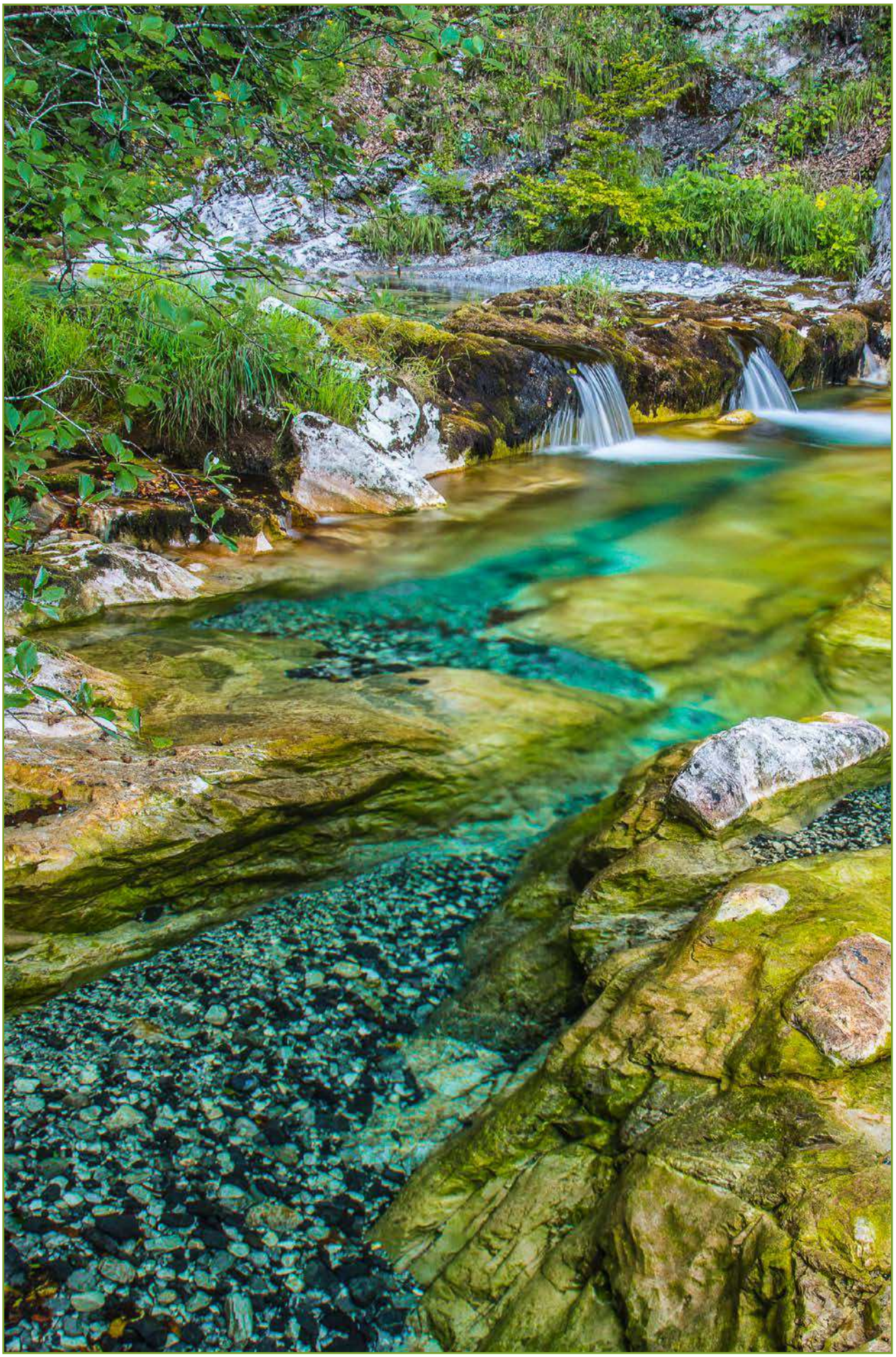
European Wilderness Quality Standard and Audit System

EUROPEAN WILDERNESS SOCIETY

Let's get Wild!

2016



European Wilderness Quality Standard and Audit System

This European Wilderness Quality Standard and Audit System in the scientific context of current Wilderness research chapter was written by Michael Huber & Michael Jungmeier (E.C.O. Institute of Ecology/University of Klagenfurt) February 2016.

Introduction

Wilderness is a vital part of Europe's natural heritage. This is underpinned by an ongoing trend towards the designation of Wilderness in Europe (e.g. the UNESCO World Heritage Site Primeval Beech Forests of the Carpathians and the Ancient Beech Forests of Germany (since 2011) or recent initiatives to promote Wilderness (e.g. Wild Europe Initiative, European Wilderness Society, PANParks etc., Martin et al. 2008).

The trend towards Wilderness conservation and promotion raises certain questions about what the term Wilderness actually means in a European context. In Central European countries, no legislation comparable to the US Wilderness Act exists, which clearly defines Wilderness as of a minimum area size, and designates places exclusively as such (Lupp et al. 2011). Although the term Wilderness has long existed in various European languages, it is a rather new concept as a concept for nature conservation in Central Europe (Hintermann et al., 1995; Zunino, 2007). The German term Wildnis (Wilderness) also has an associated meaning as something looking messy and untidy giving Wilderness a rather negative meaning (Lupp et al. 2011). As no clear definition for this term seems to exist, misunderstandings may occur (Lupp et al. 2011). Murray (1968) even assumes that "Wilderness is what men think it is".

According to the US Wilderness Act (1964) Wilderness, are "areas where the Earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain" (US Wilderness Act, 1964). It reflects a holistic approach, as well as preserving the capacity of the landscape to experience what the country was like when the first European settlers arrived (Lupp et al. 2011). The current definition for IUCN Category Ib (Wilderness Areas), defines Wilderness as "usually large unmodified or slightly modified areas, retaining their natural character and influence, without permanent or significant human habitation, which are protected and managed so as to preserve their natural condition." (Dudley 2008). This definition of IUCN is strongly relying on the definition of the US Wilderness Act (Vicenzotti 2010).

However, after thousands of years of shaping European landscapes, this primeval imagination of Wilderness is hardly achievable. It soon became apparent, that an individual definition of Wilderness as a conservation concept in Europe was required to reflect the current natural and spatial conditions and the cultural context. Numerous authors acknowledge the difficulties in finding an appropriate definition as next to a conservation concept and a historic concept, Wilderness is above all a cultural concept. Trommer (1997) calls the European Wilderness mainly a cultural phenomenon being a contrast to civilization.

One man's Wilderness is another's roadside picnic ground (Nash, 1982, P.1).

Lupp et al. (2011) observed that the Wilderness discussion in Central Europe lacks a common physical and spatial definition and that this is also an indication for strong ethical and religious, educational and cultural motifs in the demand for Wilderness. Thus, they conclude that Wilderness more is a state of mind (Nash, 2001) or a mental construct (Vincenzotti and Trepl, 2009) (Lupp et al. 2011).

The European Wilderness Quality Standard and Audit System definition

As a reaction to the lack of a common European definition of Wilderness, the Wilderness Working Group of the Wild Europe Initiative developed and generated the definition of European Wilderness and Wild Areas (Wild Europe Initiative 2013), which builds on the definition of the existing IUCN Category IB. According to the definition, Wilderness and wild areas are therefor defined as follows:

Wilderness

"Wilderness zones meeting the European Wilderness Quality Standard and Audit System "Gold- or Platinum Wilderness Category" are governed by open ended undefined natural processes. They are composed of native habitats and species, and large enough for the effective ecological functioning of natural processes. They are unmodified or only slightly modified and without intrusive or extractive human activity, settlements, infrastructure or visual disturbance."

