als 100 alte Buchenwaldgebiete wurden auf diese Weise identifiziert. Basierend auf einer gemeinsam abgestimmten Methode wurden diese Gebiete im Hinblick auf deren Potenzial, die Anforderungen für eine Erweiterungsnominierung zu erfüllen, analysiert. Diese Anforderungen beinhalten den Beitrag zum Außergewöhnlichen Universellen Wert (Outstanding Universal Value, OUV) nach Kriterium ix (andauernde ökologische Prozesse), die Integrität (Unversehrtheit) und den angemessenen Schutz sowie das geeignete Management der jeweiligen Flächen. Die Ergebnisse der Identifikation und Analyse der Buchenwaldgebiete wurden im Rahmen von drei internationalen Expertenworkshops schrittweise diskutiert und überarbeitet und durch weitere Forschungsarbeiten sowie intensive Kommunikation mit den Experten ergänzt. Insgesamt nahmen 58 Experten aus 20 Ländern an den Expertenworkshops teil.

Außerdem wurden die (Zwischen-) Ergebnisse des Vorhabens im Zusammenhang von drei Treffen auf Ebene der Abteilungsleiter für Natur(-schutz) und Biologische Vielfalt der jeweiligen Länderministerien vorgestellt, um den Prozess auf der

Entscheidungs-Ebene zu koordinieren und seine Fortführung nach dem Projekt zu sichern. Insgesamt beteiligten sich Vertreter aus 15 Ländern an diesen Treffen.

Das Gesamtergebnis des Vorhabens wurde durch eine finale Auswahl von 46 Kandidatenflächen für eine Erweiterungsnominierung zum bestehenden trilateralen Weltnaturerbe erreicht. Diese Auswahl stellt einen Vorschlag auf Expertenebene dar. Zudem wurde ein Entwurf für die Erklärung zum OUV für eine erweiterte, europäische Nominierung erarbeitet und ein Fahrplan für das weitere Vorgehen abgestimmt.

Die Vertreter der Abteilungen für Natur(schutz) und Biologische Vielfalt aus 14 Ländern bestätigten ihre Teilnahme an der Erweiterungsnominierung. Dieser Prozess wird von Österreich koordiniert. Der weitere Fahrplan zielt auf die Einschreibung der vorgeschlagenen Kandidatenflächen in die Welterbeliste als Erweiterung zum bestehenden trilateralen Weltnaturerbe im Jahr 2017 ab.

3 Background

In June 2011, the World Heritage Committee (WHC) approved the “Ancient Beech Forests of Germany” as extension to the “Primeval Beech Forests of the Carpathians, Slovakia and Ukraine” at the 35th session in Paris.

“The Primeval Beech Forests of the Carpathians and Ancient Beech Forests of Germany” are a serial property comprising fifteen components. They represent an outstanding example of undisturbed, complex temperate forests and exhibit the most complete and comprehensive ecological patterns and processes of pure stands of European beech across a variety of environmental conditions. They contain an invaluable genetic reservoir of beech and many species associated and depend on these forest habitats” (WHC 2011).

In this context, the WHC commended the three State Parties to continue the process of and to assess the potential for a finite European nomination of primeval and ancient beech forests of Europe.

“[The WHC] commends the States Parties of Ukraine, Slovakia and Germany for their on-going commitment to ensure a comprehensive approach to conserving the primeval and ancient beech forests of Europe and for their exploration of the potential for the World Heritage Convention to further these efforts by cooperating with the support of IUCN and the World Heritage Centre, with other interested States Parties towards a finite serial transnational nomination in order to assure the protection of this unique forest ecosystem.” (WHC 2011).

Following this recommendation, the German Federal Ministry for Environment, Nature Conservation, Building and Nuclear Safety (BMUB) launched the Research and Development Project “European World Heritage Beech Forests” (05/2012-11/2014), (further hence “the project”), which was commissioned by the German Federal Agency for Nature Conservation (BfN) and implemented by the Centre for Economics and Ecosystem Management (CEEM) at the Eberswalde University for Sustainable Development (HNEE).

The project built on the results of previous initiatives in Germany (three workshops “European beech forest initiative”, Isle of Vilm, starting in 2007; various publications on beech forests by BfN; three international workshops “Beech Forests – Joint Natural Heritage of Europe” Isle of Vilm, started in 2010) and therefore constituted the continuation as well as the consolidation of this process by providing an organisational and technical structure to achieve the goal of defining the scope of a possible finite European extension nomination to the existing trilateral World Heritage Property.

4 Project goals

The overall goal of the project was to facilitate and technically support the scientific, technical and organisational process of the preparation of a possible finite European extension nomination to the trilateral World Heritage property on expert and governmental level.

To achieve this goal, several activities were carried out:

- Definition of the scope of a potential finite serial World Heritage nomination of selected European beech forests as an extension of the existing trilateral property.
- Identification of potentially suitable candidate areas and comparative analysis of these in cooperation with a large (and steadily growing) network of experts from respective European countries. The analysis evaluated the selected areas regarding their potential to fulfil the criteria set out by the World Heritage Convention (OUV, integrity, protection and management).
- Organisation of a sequence of three expert meetings on European level to include experts on old-growth beech forests from respective European countries in the identification, evaluation and selection of suitable candidate areas.
- Organisation of three meetings of Ministerial representatives (Nature & Biodiversity Directors) from concerned European countries to ensure the coordination of the process on government level.
- Conduction of further preparatory activities aiming at the development of elements for possible a nomination dossier respectively a draft statement for the OUV of a possible finite European serial World Heritage property and further elements relevant for national Tentative Lists and a joint nomination dossier.

