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CONSIDERING PROTECTED AREAS AS THERAPEUTIC LANDSCAPES: THE ROLE OF CULTURAL AND NATURAL HERITAGE IN COMPREHENSIVE SENSORY WELL-BEING

ABSTRACT

Spa complexes are primarily interpreted through the curative properties of mineral waters and the immediate medical complex, often overlooking the richness of the wider landscape. This paper reinterprets the Slankamen Spa (Stari Slankamen, Serbia) as a therapeutic landscape that jointly supports sensory and emotional well-being through cultural heritage, protected natural areas, and historically embedded spatial structures. The study adopts a qualitative, interpretative spatial approach grounded in the concepts of therapeutic landscapes and landscape memory. Methodologically, it combines a focused review of selected literature that motivated the research, observational abstraction of persistent spatial elements from an early-eighteenth-century historical map in correlation with contemporary orthophotographic imagery, and finally, spatial overlay mapping of cultural heritage assets and natural protection regimes. Rather than performing a strict cartographic comparison, the analysis identifies enduring spatial axes, corridors, and morphological relationships through which historical memory remains embedded in the present-day landscape. The results delineate three analytical areas characterised by different degrees of cultural–natural interweaving. By operationalising landscape memory through interpretative mapping, the paper contributes a transferable conceptual and methodological framework for rethinking spa environments as open, heritage-based therapeutic landscapes.

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KEY WORDS
SPA LANDSCAPES
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1. INTRODUCTION

A sojourn at a spa complex represents one of the most apparent examples of consuming the benefits of land, as their therapeutic effects are inseparable from the specific spatial, environmental, and cultural contexts in which they are embedded. Unlike therapeutic treatments that can be relocated or performed independently of place, spa therapies operate only through a direct engagement with their surroundings. Traditionally, however, the spa has been perceived primarily as a clinical institution, with analytical focus placed on the healing properties of mineral waters and the systematic arrangement of medical facilities and their adjacent parks. Such a reductionist perspective tends to marginalise the wider landscape, despite its potential role in shaping holistic recovery and sensory well-being.

Over the past three decades, the concept of therapeutic landscapes has broadened the understanding of healing environments beyond the confines of clinical facilities. Some of the earliest mentions of therapeutic landscapes can be found in the work of Gesler (1992), who emphasises health effects as an outcome of the interaction between environmental and sociological factors, introducing notions such as “sense of place, landscapes of meaning, authentic and inauthentic landscapes, landscapes of the mind, and landscapes as texts (texts of negotiated reality), territoriality, and legitimization, among others – used within cultural geography to interpret the spaces inhabited by people. Experiential attachment in health-related spatial research. Building on this foundation, Williams (1998) emphasised the importance of emotional and experiential dimensions in therapeutic environments, arguing that healing processes are inseparable from human engagement with space. Within this theoretical framework, spa landscapes can be understood not merely as sites of medical intervention but as complex environments in which natural features, built structures, cultural memory, and everyday practices collectively contribute to well-being.

In the context of Serbia, as an example of a post-socialist society, spa complexes constitute a particularly revealing spatial typology. Historically, they have functioned as hybrid environments, simultaneously combining medical institutions, natural assets and social resorts, emerging across diverse periods, from Roman and Ottoman bath traditions to nineteenth-century royal spas and twentieth-century workers' resorts. What unites these phases is the continuous reliance on natural resources combined with culturally specific forms of social use. However, the post-socialist transition has profoundly altered this model. As former socially managed spa centres were subjected to privatisation and fragmented ownership structures, their spatial coherence was frequently disrupted, resulting in reduced accessibility, functional isolation, and the gradual erosion of collective memory associated with these places (Ljubisavljević & Radosavljević, 2018; Vujošević et al., 2012). In many cases, the spa has been reduced to an enclosed clinical complex, detached from the surrounding cultural and natural landscapes that historically constituted its therapeutic foundation.

This fragmentation is particularly problematic when considered through the lens of contemporary understandings of wellness. By definition, it encompasses the integrated well-being of body, mind, and spirit, extending beyond purely physiological treatment to include sensory, emotional, and experiential dimensions (Denda & Micić, 2016). From this perspective, the therapeutic value of spa environments cannot be evaluated solely based on medical infrastructure or mineral waters. Rather, it must also account for the symbolic, morphological, and sensory qualities of the surrounding landscape, including cultural heritage, historical narratives, and protected natural features. Despite this, cultural and natural heritage are often treated as separate domains within planning and protection frameworks, managed by distinct institutional systems and rarely addressed as an integrated resource for health and well-being.

Against this background, the present study addresses a critical research gap at the intersection of architecture, landscape studies, and heritage research. While existing scholarship has acknowledged the importance of therapeutic landscapes and, more recently, the role of cultural ecosystem services in well-being, there remains a lack of spatially explicit methodologies that link cultural heritage, natural protection regimes, and landscape morphology in spa contexts – particularly within post-socialist settings. Specifically, there is limited research demonstrating how layers of cultural memory and protected natural environments can be operationalised through spatial analysis and mapping to support holistic therapeutic landscapes.

