


Article

Development of Structural Criteria for the Certification and Designation of Recreational and Therapeutic Forests in Bavaria, Germany

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Abstract: Background: Based on the increasing evidence of forest on health, a research project assessed the structural certification criteria of recreational and therapeutic forests in 15 Bavarian pilot sites. The main project objectives were (1) to develop a certification standard for recreational and therapeutic forests and (2) to establish a certification and designation process. Methods: Relevant criteria were identified by a literature review. The findings, in conjunction with landscape planning principles, were used to develop a catalog of certification criteria, which was then tested and amended in field testing in the pilot sites. Results: The criteria catalog for recreational and therapeutic forests was structured into four sections: general requirements, forest-specific requirements, safety and infrastructure, and preventive and/or therapeutic interventions. At 13 pilot sites, 13 recreational forests and 3 therapeutic forests were designated, 47 professionals were trained, the designation process and a certification body were established, and the results were published in a manual (BayKK KuH). Conclusions: This newly developed Bavarian certification standard for recreational and therapeutic forests represents an innovative synthesis of science and empirical on-site experience. It enables interested parties to develop a recreational or therapeutic forest on the basis of transparently published standards in order to use the health-promoting effects of the forest in prevention and therapy.

Keywords: forest therapy; forest bathing; recreational forest; therapeutic forest; nature-based MBSR; climatotherapy; Kneipp therapy; prevention; rehabilitation



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1. Introduction

Numerous studies have investigated and confirmed the positive effect of spending time in forests on mental, psychological, and physical health [1–5]. Strengthening health by spending time in green or blue natural spaces—especially in forests—is gaining importance worldwide. The covid pandemic, in particular, demonstrated the importance of forests as protective refuges that could be used without risk of infection [6,7]. Research on health promotion and disease prevention through forest bathing (e.g., stress reduction) began in Japan in 2004 by the Forest Therapy Research Group[®] [8,9]. From 2006, intensive research was carried out on the certification of forest therapy bases [9], which resulted in the founding of the Japanese Society for Forest Therapy in 2008 [8]. The NGO is responsible for the certification of forest therapy bases and trails, professional training, and the dissemination of findings. To date, 65 forest therapy bases have been established. South Korea has embraced the welfare effects of forests and opened the first therapeutic forest in 2009. In 2010, detailed criteria for assessing the validity of recreational forests were already laid down in law and amended in 2016 [10,11]. The details of validity evaluation criteria and methods describe the designation requirements for recreational forests, healing forests, forest parks, forest campgrounds, and forest leisure sports facilities according to national law (e.g., Forest Culture and Leisure Acts.). In Europe, natural sites are also

increasingly being developed and designated for health purposes, such as the Danish healing forest Octovia or the therapeutic garden Narkadia [12,13]. In Germany, nature has been used historically for decades in the context of traditional natural healing methods, e.g., in climatotherapy or health resort medicine [14], and Germany's forest heritage contributes to this as the most forested country in Central Europe [15]. Currently, around 11.4 million hectares of forest cover Germany, and the Federal State of Bavaria has an above-average forest amount of 37% (national average 32%). In 2017, the first recreational and therapeutic forest opened in the Federal State of Mecklenburg–Western Pomerania (Northern Germany, Baltic Sea region) in the health resort of Heringsdorf on the island of Usedom [16], for which an initial catalog of criteria was developed [17], amended, and published online in 2021 [18].

In 2018, no publicly accessible catalog of criteria for the certification and designation of recreational and therapeutic forests was available. Therefore, the Bavarian State Ministry of Economic Affairs, Regional Development, and Energy launched an innovative research project on the designation of recreational and therapeutic forests in the spring of 2019 in Bavaria, Germany. In addition to the development of a publicly accessible catalog of criteria, the aim of the project was the designation of recreational and therapeutic forests in 15 pilot sites. By definition, a recreational forest is a forest that supports preventive health care (health promotion) and serves the natural maintenance of human health. A therapeutic forest is a forest that is primarily visited for indication-related therapeutic and rehabilitative treatment of various diseases (and can also be used for prevention). It should be noted that different formulations appear in this context: the criteria catalog of Mecklenburg–Western Pomerania uses the term “curative forest” for recreational forests and the term “healing forest” for therapeutic forests.

Besides the two main goals, (1) the development of a catalog of certification criteria for recreational and therapeutic forests and (2) the certification and designation of those forests in the different pilot regions, there were two more objectives within the project: (3) the training of professionals to carry out preventive or therapeutic programs in the certified recreational or therapeutic forests, as well as (4) development of a strategy for the future designation process after the project's end. The successful knowledge- and practice-based project implementation led to the publication of the Bavarian criteria catalog for recreational and therapeutic forests (BayKK KuH) in July 2022 [19], which will serve as the current qualification standard for the certification and designation of recreational and therapeutic forests in Bavaria from 2022.