5 Methodology

The applied methodology consisted of a stepwise procedure comprising the identification and the analysis of ancient beech forest areas¹ with potential to be included as component parts in an extension nomination.

The screening for suitable beech forests was based on the combination of bottom-up and top-down approaches. Experts from relevant countries proposed and discussed potential areas in the context of expert workshops and through bilateral cooperation (bottom-up), (see 6.3). Additionally, European beech forests were analysed regarding their relative conservation value, which was based on available geodata (top-down). The identified ancient beech forest areas were further analysed according to certain criteria representing the requirements for inscription to the World Heritage List (OUV,

¹ Here, the term 'ancient beech forest areas' includes also primeval beech forest areas.

here: criterion ix, integrity and protection and management) and, (see 6.4). The results were also presented, discussed and jointly confirmed during the expert workshops. (Fig. 1)

In parallel the process was brought to the government level to assess the interest and willingness of the concerned State Parties to join a possible extension nomination with identified candidate areas on their territories.

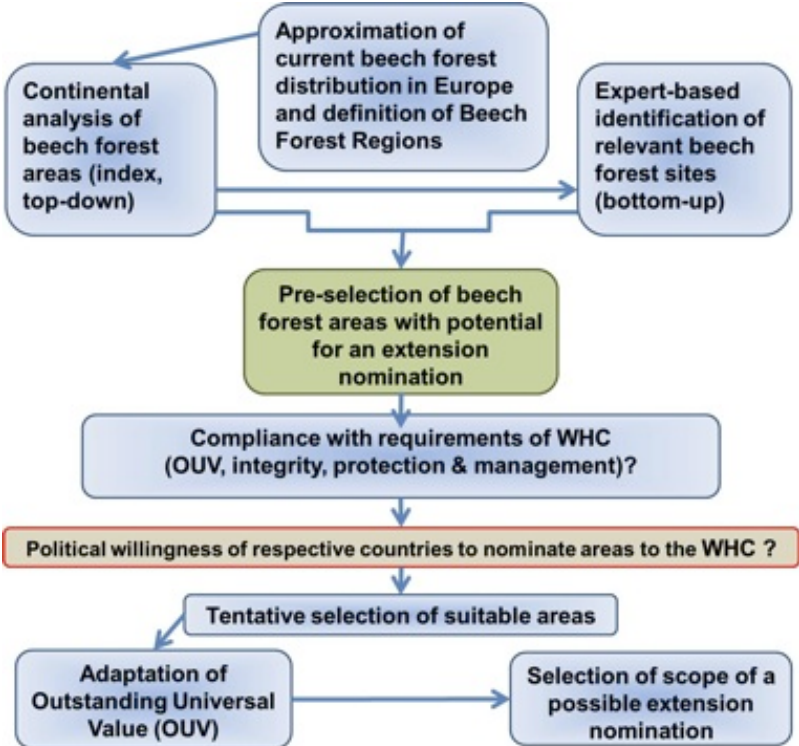


Figure 1: Methodology of the screening, evaluation and selection process

5.1 Current distribution of European beech forests

To assess the current beech forest distribution in Europe data were collected for all countries, which are currently containing beech forests according to the EU Tree Species Map² (Brus et al. 2011). Beech forests were mapped by identifying those broadleaved and mixed forests that are supposed to include a share of beech of at least 20% (according to Brus et al. 2011). The outcome was complemented by available data on beech forests of selected countries. A detailed description of the mapping methodology is provided in Appendix 9.

² Aland Islands, Albania, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Guernsey, Hungary, Ireland, Isle of Man, Italy, Jersey, Kosovo, Latvia, Lithuania, Luxembourg, Macedonia, Moldova, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine, United Kingdom of Great Britain and Northern Ireland, Vatican.

5.2 Definition of European Beech Forest Regions

The concept of dividing the European beech forest ecosystem in Beech Forest Regions (BFR) was achieved during the first expert workshop in the project (Beech Forests (4), Isle of Vilm, 2012) on the basis of the map of the Natural Vegetation of Europe, conducted by Bohn et al. (2004), the WWF Terrestrial Ecoregions (Olson et al. 2004), the species distribution of *Fagus sylvatica* (Welk 2008, Preston et al. 2003), the phytogeographical division of Europe (Jaeger et al. 2003) and several topographic maps. The aim of this approach was to regionalise the European beech forest distribution according to similar climate and soil characteristics as well as comparable ecosystem features (continental colonisation history and ecological homogeneity). The BFR concept served as structural framework for the further analysis of the identified ancient beech forest areas.

5.3 Identification of ancient beech forest areas and data collection

Based on the information matrix for potential beech forest sites, which was developed during a workshop on the Isle of Vilm in 2011, an information form was used to collect basic data on identified ancient beech forest areas in cooperation with the network of European experts. The information forms were sent to experts in the respective countries together with individual requests for geodata (Appendices 10 and 11).

In the framework of the three expert workshops organised within the project (Beech Forests, 4-6) the proposed sites were presented and discussed according to the requirements for the nomination to the World Heritage List. The expert workshop were held at different stages of the screening process and served as steps of selection of the most promising beech forest areas to be considered in the further extension nomination process. Additional activities contributed to the identification and evaluation of suitable sites: More detailed information was obtained through expert assessments, literature review (if available), and complementary desk studies and field research conducted by students.