Wild area

"Wilderness zones meeting the European Wilderness Quality Standard and Audit System "Bronze- or Silver Categories" are wild areas that have a high level of predominance of natural process and natural habitat. They tend to be individually smaller and more fragmented than the "Gold- or Platinum Category" wilderness areas, although they often cover extensive tracts. The condition of their natural habitat, processes and relevant species is however often partially or substantially modified by past human activities such as livestock herding, hunting, fishing, and collecting berries and mushrooms."

The definition of Wilderness by the Wild Europe Initiative is used for the European Guidelines on Management of Wilderness and Wild Areas in the Natura 2000 Network (European Commision, Kun European Wilderness Society 2013) and in the European Commission Wilderness Register.

The understanding of Wilderness as a basis for the European Wilderness Quality Standard and Audit System is rather close to the definition as provided by the US Wilderness Act (1964). It shares the same understanding of Wilderness, but accepts a certain extent of modification. The introduction of so called wild areas can be considered as a concession to a European context. However, the definition does not address the issue of Wilderness as a state of mind (Nash 1982, Nash 2001) or as a cultural concept (Stremlow & Sidler, 2002, Trommer 1997; Vicenzotti & Trepl 2009).

Hoheisel et al. (2010) claims that Wilderness is not a feature that can be described in natural scientific terms only, but needs a more sociocultural approach. As not only the European Wilderness Initiative and the European Wilderness Society, but also the European Commission adopted this definition in their guideline, this could be as well a first step towards a shared set of common features of Wilderness and thus building a foundation for a common European understanding of Wilderness.

According to the definition, the European Wilderness Quality Standard and Audit System is based on the following key issues describing Wilderness:

- **Governed by natural processes:** This is considered a basic principle and is in line with the understanding of Wilderness as proposed by IUCN Cat Ia or Ib, to a certain extent even with IUCN Cat II. Nationalparks which have the priority objective to allow for dynamic processes on a large scale (Dudley 2008). It is also congruent with the US American definition of Wilderness.

- **The presence of native habitats and species.** This explicitly includes species and habitats that are native to a certain place, which excludes (heavily) degraded habitats and neobiota species.

- **Sufficient size to ensure the effective functioning of natural processes:** This acknowledges that a certain size is needed to allow for undisturbed and dynamic natural processes. However, minimum sizes are hard to define and depend on the type of habitats.

- **Unmodified or slightly modified area:** This focuses on areas, which have been mostly exempt from human modification in the past. This also means that heavily modified areas cannot be considered Wilderness at least on a medium perspective. However, a definition of slightly modified is yet to be provided.

- **Exempt from intrusive or extractive human activity or impact**: This clearly defines Wilderness as areas, where no current human activity or impact occurs irrespectively of the time since it has been exempt from any use.

- **Visual disturbance:** This relates to a specific impact of humans by means of a built environment and infrastructures which disturb the unspoilt character of a Wilderness. However, this closely relates to the recreational aspect of Wilderness, as it might be people who consider a disturbance a disturbance.

This definition is the basis for the European Wilderness Quality Standard and Audit System, its principles, criteria and indicators, which are supposed to further specify the above mentioned aspects of Wilderness. Additional thresholds and further specification of definitions is part of the ongoing development of the European Wilderness Quality Standard and Audit System.

Similarly, as discussed in Aplet et al. (2000), there is a differentiation between Wilderness, which has a strict and narrow definition, and so called wild areas (or wild lands in Aplet et al. 2000), which can be found in any landscape at any scale and have an intermediary character when referring to the Wilderness Continuum as proposed by Lesslie & Taylor (1985). Consequently, Wilderness or wild areas can be found at the more natural and least developed end of an environmental modification spectrum. Thus, by including the definition of wild areas it is being acknowledged that there is not a fixed threshold which defines Wilderness, but a continuum which changes over time. This is also acknowledged by Ceasu et al. (2015), who consider rewilding of abandoned farmland in order to create room for increased Wilderness experiences and a more extensive and self-regulating ecosystem as a viable option within the Wilderness discussion.

The European Wilderness Quality Standard and Audit System makes the claim to locate the current status on the Wilderness Continuum by assessing a number of criteria and indicators. However, Orsi et al. (2013) point out the problem to locate the point, along the continuum, beyond which there is Wilderness as this decision is affected by individual perceptions. Comber et al. (2010) even assume that the majority of wildness studies still seem largely arbitrary, leading to results that reflect the viewpoint of a group of scientists and stakeholders (e.g. managers, NGOs). Some authors even argue that past landscape modifications by human populations and pervasive human impacts across scales make the idea of Wilderness particularly in Europe inconsequential (Heckenberger et al. 2003).

This makes clear that the European Wilderness Quality Standard and Audit System operates in a rather dynamic new area, which demands absolute transparency and well defined criteria and thresholds, even more as there is most fundamental discussion going on and criteria and thresholds are not yet agreed on by the research community. The work of the European Wilderness Society thus constantly works on developing, defining and refining thresholds to test them in practice.

Definition of natural processes

All definitions of Wilderness somehow relate to so called natural processes. Thus, in order to assess Wilderness, an appropriate definition of which processes are included is required. A comprehensive overview and definition has been prepared by Wild Europe (2012). This is particularly interesting as it allows for a more comprehensive understanding of the definition used by the European Wilderness Quality Standard and Audit System. According to Wild Europe (2012) natural processes comprise:

Abiotic factors (Wind, water, fire, avalanches, geology and climate)
Biotic factors are comprised of

- Wildlife (Trophic levels, population dynamics, migration, prey-predator relationships etc.).
- Habitats and flora (Natural succession, ecotone functioning, habitat mosaics, reproduction and population dynamics etc.).
- Natural cycles (Sequestration and storage, availability of biomass, nitrogen etc.).

Furthermore, scale plays a prominent role as it is necessary to allow the full range of processes with a special focus on space for abiotic processes and on metapopulations. Further key principles of Wild Europe (2012) for the functioning of natural processes refer to self-sustained processes, which are free from external influences and show the highest species variability and broadest age structure.

Assessment of Wilderness – current approaches

Lupp et al. (2011) carried out a comprehensive analysis of the current state of Wilderness research and concluded that, even quite theoretical work has been carried out so far in a European context, but that concrete, empirical research is still lacking. Theoretical research has not yet been fully tested the ground, makes it rather challenging to elaborate a system to assess the quality of a Wilderness, but also makes the European Wilderness Quality Standard and Audit System one of the few efforts to standardize and put theoretical work in practice.

Even though, the conservation of Wilderness is an objective target that is socially desired and a main task of protected areas (Machado 2004; Mittermeier et al. 2003), there is no generally applicable method for recording and assessing this value (Mayrhofer et al. 2015).

The following section provides a brief overview about the various efforts to structure, conceptualize and assess Wilderness with a specific focus on a European context:

The dimensions of Wilderness

Ceausu et al. (2015) provide a comprehensive overview of current approaches. They consider Wilderness a multidimensional concept that has developed from an aesthetic idea towards a science- based approach. According to them, a Wilderness assessment should at least capture a subjective, human experience as well as an ecological dimension of minimally impacted ecosystems. Some of the main currently used conservation approaches regarding Wilderness consider Wilderness from a rather strict point of view focusing on the degree of human presence, biophysical aspects of natural processes, ecological communities and ecosystems that develop in the absence of human management (Brooks et al. 2006, Kalamandeen and Gillson 2007).