2. Materials and Methods

The research project represents a synthesis of theory- and knowledge-based as well as practice-guided research content to develop new quality criteria for recreational and therapeutic forests in Bavarian health resorts. Table 1 illustrates all relevant topics of the project.

2.1. Recruitment of Pilot Sites

In the spring of 2019, the Bavarian State Ministry of Economic Affairs, Regional Development, and Energy published a research call to strengthen Bavarian health tourism through the development of recreational and therapeutic forests. Only highly accredited Bavarian health resorts that meet both medical and tourism standards were eligible to apply. In the end, 15 health resorts joined the project: Bad Alexandersbad, Bad Bayersoien, Bad Berneck, Bad Birnbach, Bad Füssing, Bad Kötzing, Bad Neualbenreuth, Bad Reichenhall, Bad Wiessee, Bad Wörishofen, Bischofsgrün, Garmisch-Partenkirchen, Pfronten, Treuchtlingen, and Weißenstadt. At the beginning of the project, the 15 pilot resorts were introduced to the project with a kick-off meeting in autumn 2019.

Table 1. Working steps and methods of the research project.

	Development of Criteria Catalog BayKK KuH (Knowledge and Science-Based)	Development of Recreational and Therapy Forests in the Pilot Sites (Practical Testing)
Starting phase (07/19)		<ul style="list-style-type: none"> • Recruiting pilot sites for project participation • Informational event: Kick-off meeting
Creation phase	<ul style="list-style-type: none"> • Reviewing the literature on the health-promoting effects of forests • Comparing screening results with existing material • Developing a basic structure of the new BayKK KuH criteria catalog 	<ul style="list-style-type: none"> • Collecting information of the pilot sites (infrastructure, forest area/s, goals, etc.) using a detailed questionnaire • Developing and testing of an inspection protocol in selected pilot sites • Establishing an inter-ministerial working group to clarify relevant issues
Testing and teaching phase	<ul style="list-style-type: none"> • Testing and application of defined BayKK KuH criteria in the 15 pilot sites 	<ul style="list-style-type: none"> • Carrying out standardized site visits to check the forest's suitability in the pilot sites based on the defined BayKK KuH criteria • Teaching of medical staff in preventive/therapeutic forest-based interventions
Analysis phase	<ul style="list-style-type: none"> • Updating the criteria catalog through new findings from on-site experiences • Last literature update and finalizing the criteria catalog 	<ul style="list-style-type: none"> • Evaluating the forests criteria based on a specific rating matrix • Regular exchange of information between the project team and the pilot sites • Presenting results in the form of a forest appraisal for each pilot site with recommendations for action
Publication phase	<ul style="list-style-type: none"> • Publication of the "Manual of designation of certified Bavarian recreational and therapeutic forests", including the criteria catalog, BayKK KuH 	
Final phase	<ul style="list-style-type: none"> • Development of a self-assessment questionnaire to evaluate the available forest areas in the future 	<ul style="list-style-type: none"> • Founding of an accreditation body for certification as well as for the designation structure • Designation of certified recreational and therapeutic forests in Bavarian health resorts

2.2. Development of the Criteria Catalog BayKK KuH

The process of developing the Bavarian criteria catalog was started by carrying out a literature review to identify all relevant scientific findings on possible structural requirements of forests with regard to their health effects. The literature search was conducted in the PubMed database as well as a grey literature search on the internet (search terms: forest bathing, forest therapy, ecotherapy, shinrin-yoku, forest medicine, healing forest, therapy forest, recreational forest, cure forest, therapeutic landscape, forest aesthetic, forest therapy trails) in English, German, and French languages for the period 2015–2021. All relevant information on preventive or therapeutic measures as well as on the natural and infrastructural equipment of therapeutic forest landscapes was extracted, evaluated according to relevance, and compared to the previous requirements for cure and healing forests in Mecklenburg–Western Pomerania [17,18]. Likewise, the Bavarian catalog of criteria (BayKK KuH) was supplemented with landscape planning aspects, and the criteria were summarized in terms of their content and newly restructured. In the next step, the on-site experiences in the different forest areas of the 15 pilot sites led to a constant review of the practicality of the criteria catalog and resulted in continuous further development under the constant inclusion of new findings. At the end of the project, the Bavarian criteria

catalog BayKK KuH was published as a part of the “Manual for the designation of certified Bavarian recreational and therapeutic forests”.