Personal field observations from members of the project team in various BFRs were also taken into account – from regions where the respective team members are based: Alpic: Kirchmeir; Baltic: Ibisch, Knapp; and Atlantic: Hobson; and from several field trips: Albania: Hobson, Ibisch, Knapp (2009, 2013); Austria: Knapp (2013); Greece: Knapp (2014); Italy: Knapp, Waldherr (2012, 2014); Macedonia: Knapp (2013); Spain: Knapp (2014); Sweden: Knapp (2012); Slovakia and Ukraine: Hobson, Ibisch, Kirchmeir, Knapp (since 2003).

All in all more than 87 European beech forest experts contributed to the screening process by providing data and information and/or participating in the review process (Appendix 12).

5.4 Analysis of identified ancient beech forest areas

The identified ancient beech forest areas were comparatively analysed according to the requirements for the inscription to the World Heritage List. The key element for the inscription is the OUV, which is composed of three elements:

- Meeting the criteria (here: criterion ix³), additional value to the serial property
- Integrity (intactness, naturalness)
- Adequate protection and management

As the present World Heritage property is inscribed under criterion ix all possible additional components have to meet this criterion and further contribute an additional value to the OUV of the entire World Heritage property. Possible attributes, which could serve as additional values, were defined to justify the suggestion of candidate areas.

The integrity of the identified ancient beech forest areas was assessed according to the size of the proposed areas, their average stand age and the time without (forestry) use. The areas were then rated according to certain thresholds for the mentioned criteria.

A minimum average stand age of 150 years and the time out of forestry use longer than 99 years were rated with 1 point each. The thresholds for area size were adapted to the general situation of beech forests in the different BFRs. In BFRs, where only small old-growth beech forest areas remained (Pyrenaic-Iberian, Central Mediterranean, Illyric and Atlantic) a threshold of 99 ha was applied and for the other BFRs a threshold of 999 ha was used to rate the areas with 1 point. Areas, which did not fulfil the minimum area size requirement, could still be rated with 1 point, when the proposal included a very large buffer area size. A maximum of 3 points could be reached per beech forest area. However, as the necessary data and information for evaluation could not be obtained for all beech forest areas, the rating was not used as criteria for exclusion of areas but rather for identification and prioritisation of areas with high integrity values.

The prerequisite of adequate protection and management for the proposed areas is represented by the protection status according to IUCN category I/II (or equivalent) to guarantee a non-intervention regime as it is the case within the inscribed property.

Furthermore, the beech forest areas were assessed regarding their additional value, which they could potentially add to the serial property. Several elements for additional values were defined:

- The principal element of the OUV with regards to criterion ix is the representation of the on-going ecological process of the post-glacial beech forest expansion in Europe. In this context the additional value is given for

³ "... outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals" (WHC, 2013)

glacial refuge areas or areas, which represent stages of the post-glacial re-colonisation process.

- As this process has its origin in different refuge areas the representation of the genetic diversity of *Fagus sylvatica* – e.g. the intraspecific diversity and phylogenetic relations, which are indicated by isozyme groups according to Magri et al. (2006) – is also qualifying as additional value for possible candidate areas.
- Additional value can also be found concerning the spectrum of climatic adaptation of *Fagus sylvatica*, which is represented by beech forest areas in extreme climate regions or such areas, which occur along large altitudinal gradients.
- The inclusion of beech forests located at the geographical extremes of the European beech forest distribution is also considered an additional value, because these represent the entire spectrum of the ecosystems' occurrence in Europe.
- Furthermore, areas, which comprise a special diversity of site conditions and geo-morphological characteristics of beech forest communities (e.g. regarding bedrock material, soil conditions, outstanding landscape features) can bring an additional value to the serial World Heritage Property.
- Finally, superlatives of beech forests (e.g. oldest beech trees, largest areas, broadest altitudinal gradient, highest species diversity...) are also representing an additional value. However, this can only be used as an add-on.

For the assessment of the relative conservation value⁴ of the identified beech forest patches proxy indicators were combined as sub-indices to one overall index, based on the method presented by Freudenberger et al. (2012). Furthermore the InSensa-GIS software was applied to calculate the index and to conduct a statistical assessment of the results (Biber et al. 2011).

The parameters were organized in three sub-indices:

- Vegetation parameters (vegetation height and density) were used to assess the structural quality of the forest.
- The anthropogenic pressure was determined through the Human Footprint Index (e.g. roads, railroads and urban areas) and the population density to reflect the intensity of direct or indirect impact on beech forests.
- The connectivity of the beech forest patches was described by the ratio of patch area size and the (net) area of the surrounding Thiessen polygon, which represents the space that is closer to the forest patch in question than to any other patch. Additionally, an approximation of the size of the 'low-edge effect' forest patches, which do not suffer from direct matrix-related edge effects, was achieved by creating 100 m buffers within in the patches and calculating

⁴ The relative conservation value helps to describe the integrity of respective beech forests on the basis of the ecosystem functionality, which includes the vegetation height and density, the connectivity of an identified beech forest to the neighbouring beech forest (distance) and finally the degree of accessibility of a beech forest regarding human impact.

the area of the resulting polygon (if any remained). Through this approach the functionality and integrity of the beech forest patches could be assessed.

For the protection gap analysis the data from the World Database on Protected Areas (IUCN/UNEP 2013) were used to compare the coverage of the mapped beech forests to the different protected areas categories. All data were converted (re-projected) to the Geographic Coordinate System GCS_ETRS_1989, Projection: Lambert_Azimuthal_Equal_Area (LAEA), Datum: D_ETRS_1989. The detailed description of the sources and data processing are included in Appendix 13.