The qualities of Wilderness

When it comes to assess the quality of Wilderness, the question raises, which qualities comprise Wilderness. A number of approaches and definitions from the American context, such as a minimum size of 5000 acres (2000 ha), or the possibility to hike for several days without finding traces of human use are not very well suited for Central Europe. (Lupp et al. 2011). The European Commission (2013) requires that any evaluation of the effectiveness of protected areas for the conservation and development of Wilderness needs to address the four qualities of Wilderness: a) naturalness, b) undisturbedness, c) undevelopedness and d) scale. In varying terms with similar meanings all assessments refer to these dimensions (e.g. remoteness (Mackey et al. 1998 and Mayerhofer et al. 2015); solitude (Aplet et al. 2000)). Some authors also refer to trophic chains by looking at the spatial occurrence of megafauna species such as apex predators, large herbivores or birds of prey (Ceausu et al. 2015). Furthermore, human impact such as land-use, pollution (Aplet et al. 2000) or artificial light (Ceausu et al. 2015) and human infrastructures such as roads, buildings or settlements, natural composition, uncontrolled processes, unaltered structures and many more are used as proxies to describe the Wilderness quality. In other approaches the term untrammelled (U.S. Wilderness Act 1964, BLM 2010) is also used. Initial efforts to include the documentation and monitoring of natural processes have been undertaken by Jungmeier et al. (2015).

There are several GIS-based studies which measure Wilderness on the basis of Wilderness quality on a regional, national or even global scale by using varying combinations of the above mentioned qualities (Orsi et al. 2013; Plutzar et al. 2013; Carver et al. 2011; Fischer et al. 2010; Fritz et al. 2000; McCloskey & Spalding 1989; Mayrhofer et al. 2015).

Reif (2013), who reflected the operationalization of Wilderness targets in Germany, proposes five qualities namely (1) size, representing the completeness of processes, states, and species composition, (2) habitat continuity, (3) rareness and endangerment, (4) connectivity and absence of fragmentation and (5) representativeness.

Kuiters et al. (2013) made a comprehensive effort to identify Wilderness in Europe and implement a European Wilderness Register by adhering to the four Wilderness qualities. Their analysis included zonation, size of the core zone, extent of management measures and interferences as well settlements, road infrastructure and access, extractive uses and management aspects such as wildlife management.

In general, there seems to be a trend towards the use of at least the four qualities of Wilderness as also defined by the European Commission (2013). Consequently, the following section makes an effort to further specify these dimensions and the current state of debate.

Naturalness

According to the European Wilderness Guidelines, the quality Naturalness includes naturalness of vegetation, naturalness of the occurring species and naturalness of the natural processes (EU Commision 2013). However, there is substantial discussion about how to measure naturalness. Some authors even argue that past landscape modifications by human popula-

tions and pervasive human impacts across scales make the idea of Wilderness particularly in Europe inconsequential (Heckenberger et al. 2003). This raises the question of the respective baseline against which naturalness is measured. In practice, traditional agricultural landscapes often have become the benchmark against which biodiversity change was measured (Papworth et al. 2009).

Most approaches make use of proxy indicators such as distance to roads or settlements as well as distance from patches of artificial / modified land cover (e. g. Orsi et al. 2013) due to a lack of spatial data on other indicators of naturalness. Several authors also describe naturalness by indicator species (Mayrhofer et al. 2015), by forest hemeroby (Mayrhofer et al. 2015, Grabherr et al. 1998) or by a comparison with the potential natural vegetation (Pnv, e.g. Bohn et al. 2000; Ceausu et al. 2015). This issue is addressed by the European Wilderness Quality Standard and Audit System by the principle Natural process and Biodiversity and its related criteria.

Undisturbedness

According to the EU Commission's definition (2013), undisturbedness refers to an administrative, statutory or legislative measure. A Wilderness should be free from modern human control or manipulation. While existing human interventions like infrastructure and land uses are assessed in the categories of naturalness and undevelopedness, regulations with regards to human interactions in the given area are considered main criteria to assess undisturbedness (Mayrhofer et al. 2015). This can be ensured by regulations, legal provisions, management plans or an appropriate zonation system, which should provide a frame to minimize possible disturbances. Some authors also consider stand age of forests as appropriate indicator to assess the degree of undisturbedness from a historical point of view (Mayrhofer et al. 2015).

Undevelopedness

The quality of undevelopedness can be measured by number of or distance to settlements or other human artefacts (Plutzar et al. 2013; Orsi et al. 2013; Tricker et al. 2012). Tracks that allow motorized vehicles increase the potential for modifying the environment and are considered human artefacts. Evaluating undevelopedness could be based on an analysis of length and density of the road network (Mayrhofer et al. 2015). Orsi et al. (2013) define solitude as an important factor for the perception of Wilderness by visitors and have used the probability of meeting other visitors by length and visitor frequency on footpaths. Aplet et al. (2000) took population density as an indicator for solitude.

Scale

From an ecological point of view, it can be argued that a Wilderness should meet minimum size features (i.e. large enough for the effective ecological functioning of natural processes). The spatial scale needed for maintaining the ecological integrity of a natural area determines its minimum size (i.e. scale needed for undisturbed natural ecological processes and viable species populations). This largely depends on the ecosystem types involved (Kuiters et al. 2013). Thus, IUCN does not give standardized minimum sizes for Wilderness as long as it is

ensured that areas are large enough for an effective ecological functioning of natural processes without intrusive or extractive human activity (European Commission 2013). Thus, this also includes core zones of Nationalparks (IUCN Category II) which allow for dynamic processes on a large scale (Dudley 2008). The Swedish Environmental Protection Agency (SEPA), has further specified standards for IUCN Ib Wilderness to 1000 ha in Northern, and 500 ha in Southern Sweden (Kuiters et al. 2013), following a similar definition as Finland (1000 ha; European Commission 2013). The US Wilderness Act (1964) generally considers about 2000 ha as an appropriate minimum size. The European Wilderness Register adopted a minimum threshold value for Wilderness core zones of at least 3.000 hectares (Kuiters et al. 2013). Other initiatives even define minimum areas up to 10.000 ha (PANParks 2009).

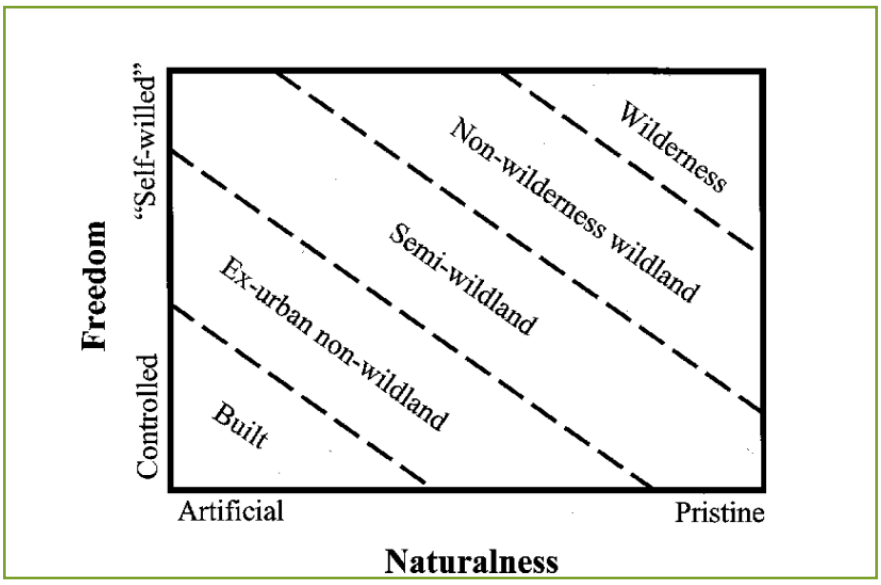
Given the variety of minimum sizes, the frequent absence of minimum areas and the numerous attempts to provide definitions for a minimum size of Wilderness in Europe show that primarily values and perspectives are important in defining thresholds.

Scale is not only important from an ecological point of view but it can also be defined by anthropogenic factors. A certain size may be necessary to enable the protection of whole landscapes. This is important as people spiritually identify with Wilderness and feel emotionally bound to certain landscape features. The size of the area often determines the perception of 'wildness', i.e. if a visitor can experience solitude, wholeness and other spiritual experiences. The issue of sufficient size must be considered with reference to the surrounding landscape as the quality of the surrounding landscape determines the ecological connectivity and the functioning of the ecosystems in the core area. The surrounding landscape also influences how the visitors experience the area. Therefore, Wilderness is often related to remoteness, although it is not a strict prerequisite (European Commission 2013).