2.3. Identification of Recreational and Therapeutic Forests in the Pilot Sites

The practical implementation of the project took place in close cooperation with the 15 Bavarian pilot sites. First, the pilot sites were surveyed using a self-developed written questionnaire to obtain preliminary information about the forest area, the objectives, and the planned orientation of the pilot site. For the subsequent forest assessment, an inspection protocol was developed with which central forest criteria were assessed and descriptive elements were documented. An inter-ministerial working group supported the project team in legal issues if needed. The results of the forest inspections (documented in the inspection protocol) were analyzed for each individual criterion in a self-developed scoring system (4-stage rating scales). The main results were summarized in a rating matrix, with the rating grades being color-coded (unsuitable/limitations present, improvements necessary, good, very good) [19] (see Supplementary Material: Table S1: Rating matrix of forest qualification). Based on the results of the evaluation matrix, a steady exchange between the research team and the pilot sites was implemented to optimize the forest quality where needed. Finally, at the end of the project, every pilot site received a forest appraisal with detailed information as well as recommendations for further usage, including forest management options. At the project's end, the pilot sites were ceremoniously awarded the designations “certified recreational forest” or “certified therapeutic forest”.

2.4. Training of Medical Staff

In order to provide high-quality medical care and new health programs in the certified forests, the third part of the project was the training of specialized professionals in the pilot regions. For recreational forests, so-called “forest health trainers”, and for therapeutic forests, “forest therapists” were trained on the basis of highly standardized curricula. Both curricula were developed by medical experts, a health scientist trained in forest therapy, a landscape ecologist, and forest scientists in a joint transdisciplinary approach to combine medical, forestry, climatological, as well as ecological knowledge in this advanced training on forest bathing and forest therapy (block seminar with examination, 6-month internship, final thesis, supervision if necessary).

3. Results

3.1. Development of the Bavarian Criteria Catalog for the Designation of Recreational and Therapeutic Forests (BayKK KuH)

3.1.1. Mission Statement for Recreational and Therapeutic Forests in Bavaria

Based on the literature research as well as application and planning-oriented considerations, a guiding principle was formulated as a basis for the creation of the Bavarian criteria catalog (BayKK KuH) [19]: “A certified recreational and therapeutic forest as a place of recreation for prevention and therapy should be an aesthetically high-quality forest with the greatest possible biological diversity, and a distinctive forest interior climate that is largely free of anthropogenic noise and environmental pollution. Its health effect can be deepened through a holistic experience of nature by stimulating an emotional connection to nature in visitors/patients. The connection to nature is thus assigned a central role as an individual health resource”. The aim of the Bavarian method is to designate aesthetically pleasing forest areas that are managed according to the criteria of nature-appropriate forestry, whereby the concerns of recreational and therapeutic forest development are to be harmonized with the concerns of forest management and nature and species conservation.

3.1.2. Structure and Content of the Criteria Catalog

The Bavarian catalog of criteria for recreational and therapeutic forests is the central component of the manual for the designation of certified recreational and therapeutic forests in Bavaria [19]. The criteria are organized into four main domains, in which various

subsets of criteria are grouped together (Table 2). The criterion catalog BayKK KuH is available in detail in English in Supplementary Materials (Table S2).

Table 2. Overview of the structure of the Bavarian criteria catalog of recreational and therapeutic forests (BayKK KuH).

BayKK Recreational Forest	BayKK Therapeutic Forest
Areas of use: Rest and activity zone	Areas of use: Rest and activity zone, therapy sites
General criteria: Forest size, accessibility, topography/terrain, tranquility, air purity in the forest stand.	
Forest-specific criteria: Tree population, forest floor/topography, special features, forest “sensory rooms”, forest environment, forest management	
Infrastructure: Road and path network, buildings	Infrastructure and safety: Road and path network, structural facilities, rescue plan for emergencies, partially barrier-free paths
Measures and procedures for health promotion: Decelerating forest health training, preventive climatotherapy, sports and exercise training, Kneipp applications. Qualified personnel: Forest Health Trainer	Forest therapy procedures: Nature-based mindfulness programs, relaxation-promoting forest therapy, body-mind procedures, psychotherapy, climatotherapy, sports and movement therapy, respiratory therapy, Kneipp therapy, occupational and physiotherapy, art therapy. Qualified personnel: Forest therapist

For each main criterion with the respective sub-criteria, minimum and optimum equipment features were defined for recreational and therapy forests. The minimum criteria must be met for the certification (e.g., forest-specific requirement: tree population with a minimum varied tree population, see Table S2). In addition to the development of general and specific forest criteria and various programs of preventive and therapeutic interventions in the forest (Table 2), the basic division of the recreational and therapeutic forest into different areas of use resulted from on-site experience in order to offer different therapeutic measures and to be able to separate competing activities. The rest zone is located in the center of a recreational or therapeutic forest, where tranquility and privacy are best guaranteed. This area can be used predominantly for the application of calming and relaxing procedures. The activity zone surrounds the quiet zone and offers alternative and expansion options. It is mainly used to guide activity-related measures. However, it also represents a kind of buffer zone, e.g., against noise emissions. In addition, fixed therapy places for group or individual therapy were set up in the therapy forest within both zones to provide more security. Depending on the preventive or therapeutic objective, different interventions can be carried out in the recreational or therapeutic forest (Table 3).

In general, the certification of a therapeutic forest is based on the criteria of the recreational forest with significant additions in terms of safety aspects, therapy places, and other infrastructural equipment of the therapeutic forest adapted to the patient group/indication, a larger scope of interventions, and through the instruction of medical professionals trained in forest therapy.