6 Project course and work flow

6.1 Project organisation

The project team consisted of a consortium, which included:

- The contracting entity (CEEM, HNEE):
 - Project lead: Prof. Dr. Pierre Ibisch (co-director CEEM)
 - Project coordination: M.Sc. Marcus Waldherr; replaced by Lena Strixner and Daniela Aschenbrenner during parental leave (07/08 2014)
 - GIS expert team: Prof. Dr. Jan-Peter Mund, M.Sc. Julia Sauermann, B.Sc. Monika Hoffmann
- The sub-contracting entity E.C.O. Institute for Ecology, Klagenfurt, Austria, represented by Dr. Hanns Kirchmeir.
- The scientific backstopping team, which included:
 - Prof. Dr. Ivan Vološcuk (Matej Bel University, Faculty of Nature Sciences, Institute of Landscape and Regional Research, Slovakia)
 - Manfred Grossmann (Director National park Hainich, Germany)
 - Prof. Dr. Fedir Hamor (Director Carpathian Biosphere Reserve, Ukraine)
 - Dr. Peter Hobson (co-director CEEM; Writtle College, United Kingdom)
- The project advisory group (PAG), represented by the project commissioning and financing entities:
 - Barbara Engels (BfN, contracting entity)
 - Nicola Breier (BMUB)
 - Prof. Dr. Hannes Knapp (BfN)

6.2 Project procedure

The project built on two international meetings on beech forests as a joint natural heritage of Europe, which had been held on the Isle of Vilm in 2010 and 2011 (Knapp & Fichtner 2011, Fichtner et al. 2011), before the project began.

The project started shortly before the third **international expert workshop** took place in **Soriano nel Cimino and Villavallelonga, Italy in June 2012**. In the framework of this workshop the project and its foreseen methodology and roadmap

(Figure 2) were presented to the network of beech forest experts, who were already involved in the process.

Time frame		Identification of potentially suitable areas	3 Workshops On expert level	3 Meetings on Nature & Biodiversity directors level
2012	May to September	Collection of data and information		
	October		I	
2013	2. Quarter	Data analysis, specific expert reports		
	September		II	
	November	Shortlist and description of candidate sites		I
2014	1. Quarter		III	II
	3. Quarter			III

Figure 2: Project procedure

From this point of time onwards the identification of suitable ancient beech forest areas and the collection of relevant data and information were coordinated by the project (in close cooperation with BfN). Together with the workshop documentation (see Appendix 1) an information form was sent to the participating experts with the request to provide the respective data and information on identified ancient beech forest areas to the project team. Additionally, further experts, who were not yet involved in the process, were addressed to include further regional expertise. For this purpose a project information document was developed and sent to respective experts to inform about the project and the foreseen roadmap of the process (see Appendix 2).

The first **expert workshop** organised by the project took place on the **Isle of Vilm in October 2012** (see Appendix 3). During this workshop the group of participating experts jointly agreed on the proposed methodology for the screening process. Furthermore the presentation of further proposals by experts from concerned countries was continued, existing information gaps could be partly closed and a first selection round of areas that should be included in the analysis was realised. Moreover, the European Beech Forest Regions (BFR) were defined and a first draft of the statement of OUV of a possible finite European nomination was discussed.

Following to this workshop an up-dated list of proposed ancient beech forest areas was sent to the network of beech forest experts together with the request for still missing data and information.

The next step of the identification process included further desk studies and intensive communication with involved experts to identify further ancient beech forest areas and to close information gaps.

In this context **synergies with further research activities** (HNEE/DAAD, HNEE/GOPA)⁵ benefited the project. Junior researchers from Albania, Kosovo and Montenegro, who accomplished internships at the CEEM/HNEE were involved in the desk studies and contributed with regional expertise to the collection of information on ancient beech forests in these countries. Another activity in the context of investigating the situation of beech forests in Albania included a group of students from the HNEE, who conducted field research at candidate sites for several months.

Additionally, several **expert assessments** on those BFRs where the largest information gaps existed (Atlantic, Illyric, Moesian-Balcanic and Polonic-Podolic-Moldovan) were sub-contracted to experts from the scientific backstopping team. Complementary to these activities, personal observations made by members of the scientific backstopping team during site visits completed the state of knowledge on identified beech forest areas.

The interim results of the screening process and the criteria for the analysis of identified ancient beech forests were presented to the group of experts and jointly revised and agreed upon during the second **expert workshop** (Appendix 4), which took place in **Rakhiv, Ukraine, in September 2013**. The main achievement of this workshop was a preliminary list ("*Rakhiv Short List*") of candidate areas to be included in an extension nomination. Moreover the draft statement of the OUV of a possible finite nomination was further developed, several information gaps were closed and draft descriptions for additional values of preselected candidate areas were defined. However, several information gaps still existed and corresponding requests for additional data and information were sent to the expert network following to the workshop.

The process was brought to government level in the framework of the **first meeting of Nature and Biodiversity directors in Bonn, in November 2013**. Representatives of the participating State Parties were highly interested in participating in the process, and in the case of Austria and Poland the participation in a possible extension nomination was confirmed (see Appendix 5).

The **third and final workshop on expert level** took place in **April 2014 in Vienna**. Within this workshop the participating experts jointly revised the "*Rakhiv Short List*" and a final list of candidate areas ("*Vienna Short List*") to be considered for the extension nomination process was agreed (see Appendix 6). This selection is a proposal on expert level, which was presented to the representatives of the

⁵ In the context of another project conducted by the CEEM/HNEE (funded by the German Academic Exchange Service, DAAD) with three universities in Montenegro, Albania and Kosovo three interns from the respective countries had the chance to be included in the project. Furthermore a group of five students from HNEE conducted field research in Albanian beech forests in the framework of their internships with GOPA Consulting Group.