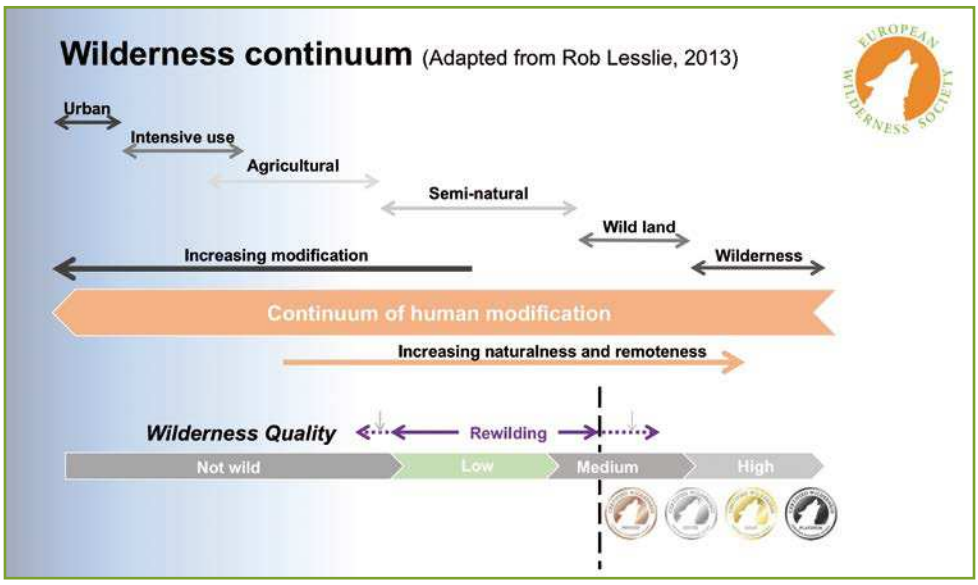
Categories of Wilderness

Lupp et al. (2011) analyzed the current discussion regarding approaches to determine various types of Wilderness (e.g. by Diemer et al. 2003), who proposes four designations based on spatial extents (Nationalparks (>1000ha), Urban Wilderness (<1000ha close to cities), Urban or Rural Rewildering Sites (<500ha) and Rewildering Microcosms (several hectares).

The Wilderness continuum assesses Wilderness quality in relation to the degree of modification as well as in relation to the degree of freedom to develop without human interference. Similarly, Aplet et al. (2000) describe five different types of Wilderness depending on the degree of naturalness and freedom.



The „continuum of wildness" with increasing wildness as a function of naturalness and freedom from human control.



The Wilderness continuum as a basis for the European Wilderness Quality Standard and Audit System.

Considering the figures showing the Wilderness continuum, the question raises how they relate to the European Wilderness Quality Standard and Audit System and how they are or could be operationalized.

The classification of Aplet et al. (2000) offers an attractive two-dimensional model. The assessment of self-will or control is rather easy to operationalize by referring to existing regulations, eventual zoning and management plans. However, the second key dimension, naturalness, is widely considered a core dimension for Wilderness, but raises a number of questions yet to be answered. How can a pristine environment be characterized? How to define thresholds for naturalness? Several studies have addressed this issue (as indicated

further above) using proxies such as hemeroby, potential natural vegetation, indicator species or even just the absence of human infrastructure.

If considering a comprehensive assessment of Wilderness, a further issue needs to be considered: Where to draw the baseline? How to define understandable thresholds? The location of the different types or labels of Wilderness on this matrix is a key challenge for research. Orsi et al. (2013) point out the problem to locate the point, along the continuum, beyond which there is Wilderness as this decision is affected by individual perceptions.

Wilderness Categories and minimum size

There are four categories of Wilderness zones; each category defines a specific Wilderness quality standard with a focus on its Wilderness values. Wilderness should have a Wilderness zone with the following sizes:

- Bronze Wilderness – at least 1,000 ha (500 ha for specific habitats such as raised bogs, floodplains, etc.), that maybe fragmented but ecologically connected.
- Silver Wilderness – at least 2,000 ha.
- Gold Wilderness – at least 3,000 ha. This category represents the minimum size recommended by the former Working Definition of European Wilderness and Wild Areas.
- Platinum Wilderness – at least 10,000 ha. This category represents the highest achievable level in the Wilderness continuum.

Bronze-, Silver-, Gold and Platinum Wilderness-Categories, European Wilderness Quality Standard and Audit System.

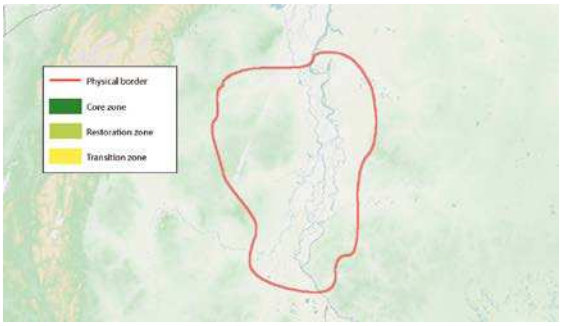
Step Approach to Certification along the Wilderness Continuum

A potential Wilderness generally has a defined boundary as a result of mapping in addition to a vision for the area. Based on this vision, several steps take place; an initial examination of the area, workshops with the management team and an analysis of available and relevant research and management plans. After which the area becomes designated as a the European Wilderness Quality Standard and Audit System Candidate. During the following two years, various actions take place, such as the creation of a management plan for invasive species, fire control management plan and a restoration plan in order to prepare the area for an audit.

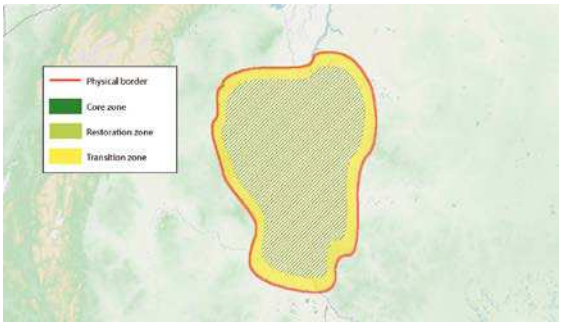
The manager of a potential Wilderness proposes a Wilderness with a clearly defined boundary.

After two years, the area will be examined according to the indicators resulting in a SWOT analysis. Based on the results of this audit System, a management plan would be developed for the Wilderness, followed by the awarding of a Wilderness category.

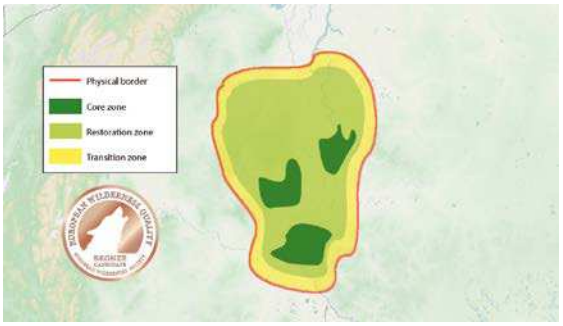
The Wilderness zone would gradually be enlarged in order to reach a maximum extent. The progress of restoration defines which Wilderness category would be assigned.