In summary, the scientifically based and field-tested Bavarian catalog of criteria for recreational or therapeutic forests addresses four different main domains: general requirements, forest-specific requirements, infrastructural and safety issues, and measures/interventions for preventive or therapeutic programs. Each domain contains several sub-criteria that describe the necessary requirements in detail. Within the recreational or therapeutic forest, there are special “activity zones” or “rest zones” that can be used for selected interventions. Thus, the focus of the project was on developing structural certification standards for forests; experimental testing of physiological effects was not part of the project. This was also justified by the fact that there are already numerous positively documented effects of forest recreation on human health [1–6].

Table 3. Health-promoting activities and therapeutic interventions in the recreational and therapeutic forest, divided into their respective zones.

Recreational Forest	Therapeutic Forest
<p>Rest zone</p> <ul style="list-style-type: none"> Decelerating forest health training (mindfulness-based activities in the forest, body–mind methods, qigong, restorative Yin yoga, relaxation methods, breathing training) Preventive climatotherapy (climatic terrain cure “light”, fresh air rest cure, sunbathing) 	<p>Rest zone with therapy places</p> <ul style="list-style-type: none"> Nature-based mindfulness practice (nature connection through MBSR) Body–mind medicine: qigong, restorative yoga (Yin yoga) Climatherapeutic procedures: fresh air rest cure, heliotherapy Breathing therapy, voice, and smell training Relaxation therapy (progressive muscle relaxation) Body-oriented psychotherapy with body awareness exercises/body consciousness training, concentrative movement therapy Patient-centered talk therapy Art-therapeutic work with nature materials (wood, leaves, moss, etc.)
<p>Activity zone</p> <ul style="list-style-type: none"> Body–mind methods: tai chi, yoga Preventive climatotherapy: climatic terrain cure “light” with focus on mindful hiking Sports and movement training (strength and endurance training, yoga, sensorimotor training) Kneipp treatments (foot or arm bath, stepping on the dew, snow rubs) 	<p>Activity zone with therapy places</p> <ul style="list-style-type: none"> Body–mind medicine: tai chi, yoga Climatotherapy: climatic terrain cure Sports and exercise therapy: endurance- or coordination-based training (e.g., stretching, fascia training, gymnastics, light hiking). Kneipp therapy (water treading, dew treading, barefoot walking) Occupational therapy: improvement of gross and fine motor skills (e.g., working with natural materials) Physiotherapy: green gym (green back school), gait and sensorimotor training, balance/coordination training, fall prophylaxis Ergotherapy: training fine motor skills

3.2. Certification of Recreational and Therapeutic Forests in Bavaria

Every potential recreational or therapeutic forest must meet the required minimum criteria for certification: no criterion may be classified as unsuitable, and there may be only minor limitations that can be improved in the near future (e.g., forest maintenance). In the 15 pilot health resorts, a total of 40 different forest areas were examined on the basis of the developed criteria catalog BayKK KuH. Based on the inspection results, a summary color-coded rating matrix was created for each site (see Supplementary Table S1), which served as a basis for discussion between the project team and the representatives of the pilot sites for the further health-promoting development of the forest. If all qualification criteria were met, a certificate was issued.

Out of 40 forest areas, 13 certified recreational forests and 3 certified therapeutic forests were developed in 13 pilot sites at the end of the project. The size of the certified recreational and therapeutic forests is between 6 ha and 111 ha (0.06–1.11 km²), the forest areas are mainly in public ownership, and only a few forests are private. The forests represent a broad spectrum of different forest types (mixed forest, deciduous forest, coniferous forest, mountain forest). In two pilot sites, no forest areas could be designated due to conflicts of use (no permission of the landowner or intense tourism). In all forest areas assessed, there were no comparable certifications from other providers to dedicate the forest for nature-based health interventions.

As a next step, the certified forests were officially designated and awarded as recreational or therapeutic forests (see Section 3.4).

3.3. Training of Medical Staff

From the pilot sites, medical personnel were trained as forest health trainers or forest therapists in order to be able to offer qualified services and interventions in the forest. A total of 39 persons participated in two professional trainings (29 persons as forest health trainers, 18 persons as forest therapists) at the Competence Centre of Forest Medicine and Nature Therapy in Bad Wörishofen [20]. The main focus of the professional training is the preventive and therapeutic intervention in nature and the use of the forest as a co-therapist. Besides personal professional development, an important objective of the training was the development of a preventive and/or therapeutic nature-based treatment concept. This concept had to outline, in detail, the existing health resources with the new therapeutic possibilities in the recreational or therapeutic forest on the basis of a written final thesis. The professional training certificate could only be obtained after passing the examination and receiving a positive appraisal of the submitted written work by the course instructor.