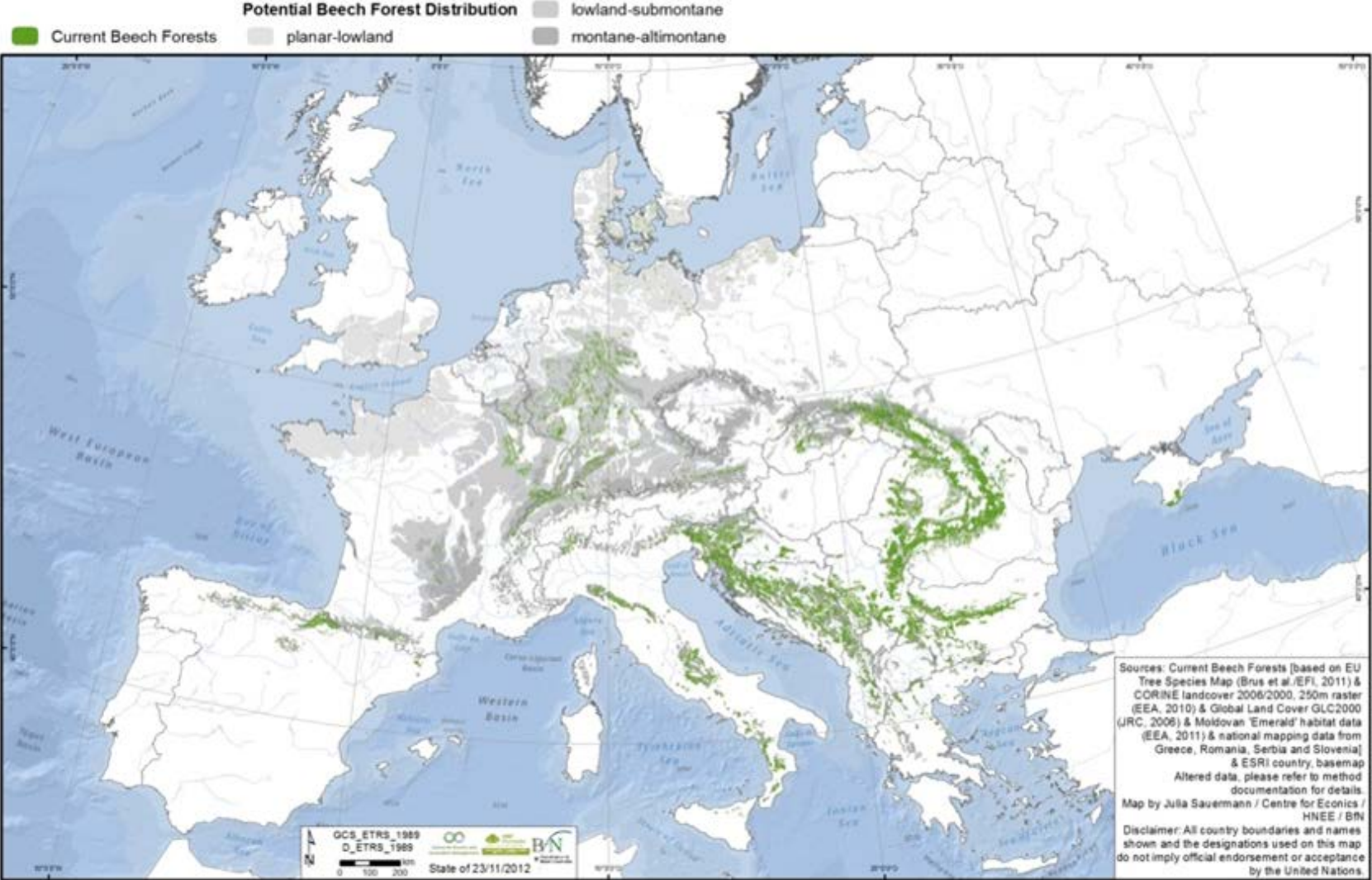
respective Ministries of concerned State Parties in the framework of the **second and third meeting of Nature and Biodiversity directors in May 2014 and in October 2014 in Bonn** (see Appendices 7 and 8). After the final meeting the representatives of 14 State Parties had confirmed their high interest in participating in the further extension nomination process and agreed on the foreseen roadmap and Austria.

7 Results

7.1 Current distribution of European beech forests

The first result of the study comprises an up-dated map of the current beech forest distribution in Europe (Fig 2). This map revealed the potential scope of a finite European nomination. The remaining beech forests in Europe cover an area of slightly more than 217.000 km², which is less than one third of the potential beech forest cover of approximately 907.000 km² according to Bohn et al. (2003).

Figure 3: Current and potential beech forest distribution in Europe



7.2 European Beech Forest Regions

The group of experts agreed on the final definition of 12 European Beech Forest Regions (BFR) during the first expert workshop in the project, which was the second principal outcome of the project and a prerequisite for the further analysis.