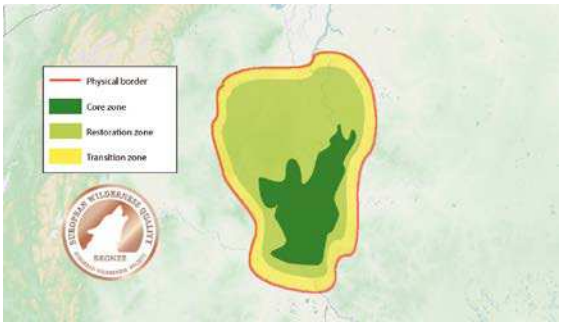
Step 1: *Selection of the area is based on Wilderness quality mapping, giving it a physical boundary.*



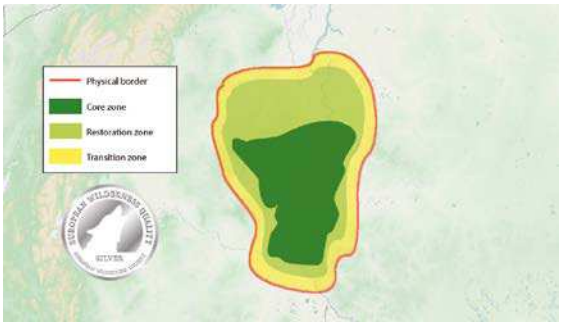
Step 2: *Development of a vision for Wilderness.*



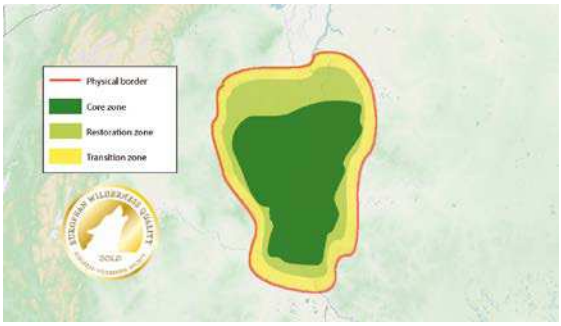
Step 3: *Area receives candidate status, followed by a Wilderness audit over the next two years, utilizing the European Wilderness Quality Standard and Audit System.*



Step 4: *Based upon the results of the European Wilderness Quality Standard and Audit System audit, a management plan is created as well as a Wilderness restoration plan. The area is given an appropriate certified Wilderness category.*



Step 5: *Restoration in the restoration zone leads to non-intervention Wilderness zone of more than 2,000 ha. The area is given Silver certification.*



Step 6: *Progressive restoration leads to non-invention Wilderness zone reaching 3,000 ha and given Gold certification*

Step 7: *The restoration of Wilderness is complete.*

The European Wilderness Quality Standard and Audit System approach: Methodology

The European Wilderness Society developed the European Wilderness Quality Standard and Audit System (European Wilderness Society 2015) to provide a common European Wilderness certification standard which is following the common accepted "Definition for European Wilderness and wild areas" developed by the Wild Europe initiative (Wild Europe 2012).

The European Wilderness Quality Standard and Audit System is based on over 500 indicators assigned nine principles. Each area is assigned one of the four categories forming the proposed Wilderness preservation system: bronze, silver, gold or platinum. The European Wilderness Society puts a lot of effort into the discussion and further development of the European Wilderness Quality Standard and Audit System and thresholds for its indicators in order to provide a comprehensive tool for operationalizing the theoretical discussion. The European Wilderness Quality Standard and Audit System understands principles as the fundamental statements about a desired outcome. Criteria are the conditions that need to be met in order to comply with a principle. Indicators are the measurable states which allow the assessment of whether or not a particular criterion has been met.

Areas of platinum or gold category are regarded as Wilderness, while those of bronze or silver are wild areas. A wild area can evolve into a Wilderness over a long term process as also considered in the Wilderness continuum approach (Lesslie & Taylor 1985). For general communication purposes and easy understanding, the European Wilderness Society applies the term Wilderness for all categories irrespective of the actual category.

The nine European Wilderness Quality Standard and Audit System principles

The European Wilderness Quality Standard and Audit System is based on 9 principles, which are as follows (in order of their appearance in the European Wilderness Quality Standard and Audit System guideline):

- **Wilderness zoning and size:** Wilderness should have three zones: the Wilderness zone (where there is no human intervention and natural dynamic processes govern), the restoration zone (where restoration and/or expansion is undertaken) and the transition zone (where further expansion of the Wilderness is planned).

- **Natural processes and biodiversity:** Wilderness must have a Wilderness zone, where natural dynamic processes can take place without human intervention in order to contribute to the conservation of threatened species of that region and to become a leading example of an undisturbed habitat.

- **Wilderness management:** The Wilderness management contains several Wilderness concepts like a biodiversity management plan, a support plan for natural dynamic processes, landscape management and the training of the Wilderness management team. In addition, this principle covers the impact of tourism.

- **Wilderness restoration:** Wilderness restoration is an intentional activity that initiates or accelerates the recovery of a damaged ecosystem that has Wilderness potential. Wilderness restoration includes a wide range of activities such as restoration of disturbed areas and the reintroduction of native species. These activities should be implemented once and not continuously.

- **Wilderness extractive and intrusive uses:** The European Wilderness definition stipulates that the Wilderness zone is an area without extractive or intrusive uses.

- **Wilderness disturbances:** This principle focuses on the removal of permanent and temporary infrastructure, creating well-planned tourism access with minimal impact and regulating and limiting road access to the Wildernes in order to reduce the human impact in the Wilderness zones.

- **There are management strategies for fire, neophyte and invasive species, and natural disturbances:** Ecological disturbances are one of the most profound aspects of Wilderness. Natural disturbances, like windstorms, are important sculptors of landscape and habitats. However, they are often considered problematic and undesirable.

- **Wilderness research and monitoring:** Wilderness offers opportunities to study the unique attributes of nature and natural processes. Quality Wilderness research and monitoring allows park managers to make appropriate decisions. Research and monitoring activities should never be invasive in their character and minimize impact to the Wilderness zone.

- **International relevance and the importance of the Wilderness:** A Wilderness should be internationally recognized by the IUCN, UNESCO, EU as well as other important international organizations.

Given the structure and content, it becomes clear that a wide range of issues of Wilderness is covered by the European Wilderness Quality Standard and Audit System approach. The principles related Wilderness Management Plan, to Wilderness Research and Monitoring as well as International relevance, furthermore indicate the presence of an additional dimension referring to a management quality. (see page 18).

The dimensions of Wilderness and the European Wilderness Quality Standard and Audit System.

	Dimensions of Wilderness				
European Wilderness Quality Standard and Audit System Principles	Naturalness	Undisturbedness	Undevelopedness	Scale	Management
Wilderness zoning and size				√	
Natural processes and biodiversity	√				
Wilderness management					√
Wilderness restoration					√
Wilderness extractive and intrusive uses	√				
Wilderness disturbances		√	√		
There are management strategies for fire, neophyte and invasive species, and natural disturbances		√			
Wilderness research and monitoring					√
International relevance and the importance of the Wilderness					√

These general principles or qualities seem to adequately reflect the Wilderness qualities as defined by the European Commission (2013) without referring to the specific criteria or indicators.
However, this leaves three principles, which provide additional qualities going beyond the current Wilderness debate. This comprises mainly the principles of Wilderness Restoration, Wilderness Research and Monitoring and International Relevance. Based on these principles, the European Wilderness Quality Standard and Audit System covers two key dimensions:

- The quality of Wilderness (the current state of biodiversity, natural processes, existing infrastructures, visitors, eventual uses and disturbances).

- The quality of the Wilderness management (existence of plans, regulations, organizational settings, guidelines how to deal with certain issues etc.).

Thus, the European Wilderness Quality Standard and Audit System gives not only an assessment of the current quality of Wilderness, but also about the current quality and standard of the authority responsible to manage the respective Wilderness. This could be a major additional value of the European Wilderness Quality Standard and Audit System subject to the condition that the related indicators cover all relevant aspects. However, the indicators are not subject of the present review.

The principle international relevance aims to describe the Wilderness and its importance within the international conservation network as it assesses whether the area is recognized by IUCN or similar organizations, whether it is part of the Natura 2000 network and if endangered species or habitats are protected by the Wilderness. Furthermore, it serves a proxy indicator by assessing whether the management is able to comply with international requirements.