3.4. Strategy for the Future Designation and Awarding of Recreational and Therapeutic Forests in Bavaria, Germany

In order to be able to designate certified recreational and therapeutic forests after the end of the project, a certification body had to be established and the designation process needed to be developed in a structured and transparent manner. The certification body, which in the future will assess and certify forests according to the developed qualification standard BayKK KuH [19], was affiliated with the Competence Centre for Forest Medicine and Nature Therapy in Bad Wörishofen, Germany [20]. The future designation of a certified recreational or therapeutic forest will be carried out by the Bavarian Spa Association e.V. with the award of the quality seal “Bavarian Forest Health” [21]. Interested persons/institutions apply to the Bavarian Spa Association (BHV) for the designation of a recreational and/or therapeutic forest. The BHV forwards the request to the certification body at the Competence Centre of Forest Medicine and Nature Therapy in Bad Wörishofen, which assesses the forest quality with external experts based on the BayKK KuH. The certification report of the inspected forest area(s) will be passed on to the BHV as the designation body. If the assessment was positive, the BHV awards the designation certificate with the quality seal “Bavarian Forest Health” to the applicant. The prerequisites for the designation and awarding of the quality seal are (1) a positive forest assessment by the certification body and (2) the presence of qualified personnel (Forest Health Trainer, Forest Therapist). Re-certification is necessary every 5 years.

Likewise, interested stakeholders (municipalities, forest owners, tourism centers) can use a self-assessment questionnaire published in the “Manual for Certified Bavarian Recreational and Therapeutic Forests” [19] to check the quality of their forests in advance for their basic suitability for designation and thus prepare themselves for certification.

4. Discussion

4.1. Content of the Bavarian Criteria Catalog for Recreational and Therapeutic Forests

The Bavarian certification standard “BayKK KuH” was developed and implemented in a three-year science-led and practice-oriented research project [19]. This two-track approach enabled direct practical testing and, if necessary, adaptation of the defined criteria in the project. Due to the interdisciplinary research team, both medical and landscape-ecological issues were considered, and the criteria catalog was thus employed on a broad basis in order to implement a comprehensive standard for recreational and therapeutic forests.

The Bavarian criteria catalog defines a biodiverse and aesthetically pleasing natural forest as a guiding principle. This forest aesthetic approach, which is presented in detail by Stölb (2016), focuses on human perception of nature and the health benefits of nature [22]. The forest aesthetic effect of natural forests is centrally stipulated in the catalog of criteria, so that little to no structural facilities are established in order to foster nature connectedness and to avoid the effort and costs of construction and maintenance. An important goal is therefore the direct interaction between people and nature to strengthen the connec-

tion to nature, which is to be implemented in a preventive or therapeutic setting. This guiding principle contrasts with the first recreational and therapeutic forest concept of Mecklenburg–Western Pomerania [18], which envisages an extensive structural infrastructure (several exercise stations) in the recreational or therapeutic forest. The Bavarian criteria catalog focuses on immersion in the forest with all the senses in order to make the naturalness and diversity of nature usable as a recreational experience and to promote health, comparable to the Japanese concept of healing forests [9]. To this end, quiet and activity-based recreational places, as well as therapeutic sites (rest and activity zone, therapy places), were developed in order to be able to optimally use different interventions (Table 3). This novel division of the forest into defined zones is due to practical experience and makes it possible to better coordinate and guide competing activities (mindfulness practice vs. endurance training). This is in contrast to the Mecklenburg–Western Pomeranian criteria catalog as well as the South Korean qualification standards, which do not differentiate into different zones or special therapy places in the therapeutic forest.