The beech forest distribution on the northern range of the Iberian Peninsula – mainly in the Pyrenees, and a few isolated beech forest islands on the Iberian plateau represent the **Pyrenaic-Iberian BFR**. The beech forests in this region are characterised by extreme climatic conditions (low precipitation rates, high temperatures). With regards to the history of post-glacial expansion the beech forest in the Pyrenaic-Iberian BFR originated on the one hand from glacial refuge areas in the Pyrenees and on the other hand via the continental colonisation route from the East. These beech forest communities comprise the South-westernmost limit of beech forest occurrence in Europe and are considered important reference areas in the context of climate change and increasing aridity. (Schwendtner 2012)

The **Central Mediterranean BFR** is mainly presented in Italy, including a small area in South-eastern France. It includes the southernmost beech forest occurrence of the European beech forest distribution range – in Sicily and contains glacial refuge areas that were the origin of the beech forest expansion on the Italian peninsula. Moreover the relict beech forests, which are located further in the North of this region, were involved in the beech forest colonisation of Central Europe.

The **Illyric BFR** covers Slovenia, Croatia and Bosnia-Herzegovina. It includes the most important starting point for the beech forest colonisation of Central Europe from key relict beech forest areas (Willner et al. 2009, Magri et al. 2006).

The **Moesian-Balcanic BFR** comprises a great diversity of beech forest communities. It covers the countries Montenegro, Albania, Kosovo, southern Serbia, Macedonia and Bulgaria. The eastern beech forests are considered a transition zone to the Euxinic BFR and include an intermediate form between *Fagus sylvatica* and *Fagus orientalis*, which has been described as *Fagus moesiaca*. (Panek, 2012)

The **Sub-Atlantic-Hercynic BFR** represents the core area of beech distribution in Western Europe dominated by lowland plains and smaller mountain ranges. Due to rather favourable environmental conditions and relatively rich soils, in the course of history, most forests have been replaced by agro-ecosystems. The region with a relatively dense human population shows beech forest remnants mostly refined to mountain regions. The area was important for the spread of beech forests by presenting important corridors and stepping-stones towards the Atlantic and the Baltic regions.

The **Alpic BFR** is presented in most parts of Austria, Switzerland and Northern Italy. With respect to the history of post-glacial beech forest distribution it represents a main gateway for the colonisation of Central Europe and eastern and western Alps. It was probably the starting point of the colonisation of the Carpathians together with glacial relict areas in the Illyric BFR. This BFR includes the last remnants of old-growth mountain beech forests in Europe (Knapp 2012).

The **Pannonic** Plain was also defined as a BFR in its own right despite the fact that most of the region would be naturally beech-free representing beech forests just at island-like sites with special environmental conditions.

The **Carpathian BFR** includes the largest, well-connected and intact beech forest ecosystems in Europe. Romania contains the majority of this BFR, followed by Slovakia, Ukraine and Poland. The colonisation of the Carpathians by beech forests after the last glacial period originated most likely from Northwest (originating in the Illyric BFR) and from smaller refuge areas in the southern part of the region (Magri et al. 2006).

The **Atlantic BFR** is characterised by a temperate climate with mild winters and high precipitation throughout the year. The major parts of this region are presented in France and the United Kingdom, and with a smaller share in Belgium and the Netherlands and western Denmark (Hermý 2011). Here, the North-westernmost limit of beech forest distribution is found in the South of the United Kingdom (UK). In the context of climate change impacts this BFR is a very important reference area as a northwards range shift of beech forests is expected, as warmer and drier summers are predicted for the South of UK (Norris et al. 2011).

The **Baltic BFR** is presented in North-eastern Germany, southern Sweden, eastern Denmark and in northern Poland. It includes “younger“ beech forests at the northern distribution limit and is important in the context of a northward extension of the beech forest distribution under changing climate conditions. *Fagus sylvatica* reached Denmark about 2,500 years BC (Heilmann-Clausen 2011) and started to form forest communities in southern Sweden about 1,500 years BC (Brunet & Fritz 2011).

The **Polonic-Podolic-Moldovan BFR** represents the eastern distribution limit of *Fagus sylvatica* and is ranging from northern Moldova along the eastern edges of the Carpathian mountain range through Ukraine and southern Poland. The region is characterised by a continental climate. The expansion of beech forests towards further East is limited by colder climate conditions including late frost events.

The **Euxinic BFR** is situated at the eastern edge of the distribution areal of *Fagus*. Crimea peninsula is characterised by the occurrence of a somewhat distinct form of beech, which originally had been suggested as a proper species *Fagus taurica*. In other parts of the region (Panek 2012), *Fagus orientalis* is recorded, which recently

proved to be genetically very close to *Fagus sylvatica* and possibly does not represent a distinct species. Definitely, the Euxinic BFR stretches out into Asia, and represents areas where beech occurred for a long time, being less disturbed by consequences of the Ice age cooling.



Figure 4: Current beech forest distribution in Europe and Beech Forest Regions

7.3 Identification and analysis of ancient beech forest areas

The screening process, which was on-going throughout the project lifetime resulted in a final selection of 100 identified ancient beech forest areas, which are distributed in 22 countries across all 12 BFRs (Initially a larger number of beech forests were proposed, but very small areas (< 20 ha) were not considered for the further evaluation.

The further analysis of the relative conservation value of the identified ancient beech forest areas revealed that current beech forests and also high-conservation value beech forests (with relatively dense and high vegetation, low anthropogenic pressures, and large, well-connected patches) are especially concentrated in four BFRs: Carpathian, Moesian-Balcanic, Sub-Atlantinc-Hercynic and Illyric – which accounts for 83% of the European beech forest distribution. The Carpathian BFR includes 32% of the European beech forest distribution. The total area of remnant beech forests in the Sub-Atlantinc-Hercynic region is also considerably large, but the forest patches are comparatively small and not well connected. The beech forests in the Atlantic and the Baltic BFRs are poorly developed (see Figure 5).