Conclusions and Perspectives

The current essay reflects the concept of the European Wilderness Quality Standard and Audit System in the light of the current Wilderness research. Apparently, there is no other such assessment available even though there are numerous ongoing research activities aiming to assess Wilderness. Most of the research has either a focus on theoretical reflection of the concept Wilderness or is strictly case-study based.

The approach of the European Wilderness Quality Standard and Audit System is not primarily focusing on theoretical reflection, but is a well-elaborated effort for a practical and pragmatic assessment summarized in a process-oriented tool for a reproducible assessment of Wilderness. The approach applied to assess Wilderness is well covered by the existing criteria and principles. It also includes the 4 qualities of Wilderness as defined by the European Commission (2013).

The approach to build on the Wilderness continuum is viable and appropriate from a scientific point of view and provides a sound framework. Further efforts integrate this concept into the European Wilderness Quality Standard and Audit System methodology and to further specify thresholds are currently being discussed by the European Wilderness Society. Results are to be included by the next update of the European Wilderness Quality Standard and Audit System methodology. This will strengthen the credibility and transparency of the assessment as well as of the criteria applied to reach a certain label. Regarding the structure, it is recommended to strictly separate the management perspective and the Wilderness quality principles as this will make the structure more comprehensible and will further emphasize one of the strengths of the European Wilderness Quality Standard and Audit System namely bringing together quality and management.

The European Wilderness Quality Standard and Audit System makes the claim to locate the current status on this Wilderness Continuum by assessing a number of criteria and indicators. However, Orsi et al. (2013) and Comber et al. (2010) point out the problem to locate the point, along the continuum, beyond which there is Wilderness as this decision is affected by individual perceptions that reflect the viewpoint of a group of scientists and stakeholders (e.g. managers, NGOs). The approach of the European Wilderness Quality Standard and Audit System and its application across Europe will provide relevant contributions to the ongoing discussion about comparable and reproducible assessments of Wilderness to fill the gap outlined by Comber et al. (2010) and Heckenberger et al (2003). It is an elaborate effort integrate the theoretical academic approaches and case studies into a common framework, which is tested and adapted on site. Furthermore, it constantly explores the limits between academic Wilderness concepts and their implementation in practice.

The European Wilderness Quality Standard and Audit System - Principles and Criteria

Category / Principle and Criteria	Bronze	Silver	Gold	Platinum	Quick audits
Principle 1: Wilderness zoning and size					
Wilderness should have three zones: the Wilderness zone (where there is no human intervention and natural dynamic processes govern), the restoration zone (where restoration and/or expansion is undertaken) and the transition zone (where further expansion of the Wilderness is planned). If this is not the case, additional measures to ensure the protection and functioning of the Wilderness zone must be implemented. The size of the Wilderness zone depends on the predominant habitat type.					
Criterion 1.1. The Wilderness has three zones: the Wilderness zone, the restoration zone and the transition zone.	√	√	√	√	√
Criterion 1.2. The Wilderness zone has clearly defined boundaries.	√	√	√	√	√
Criterion 1.3. The minimum size of the Wilderness zone depends on the predominant habitat type. Wetlands have typically a minimum Wilderness zone of 500-1000 ha while other habitats have a Wilderness zone between 2000-10.000 ha.	At least 1,000 ha (500 ha for specific habitats). The area can have a fragmented wilderness zone which in total should reach 500 ha respectively 1000 ha depending on the habitat across the different segments.	At least 2,000 ha The area should have a non-fragmented wilderness zone which in total should reach 1000 ha respectively 2000 ha depending on the habitat across the different segments.	At least 3,000 ha	At least 10,000 ha	√

Principle 2: Natural processes and biodiversity					
Wilderness must have a Wilderness zone, where natural dynamic processes can take place without human intervention in order to contribute to the conservation of threatened species of that region and to become a leading example of an undisturbed habitat.					
Criterion 2.2. The Wilderness zone contributes to the support of Wilderness-indicator species.	√	√	√	√	
Criterion 2.3. The Wilderness zone contains examples of undisturbed natural dynamic process ecosystems.	√	√	√	√	√
Criterion 2.4. The Wilderness has a management plan to restore natural dynamic processes in the restoration zone.	√	√	√	√	

Principle 3: Wilderness management					
The Wilderness management contains several Wilderness concepts like a biodiversity management plan, a support plan for natural dynamic processes, landscape management and the training of the Wilderness management team. In addition, this principle covers the impact of tourism.					
Criterion 3.1. The Wilderness is protected by law in accordance within a national legislative framework for a either 30 years or an indefinite period of time.	30 yrs	30 yrs	√	√	√
Criterion 3.2. The Wilderness zone has a detailed Wilderness Stewardship Plan (management plan) of at least 10 years.	A Wilderness Stewardship Plan will be implemented no later than 3 years after the first certification		√	√	
Criterion 3.3. The Wilderness has a sufficiently large and trained full time management team.	√	√	√	√	

Principle 4: Wilderness restoration					
Wilderness restoration is an intentional activity that initiates or accelerates the recovery of a damaged ecosystem that has Wilderness potential. Wilderness restoration includes a wide range of activities such as restoration of disturbed areas and the reintroduction of native species. These activities should be implemented once and not continuously.					
Criterion 4.1. The Wilderness has a Wilderness restoration plan to enlarge and improve the Wilderness zone.	√	√	√	√	√
Criterion 4.2. The Wilderness zone should be enlarged with the help of the Wilderness restoration measures in the restoration zone.	To preferably 1.000 to 2.000 ha, depending on habitat type	To preferably 3.000 ha	To preferably 10.000 ha representing up to 75% of the total area	To preferably to 20.000 ha representing up to 75% of the total area	

Principle 5: Wilderness extractive and intrusive uses					
The European Wilderness definition stipulates that the Wilderness zone is an area without extractive or intrusive uses.					
Criterion 5.1. The Wilderness zone has no extractive or commercial uses.	√	√	√	√	√
Criterion 5.2. The Wilderness zone has no forestry operation.	Generally no forestry is allowed. If forestry interventions are absolutely necessary to protect or restore the wilderness area (e.g. by removing invasive species), very strict regulations apply. They are limited to the transition zone and need to be clearly defined in the management plan.		√	√	√
Criterion 5.3. The Wilderness zone has no hunting and/or culling.	Generally no hunting or culling is allowed. If some game management is absolutely necessary to protect or restore the wilderness or core wild area, very strict regulations apply and need to be clearly defined. Game management may be needed temporarily to compensate for the lack of large carnivores or because of animal diseases. Wherever possible, game management activities should be redirected to the transition zone.		√	√	√

Principle 5: Wilderness extractive and intrusive uses					
Criterion 5.4. The Wilderness zone has no extractive fishing and no management of fish populations.	Generally no fishing is allowed. If management interventions into fish populations are absolutely necessary to protect and restore the wilderness or core wild area, very strict regulations apply and need to be clearly defined.		√	√	√
Criterion 5.5. The Wilderness has a fish and game management plan for the restoration zone and transition zone.	√	√	√	√	
Criterion 5.6. The Wilderness zone has no active mining.	√	√	√	√	√
Criterion 5.7. The Wilderness zone has abandoned old mining sites.	√	√	√	√	√
Criterion 5.8. The Wilderness zone has no domestic livestock grazing.	√	√	√	√	√
Criterion 5.9. The Wilderness zone has no agricultural activities.	√	√	√	√	√
Criterion 5.10. The Wilderness zone has no deadwood collection.	√	√	√	√	√
Criterion 5.11. There is no commercial harvesting of berries, nuts and/or mushrooms in the Wilderness zone.	√	√	√	√	√
Criterion 5.12. There is no commercial collection of minerals in the Wilderness zone.	√	√	√	√	√
Criterion 5.13. There is no commercial use of the Wilderness zone for filmmaking.	√	√	√	√	√