In the new Bavarian catalog of criteria for recreational and therapeutic forests BayKK KuH [19], the general requirements represent central designation criteria that every recreational or therapeutic forest must demonstrate: a minimum forest size, accessibility, tranquility, as well as good air quality in the forest stand (Table 2). The empirically determined minimum size was set at 6 ha, which can be part of a larger forest area. The defined minimum size ensures a favorable forest interior climate, noise attenuation, and alternative forest areas that still have reserve space for damage events (e.g., windbreak). This minimum size was determined by practical experiences in order to quantify a large enough forest area required for a 3 h forest bathing intervention with different spots [19]. It is smaller than the minimum size of recreational and therapeutic forests in Mecklenburg–Western Pomerania (10 ha) [18]. This is due to the fact that there are many more private landowners with many small plots in Bavaria. Therefore, the minimum size for preventive or therapeutic measures was adapted to regional conditions. The forest size is nevertheless large enough to allow an intensive forest experience. Another central quality criterion for the designation as a recreational and therapeutic forest is the tranquility of the forest. Along with the good air quality and sport activities, this is the main reason why visitors seek out forests for recreation [23,24]. Twenty percent of Europeans suffer from high levels of noise pollution, which causes or exacerbates many health problems and is, therefore, a growing environmental issue [25]. Experiencing natural silence is, therefore, a key experience in the forest to find calmness, serenity, and peace [26]. The natural sounds of the forest are particularly valuable and beneficial to health, relaxing the body and mind [27]. The protection of ‘quiet natural areas’ for recreational purposes in or around cities is required by the European Union to protect people from harmful noise pollution [28]. Thus, the highest possible absence of anthropogenic noise emissions was required for the rest zone, as recommended by the EU Environmental Noise Directive (35 dB(A)) [28]. However, an evaluation of the sound level based on the sound values is not meaningful, since, for example, the soundscape of 50 dB(A) birdsong in the forest is perceived significantly differently by forest visitors than the same volume of road noise. Therefore, it is recommended to measure the quietness in the forest as “perceived acoustic quality of stay” (psychoacoustic approach), for which soundscape analysis is very suitable [29–32]. However, no quantitative survey of sound level heights or subjectively perceived ambient noise could be collected in the project by means of soundwalks to confirm the EU target value for quiet areas. In practice, finding tranquil forests turned out to be essential but often difficult; thus, in some cases, quietness in the forest was prioritized at the expense of accessibility. For example, no quiet forest area could be found in one pilot region, so the designation had to be rejected. In several pilot regions, noise pollution was one of the most frequent reasons why more forest areas had to be visited in order to find a health-promoting quietness in the forest. Due to this fact, a test protocol for the acoustic quality of different forest stands has been developed together with an acoustic sound expert to conduct standardized soundwalks in forest areas, but this could not be tested in the project due to lack of time [33]. The Mecklenburg–Western Pomeranian

criteria catalog also addresses the noise reduction quality of forests and its positive health effects by the absence of sound emission sources in the immediate vicinity (roads, sports fields, bathing areas, industrial/agricultural facilities) as well as the absence of driveways within the site available to motorized vehicles for public use [18]. Interestingly, the South Korean criteria catalog does not include any noise criteria for recreational or therapeutic forests, as the forests are located far away from anthropogenic noise emitters, and thus, noise pollution is non-existent [10]. Another central criterion is accessibility, including the reachability of the recreational and therapeutic forest in order to be able to carry out preventive and therapeutic programmes. Reachability of the forest within walking distance is desirable, but this could not be implemented in all pilot regions. For decentralized forest areas, shuttle services and external guest meeting points were recommended. Thus, walkable forest areas that are safely accessible are important, which is why the topography of the terrain is also an important criterion. For a deeper experience of nature, it is important to interact directly with nature [34,35]. This is best achieved in the interior of the forest with low underground vegetation in order to experience nature with all senses without being observed [36]. On the one hand, topography determines accessibility; on the other hand, a moving ground relief is particularly attractive to recreation seekers [37]. Another quality criterion in the forest is good air quality, as the forest accumulates or assimilates anthropogenic air pollutants [5]. Since no qualitative air pollution data were available in the forests of the 15 pilot regions, the standards for air quality in health resorts, which have to be regularly monitored, were used as a reference [38]. In addition, air pollution (NO_x, SO_x, fine dust PM₁₀, PM_{2.5}) was measured randomly with a mobile air measuring device (Flow 2.0), which confirmed good to very good air quality of the forest interior. The latest research on BVOCs can reliably calculate BVOC concentrations in the different forests based on the MEGAN model [39] due to effectively predicted spatiotemporal patterns of terpene emissions in the study areas. This BVOC calculation could be used to identify the BVOC concentration in the certified forests in order to increase immunostrengthening. Due to limited financial resources, measurements of the concentration of the microbiome in the air and soil could not be included in this project, although this aspect seems to have a positive and invisible interaction with the human immune system [40–42].

As a forest-specific requirement (Table 2), the criteria catalog provides information on the quality of the tree population, the forest floor, additional special features, forest images or special “sensory rooms”, as well as the forest environment and forest management, based on their recreational potential [37,43–46]. Basic requirements for tree population are varied forest area (deciduous forest, mixed forest, coniferous forest) with different (site-appropriate) tree species in different age classes, prominent individual trees, as well as light and dense forest areas with a largely closed canopy and diverse light conditions. Park et al. (2012) already describe a canopy that is as closed as possible as particularly beneficial to health [47]. A recent study detected more differentiated relations between the sky–leaf–trunk ratio of the canopy in regard to stress reduction [48]. Contrasting forest areas increase the experience value and enable a variety of different sensory impressions, which in turn have a positive effect on human health [49]. Consequently, the BayKK KuH stipulates that recreational or therapeutic forests must have at least three different “sensory rooms” or forest images (e.g., deciduous forest area, coniferous forest area, clearing), which are based on the “perceived sensory dimensions” for designing forests for restorative response [36]. Furthermore, so-called special features have a particularly high value in forest aesthetics and strengthen recreation and health promotion. Golos (2013) assigns a high recreational value to forest areas near water bodies or forest clearings/meadows [45], which could be confirmed in the project. Water bodies enhanced forest areas in several cases. Viewpoints or view axes were also explicitly included as highlights, as well as rock formations [46]. These “highlight areas” are thus also health beneficial and effective as special sensory rooms [50]. For a positive perception of the forest by the visitors or patients, a near-natural but hardly perceptible forest management in the recreational and therapeutic forest is indispensable [22,51], whereby a certain degree of tidiness is appreciated by forest

visitors [44]. Similarly, the forest environment should not have any disturbing infrastructure. Thus, a climate-resilient, site-appropriate, structurally rich, and contrasting (mixed) forest should be developed in coordination between the owner, the local forestry authority, and the recreational or therapeutic forest operator. The long-term objective should be defined in a “forest design concept”.