In addition to the spatial analysis the results of regional expert assessments findings from complementary research activities were taken into consideration for the analysis of the identified ancient beech forest areas. The corresponding reports are included in Appendices 20 and 21.

A stepwise selection process led to a final list “Vienna Short List” of 46 candidate areas, distributed across 12 BFR and 20 countries, which represent an expert suggestion for the scope of an extension nomination to the existing World Heritage property.

Appendix 14 provides the matrix of identified ancient beech forest areas including the evaluation per BFR and the Vienna Short List.

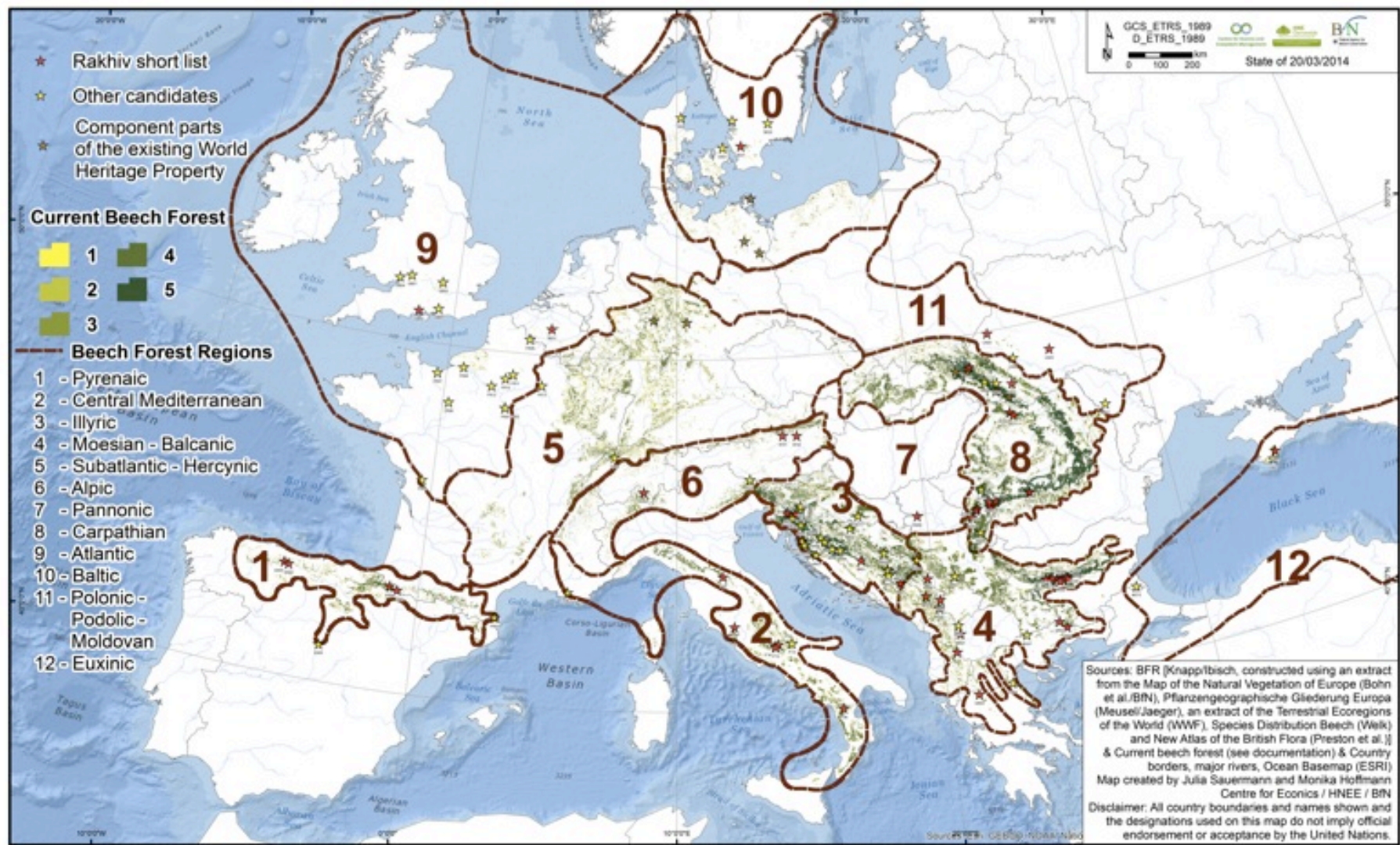


Figure 5: Current beech forest distribution (relative conservation value index), BFRs and identified ancient beech forest areas

7.4 Feedback from government level

The stages of the process on the level of Nature and Biodiversity directors (including the final statements of confirmation of participating in the further extension process) and information about the responsible contact persons for the further process in the respective countries is provided in Appendix 15.

In the 3rd meeting on 29th October in Bonn, representatives from Albania, Belgium, Croatia, Italy, Romania, Slovenia and Spain confirmed that they would participate in the further extension nomination process. Austria has already confirmed to participate and to lead the nomination process during the previous meeting in May 2014. Representatives from Macedonia, Montenegro and Poland already have confirmed their participation in the previous meetings. Furthermore, high interest in participating in the extension nomination was expressed by representatives from Bosnia and Herzegovina (May 2014, Bonn) and Greece (during further communication). The willingness to participate in the process was also confirmed by representatives from Kosovo – however, the technical requirements with regards to the ratification of the World Heritage Convention have to be achieved before. The final decision about the participation of Bulgaria will be taken next year. The interest in participating in the extension nomination was stated by representatives from Switzerland (May 2014, Bonn) but necessary procedures on national level will not allow meeting the agreed roadmap.