Principle 6: Wilderness Disturbances					
This principle focuses on the removal of permanent and temporary infrastructure, creating well-planned tourism access with minimal impact and regulating and limiting road access to the Wilderness in order to reduce the human impact in the Wilderness zones.					
Criterion 6.1. The Wilderness zone has no permanent or temporary infrastructure.	√	√	√	√	√
Criterion 6.2. Permanent infrastructures in the restoration zone are removed according to the restoration plan, unless the removal is detrimental to the quality of the restoration zone.	√	√	√	√	
Criterion 6.3. There is a management plan to deal with temporary structures (e.g. tents, picnic tables, housing containers, trailers, etc.) in the restoration zone and transition zone.	√	√	√	√	√
Criterion 6.4. The Wilderness zone has no permanent settlements.	√	√	√	√	√
Criterion 6.5. There is a management plan to deal with inherited settlements in the Wilderness zone.	√	√	√	√	√
Criterion 6.6. There is a management plan for the Wilderness zone to deal with inherited indigenous gathering sites (e.g. traditional reindeer herding sites in Nordic countries).	√	√	√	√	
Criterion 6.7. There is a management plan to deal with abandoned archaeological sites in the Wilderness zone.	√	√	√	√	
Criterion 6.8. There is no motorized transport in the Wilderness zone. Motorized transport should be limited to the restoration zone and transition zone for restoration activities.	√	√	√	√	√
	Generally no motorized transport or traffic is allowed. If motorized transport or traffic is absolutely necessary to protect or restore the wilderness or core wild area or to remove existing infrastructure, strict regulations apply and need to be clearly defined.				
Criterion 6.9. There is free access by foot into the Wilderness.	√	√	√	√	√
	Access can be restricted in parts of the area, if this is necessary for biodiversity conservation reasons or for maintaining wilderness quality.				

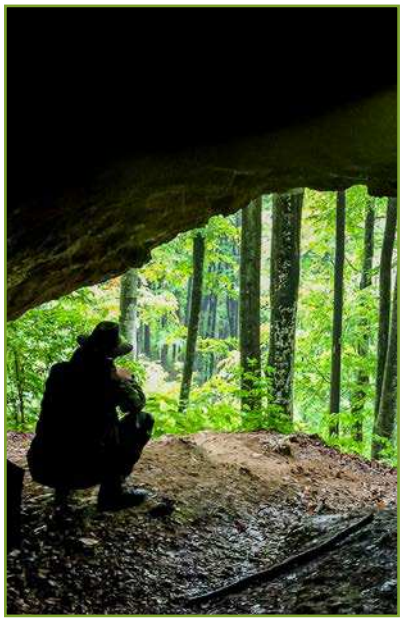
Principle 6: Wilderness Disturbances					
Criterion 6.10. The Wilderness zone has no noise pollution.	√	√	√	√	
Criterion 6.11. The Wilderness zone has no light pollution.	√	√	√	√	
Criterion 6.12. The Wilderness zone has no visual distraction on the horizon.	√	√	√	√	
Criterion 6.13. The Wilderness zone has no garbage pollution.	√	√	√	√	√
Criterion 6.14. There are recreational fire pits in the Wilderness zone.	√	√	√	√	√
Criterion 6.15. There are rules for use of horses in the Wilderness zone.	√	√	√	√	√
Criterion 6.16. The Wilderness zone has no fencing.	√	√	√	√	√
Criterion 6.17. There are rules about dogs in the Wilderness zone.	√	√	√	√	√
Criterion 6.18. The Wilderness zone has a minimal impact visitor and recreational use strategy.	√	√	√	√	

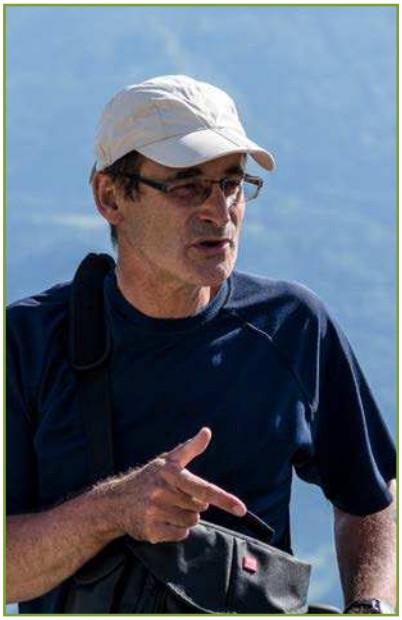
Principle 7: There are management strategies for fire, neophyte and invasive species, and natural disturbances					
Ecological disturbances are one of the most profound aspects of Wilderness. Natural disturbances, like windstorms, are important sculptors of landscape and habitats. However, they are often considered problematic and undesirable.					
Criterion 7.1. There is a fire management plan for the Wilderness and the Wilderness zone. Fire must not be supressed in the Wilderness zone.	√	√	√	√	
	Fire control is performed in the transition zone (and – if necessary and feasible without lasting impact – in the restoration zone). Design of fire control measures should seek to minimize environmental impacts.				
Criterion 7.2. There is a disease control plan.	√	√	√	√	
	Disease control activities are performed in the transition zone and – if necessary and feasible without lasting impact – in the restoration zone. Design and implementation of disease control activities should seek to minimize environmental impacts (e.g. no pesticide use for bark-beetle control, just sanitary logging and bark stripping).				
Criterion 7.3. A neophyte and invasive species management plan has been developed for the Wilderness.	√	√	√	√	
	Control activities for invasive species are restricted to the transition zone and to the restoration zone (the latter only if necessary and feasible without compromising restoration goals). Sustained control activities in the transition zone may be crucial to protect the core zone against recolonization.				

Principle 7: There are management strategies for fire, neophyte and invasive species, and natural disturbances					
Criterion 7.4. There is a plan for natural disturbances.	√	√	√	√	
Criterion 7.5. The Wilderness zone is impacted by permafrost.	√	√	√	√	

Principle 8: Wilderness Research and Monitoring					
Wilderness offers opportunities to study the unique attributes of nature and natural processes. Quality Wilderness research and monitoring allows park managers to make appropriate decisions. Research and monitoring activities should never be invasive in their character and minimize impact to the Wilderness zone.					
Criterion 8.1. There is a Wilderness monitoring and research strategy.	√	√	√	√	√
Criterion 8.2. There is a monitoring plan to document indigenous people livelihoods and their impacts.	√	√	√	√	√
Criterion 8.3. There is a plan for cooperation with scientific institutions and universities.	√	√	√	√	√

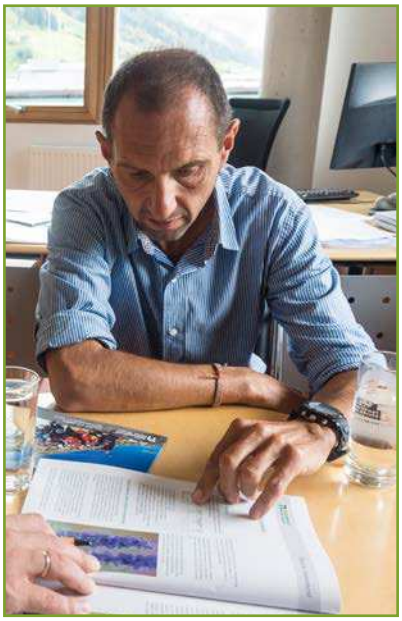
Principle 9: International relevance and the importance of the Wilderness					
A Wilderness should be internationally recognized by the IUCN, UNESCO, EU as well as other important international organizations.					
Criterion 9.1. The Wilderness is internationally recognized (IUCN, Natura 2000, UNESCO, other certifications).	There is a plan to develop a proposal for international recognition at least 10 years after the first European Wilderness Quality Standard und Audit System certification.	√	√	√	√
Criterion 9.2. There is a plan to become part of the Natura2000 network (where relevant and according to the Wilderness objectives).	√	√	√	√	√
Criterion 9.3. The Wilderness zone supports the protection of internationally threatened species.	√	√	√	√	√