In addition to the general and forest-specific aspects, the BayKK KuH also mentions infrastructural criteria: here, it is particularly important to have a walkable and varied network of paths in the forest with seating in the stand or benches along the path [51]. In the therapy forest, partially barrier-free paths without stairs or other obstacles must be provided. In this type of forest, higher safety expectations must be met, so a rescue concept for emergencies has to be developed by the operator of the therapeutic forest together with the local rescue station.

The last main requirement of the criteria catalog for recreational and therapeutic forests lists differentiated health-promoting measures and therapeutic interventions for the recreational or therapeutic forest, whereby in the therapeutic forest the interventions are usually carried out at separate therapy places for reasons of road safety obligations. The recommended list of therapeutic interventions (Table 3) is rooted in the reviewed literature and the medical–therapeutic expertise of the project team.

In summary, the Bavarian criteria catalog of recreational and therapeutic forests covers all important and necessary features that are in line with other certification standards, e.g., the criteria catalog of Mecklenburg–Western Pomerania or the South Korean certification standard. With the introduction of the “rest and activity zone”, BayKK KuH has introduced new features. In tandem with landscape aesthetics and forest management, these criteria also take into account the user preferences of forest visitors. Furthermore, this certification focuses on the therapeutic and recreational effects of forest recreation in order to better link medical services with forest functions and management.

4.2. Comparison of the Bavarian Criteria Catalog to other National and International Standards

The Bavarian criteria catalog of recreational and therapeutic forests provides a science-based and field-tested guideline for the implementation of recreational and therapeutic forests based on the Bavarian Forest Act for any interested municipality/facility or forest owner [19]. It is now the first comprehensive publicly available German-language standard for the development and designation of certified recreational and therapeutic forests. At the national level, the Mecklenburg–Western Pomeranian Spa Association updated its catalog of criteria for cure and healing forests online in 2021 [16], and the Bavarian Spa Association started its designation process in 2022 [19]. The German PEFC certification service for sustainable forest management has also launched the topic of cure and therapeutic forests in 2020 with a different type of award process [52]. Differences to the Bavarian criteria are apparent: in addition to different content, the PEFC audit in particular is carried out by a forestry PEFC assessor who decides, together with the forest owners, which forest area would be suitable as a recreational or therapeutic forest. No medical or forest therapy expert is involved in this certification, which is in contrast to the two certification systems of the Spa Associations. Experiences from this research project show that many foresters have a sense for special forest features, but do not know what features a recreational or therapeutic forest must have in order to be beneficial to health. German PEFC certification seems to be more of a national trend for already PEFC-certified forests. The quality of the certification is unclear from a medical perspective, as features of therapeutically effective landscapes are not sufficiently taken into account.

Internationally, different types of forests are certified, such as Forest Therapy Trails by the Association of Nature and Forest Therapy [53] or forests for recreation or therapy in Japan or South Korea [9–11]. South Korea, as one of the major pioneers in creating a forest health assessment system, developed a detailed assessment matrix for recreational forests, therapeutic forests, recreational forest sports facilities, and forest campsites in 2010, which was revised in 2016 [10]. In comparison, the BayKK KuH meets all validity criteria

of the Korean evaluation assessments for recreational and therapeutic forests, even though it is structured differently. However, one difference is noteworthy: the South Korean certification system does not include any criteria for noise pollution, as there seems to be none in the certified forest areas. The criteria of the BayKK KuH, on the other hand, define quietness in the forest as a central recreational criterion for the designation of a recreational and therapeutic forest, because the extent of anthropogenic noise pollution is detrimental to health in Germany or Europe. Therefore, this criterion is one of the most important, along with forest size and accessibility, for making the recreational effect of the forest more tangible. This criterion is also underpinned by the EU Environmental Noise Directive in relation to the protection of 'Quiet Areas' near cities [28]. Furthermore, the Japanese Forest Therapy Society demands psychological and physiological experiments in order to authorize certification for "Forest Therapy" and "Forest Therapy Road" [9]. Additionally, current research underpins the effectiveness of forest healing programs in South Korea [54]. The first evidence of the effectiveness of the Bavarian recreational and therapeutic forests will be tested in a randomized clinical trial in a Bavarian health resort in 2024.