There was no further feedback from Serbia (although the interest in participation was expressed during the meeting in November 2013 in Bonn), Sweden and United Kingdom.

The representatives of the State Parties who comprise the existing trilateral World Heritage Property agreed to the foreseen nomination process – it was stated that Ukraine will also nominate a number of candidate areas.

The next steps in the further process foresee the joint submission of national Tentative Lists (until the end of January 2015) by the participating State Parties. The Austrian Federal Ministry for Agriculture, Forestry, Environment and Water Management will commission the coordination of the preparation of the national Tentative Lists and the elaboration of the nomination dossier to the Environment Agency Austria and ECO.

7.5 Technical elements for the nomination process

Further results of the project comprise technical elements, which will support the nomination process. This includes a draft statement for the OUV of a finite European nomination, which is necessary to fill in the Tentative Lists and the nomination dossier (7.5.1). Moreover a template of the Tentative List with common text paragraphs to be used by all participating State Parties was agreed (7.5.2). Finally, candidate area fact sheets are included. These provide area specific information that

is necessary for the completion of the national Tentative Lists and respective chapters of the nomination dossier (7.5.3).

7.5.1 Draft Statement OUV

The present statement of the OUV of the trilateral World Heritage Property of beech forests was revised and further developed during the project. While the principle element of the OUV regarding criterion ix remained unchanged, several proposed additions were agreed on, which reflect the high diversity, the adaptive capacity and the complete representation of the post-glacial expansion process of the entire European beech forest ecosystem. Additions included the recognition of mixed beech forests, the inclusion of glacial refuge areas as well as ancient beech forests in regions, which were “recently” colonised.

The final version of the draft statement of the OUV is included in Appendix 16. As it is a working document and will be further developed in the nomination process it is additionally provided in Word-format.

7.5.2 Tentative List – common text parts

The next step of the foreseen process includes the joint submission of the national Tentative Lists to the World Heritage Commission by the participating State Parties. As it is a serial extension nomination, several paragraphs, which are addressing the entire World Heritage property, have to be identical in each national Tentative List.

The final version of the common text paragraphs that all State Parties who will participate in the foreseen nomination process have to include in their national Tentative List is provided in Appendix 17.

7.5.3 Candidate area fact sheets

For each of the selected candidate areas a fact sheet was compiled, which includes information about the areas that is necessary to fill in the national Tentative List and further serves as a basis for the nomination dossier. The information is structured according to the requirements of the Operational Guidelines for compiling the Tentative List and the nomination dossier.

The availability of resources, data and information revealed a high heterogeneity, with the result that the candidate area fact sheets in some cases do not contain all the information needed for completing the nomination dossier. For instance the availability of geodata reflecting the final zonation (nominated area and buffer) was not given in some cases. Zonation still has to be discussed and finally decided upon (and produced) in the further process for several candidate areas. The fact sheets are included in Appendix 18.

8 Recommendations for the further process

In the context of the continuation of the on-going extension nomination process (under the lead of Austria), the following recommendations are made:

- It is recommended to start as soon as possible to communicate with designated country experts regarding the collection of further information on the candidate areas – especially in those countries, where the data and information gaps could not be entirely closed. In many cases further literature is available in national languages, which should be included in the preparation of the nomination dossier.
- It has to be taken into account that the technical capacity for achieving the zonation in the form of corresponding geodata might not be sufficient in some countries – in this case technical assistance has to be provided.

Apart from the further process towards an extension nomination it is recommended to conduct a study of the management system of the present World Heritage Property with regards to expected challenges resulting from the planned extension. A finite European World Heritage Property could potentially include up to 15 countries and a maximum of 60 components, which would imply a further development of the present management system.

In addition to the achievement of a finite European World Heritage nomination of the best remaining beech forests in Europe the objective of implementing a European Beech Forest Network should be pursued by all means. The collection of identified ancient beech forest areas is considered very valuable and none of these areas should be lost. Although the majority of these beech forests do not meet the criteria of a World Heritage, their conservation could be significantly strengthened by the implementation of a European Beech Forest Network. In an ecological sense these areas are also representing important refuge islands and stepping stones for many European species.

It has been recognised throughout the entire process that a selection of the most suitable candidate areas for an extension nomination will include the “best” of the remaining ancient beech forests, which are able to fulfil the requirements for inscription to the World Heritage List. The majority of the identified beech forests cannot be part of this serial nomination.

However, it was agreed that in addition to the goal of achieving a finite European nomination of the best remaining examples of beech forests, a European beech forest network should be established. Such a network would comprise a large number of protected areas mainly dedicated to (old-growth) beech forest conservation. It would be more than a network of experts, but could represent a framework for communication and cooperation with regards to the exchange of scientists, practitioners, exchange of best practise examples, knowledge and experience, and for the implementation of joint activities. It would be a network that

could come up with a continental strategy for the conservation of old beech forests, guiding action of protected areas as well as silviculture and sustainable forestry.

On the basis of the Matrix of identified ancient beech forest areas (and such beech forests, which were not included in the evaluation) a corresponding list of suitable protected areas in Europe is provided in Appendix 19.

9 References

The scientific articles, further sources and data used (and produced) are also included in pdf-format in the complementary material (CD-ROM).

The results of the project regarding the distribution of beech forests in Europe the definition of Beech Forest Regions and the assessment of the conservation value are foreseen to be published in a scientific article. Before submission the corresponding draft will be provided to BfN for consultation.

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