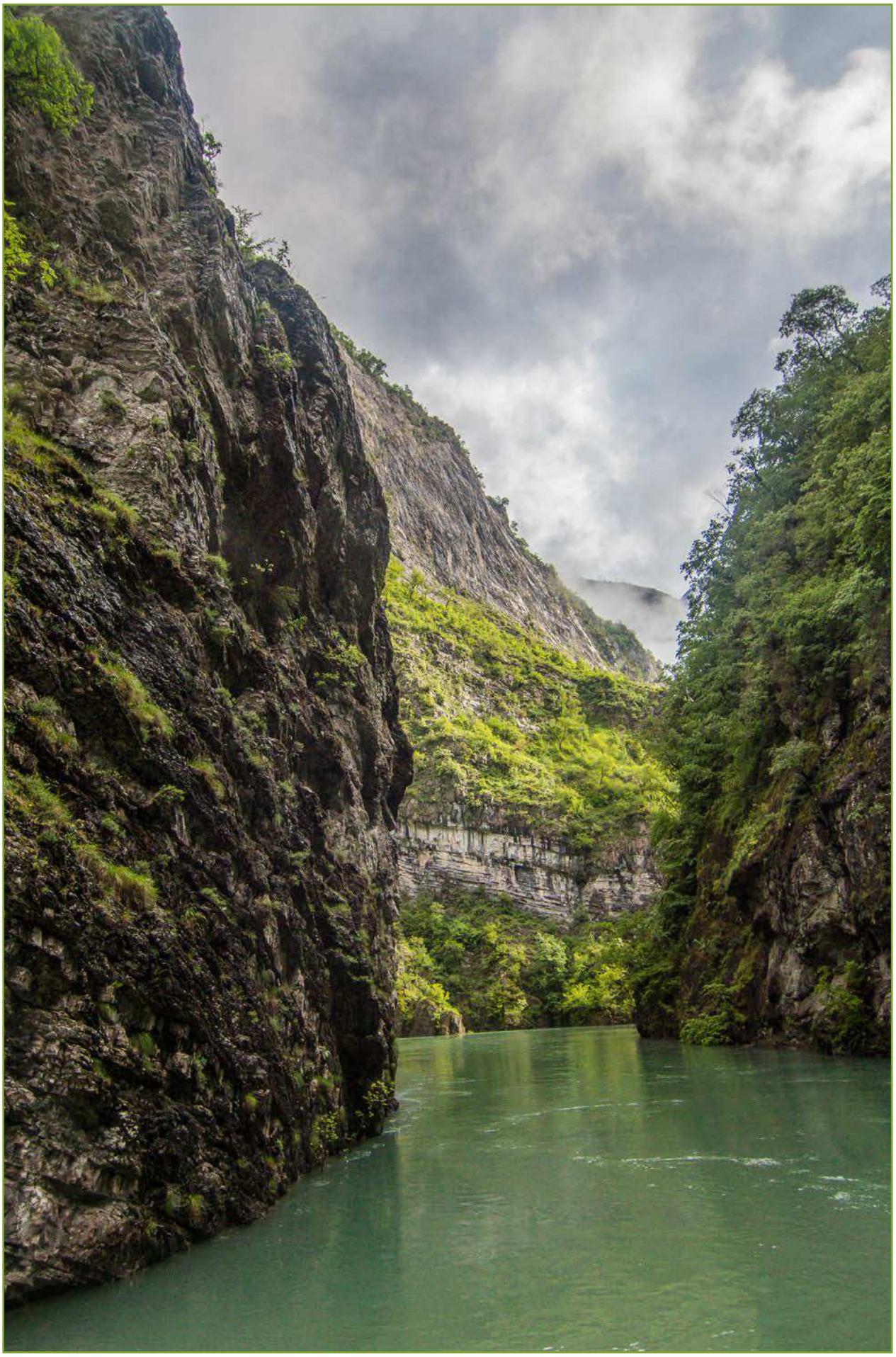










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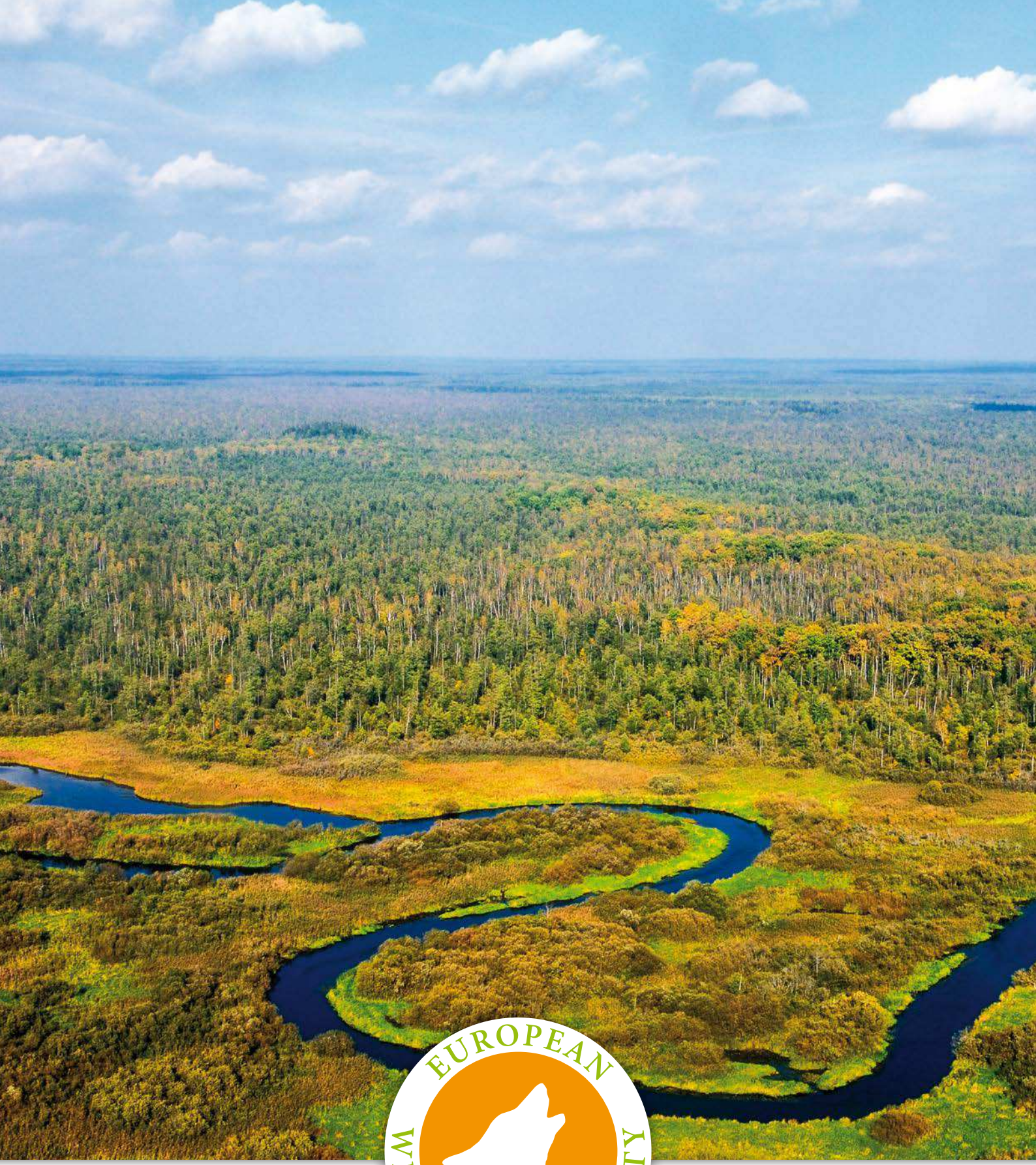

Let's get Wild!

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