4.3. Challenges in the Designation of Recreational and Therapeutic Forests

Within the project, the biggest challenges to the designation of a recreational or therapeutic forest were issues of road safety, liability, and contract terms. Concerns were mainly raised by the owners of the areas, especially private owners, which had to be dispelled in a constant discourse. The main barriers to the designation of recreational or therapeutic forests identified during the project were (1) noise pollution in the forest (car or train traffic, neighboring children's playground or sports fields, aircraft noise), (2) lack of accessibility of the forest (e.g., terrain is too steep, wet, or overgrown), and (3) conflicts of use (e.g., too many competing tourism activities). Especially in pilot regions in the south of Bavaria, which are particularly characterized by tourism, the designation of little-visited, quiet forests has proven to be very problematic due to the overuse of nature. Furthermore, the designation of recreational and therapeutic forests may also lead to conflicts with nature conservation or species protection if protected animal or plant species occur in the planned recreational or therapeutic forest area. If necessary, coordination with the nature conservation authority should take place.

4.4. Developing a Designation Process for the Future

The newly introduced certification and designation procedure BayKK KuH, as well as the time interval of 5 years of re-certification of recreational and therapeutic forests, is comparable to the award procedure in Mecklenburg–Western Pomerania [18].

The Bavarian criteria catalog is not linked to other landscape, ecological, or environmental standards, as the Bavarian Spa Association acts as an umbrella organization for Bavarian health resorts in order to combine high-quality nature-based medicine with a health tourism approach. In order to increase the use of the forest for forest therapy services, it is now planned to integrate the Bavarian designation procedure into the Bavarian health resorts guideline and to create a new forest-related health resort qualification.

4.5. Limitations

Due to various circumstances, there are some limitations related to the research project: although there were 15 pilot regions all over Bavaria, not all possible 19 Bavarian forest types could be included in the assessment. Since the majority of the forest stands fit into the findings, the results are valid and represent the existing diversity of Bavarian forests. There is also no concrete evidence on the health effects of different forest characteristics such as age or density of tree cover or the effectiveness of different forest types (deciduous forest versus mixed forest) on specific diseases, so these parameters were evaluated purely from a forest aesthetics perspective. The air quality criterion did not pose a problem within the research project, as all pilot sites are required to have comprehensive and regular air quality assessments due to their highly predicated health resort status. Due to time constraints,

these standards were used in the criteria catalog. Should sites apply in the future that do not have higher predicate health resort status and thus cannot provide evidence of regular air quality assessments, this will require further and more detailed processing. For the criterion of quietness, which plays a central role in a certified recreational or therapeutic forest, reference was made to existing values from higher-level planning. A questionnaire for empirical testing of noise pollution in the forest was developed [33] but could not be used due to time constraints. Finally, forest therapy is also a new field of treatment for which indication-specific proof of efficacy is missing in order to achieve recognition and billability by the German health insurance system. Despite the current lack of billability for forest therapy, innovative therapy approaches are being tested experimentally in clinical settings [55]. At the same time, forest bathing interventions are being co-financed as health preventive courses by statutory health insurance companies as a preventive service according to §20 SGB V if the appropriate qualification of the guide/trainer has been proven [56]. Moreover, profound clinical studies to prove the health effects are important in order to be able to become part of the national health system. In conclusion, there are still a few limitations due to a lack of research, but future research can be expected to fill this gap.

5. Conclusions

The Bavarian BayKK KuH represents the knowledge-based and practice-oriented synthesis of scientific experience and field-tested preventive and therapeutic measures and is thus a transparent milestone in the implementation of nature-based interventions. Based on the published 'Manual for the designation of certified Bavarian recreational and therapeutic forests', interested stakeholders (municipalities, forest owners, tourism centers) can from now on use the detailed instructions to pre-evaluate their forests for qualification and get prepared for certification. Other German federal states or German-speaking countries may adapt the certification guideline. In general, the application and transferability of the designation criteria to other countries is possible under consideration of different forest stands and bioclimatic conditions, national forest laws, and relevant legislation.

Future research questions should address the further development of practice-oriented indication-specific therapeutic interventions by evidence-based study designs for intervention studies. Additionally, complementary soundwalk tests to assess the perceived acoustic quality of different forest sites in the certified forests should be used as an instrument to receive better insights into the psychoacoustic effects of forest features and their tranquility on human health. Similarly, future analyses of air quality, including its various components (BVOCs, terpenes, air and soil microbiome) will be important to verify positive health effects. In addition, greater transdisciplinary research is needed to bring together the different actors involved in nature-based interventions, e.g., to explore synergies between FSC forest management and BayKK KuH. Finally, a common international framework of minimum requirements for certified recreational and therapeutic forests is desirable to strengthen forest medicine as a public health approach worldwide.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/f14061273/s1>, Table S1: Rating matrix of inspected forest areas based on the site visit. Table S2: Bavarian criteria catalog of recreational and therapeutic forests [19]. References [57–85] are cited in the supplementary materials.

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