The research focuses on the spa landscape of Stari Slankamen, a site characterised by an exceptional overlap of protected natural areas and historically significant cultural assets. The central aim of the study is to examine whether and how the spatial interweaving of cultural and natural heritage in this area can form the basis for redefining the spa as an open, integrative therapeutic landscape rather than an isolated medical facility. To address this aim, the study poses the following research questions:

(1) How are historical events and cultural memory inscribed in the contemporary spatial morphology of Stari Slankamen?

(2) To what extent do cultural heritage assets and protected natural zones overlap spatially, and where are they separated?

(3) How can these spatial relationships inform the development of therapeutic landscapes that support sensory and emotional well-being?

Methodologically, the research begins with a focused literature review as a prelude to the conducted research. An early-eighteenth-century map depicting the Battle of Slankamen is used as an initial historical source. Relating this ancient source to contemporary ortho-photographic imagery, persistent spatial axes, corridors, and morphological traces of memory are identified. These findings are subsequently overlaid with current protection regimes and the distribution of immovable cultural monuments in order to delineate zones of varying cultural–natural interconnection. Through this approach, the study seeks to establish a spatial framework for identifying areas with the greatest potential for integrative therapeutic and cultural landscape interventions.

The paper is structured as follows. After the introduction, the theoretical framework outlines key concepts related to therapeutic landscapes, cultural landscapes, and cultural ecosystem services, establishing the analytical lenses used in the study. The methodology section then details the research design, data sources, and mapping procedures. This is followed by a spatial and historical contextualization of the Stari Slankamen area, which provides the empirical basis for the analysis. The subsequent sections present and discuss the results of the cartographic and spatial analyses, before concluding with recommendations for future research and landscape-based therapeutic strategies.

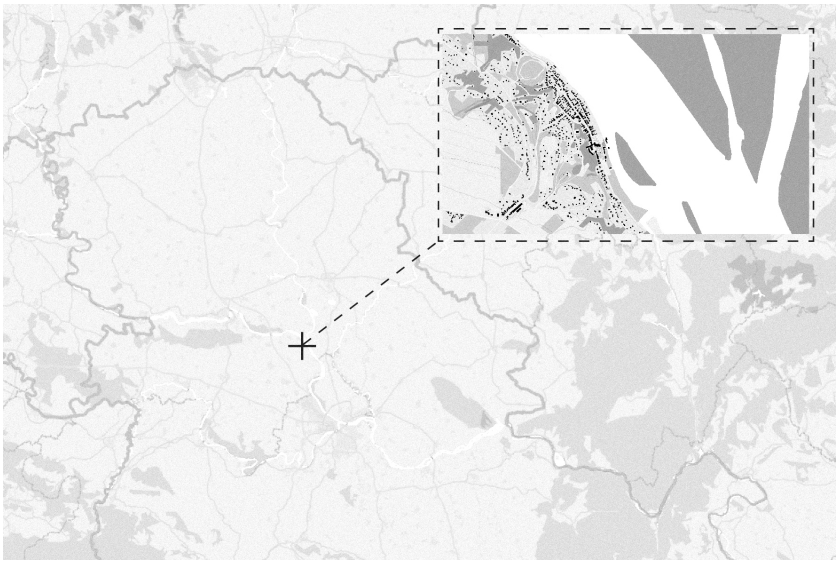


FIGURE 1. Spatial contextualization of the Stari Slankamen area
Source: MapTiler, n.d.

2. THEORETICAL FRAMEWORK

2.1. Therapeutic landscapes as spatial systems of well-being

The concept of therapeutic landscapes provides a foundational framework for understanding how spatial environments contribute to human health beyond the boundaries of formal medical institutions. Introduced within cultural geography and medical geography, the notion emphasises that healing is not produced solely through clinical intervention, but through the interaction between people, place, and meaning (Gesler, 1992). In this perspective, therapeutic effects emerge from a synergy of factors such as physical settings, social practices, symbolic values, and lived experiences, rather than from isolated environmental attributes.

Gesler's formulation marked a shift away from purely biomedical interpretations of health toward a relational understanding of space, in which landscapes function as active agents in therapeutic processes. Importantly, this approach acknowledges that landscapes operate simultaneously on multiple levels: as material environments shaped by natural and built elements; as social spaces structured by patterns of use, accessibility, and interaction; and as

symbolic spaces imbued with cultural meanings and collective memories. The therapeutic potential of a landscape thus resides not in any single component, but in the dynamic interplay among these layers.

Subsequent work by Williams (1998) further elaborated the experiential dimension of therapeutic landscapes, foregrounding concepts such as emotional attachment to place, subjective perception, and embodied experience. From this humanistic standpoint, healing environments are understood as spaces that support reflection, comfort, and a sense of belonging, often through everyday practices such as walking, resting, or social encounters. These experiences are deeply context-dependent and cannot be detached from the specific spatial and cultural configurations in which they occur.

Within spa environments, the relevance of therapeutic landscape theory becomes particularly pronounced. Spas are inherently place-bound institutions, relying on specific natural resources and historically developed spatial arrangements. However, when interpreted exclusively as medical facilities, their therapeutic scope is artificially narrowed. By contrast, when approached as therapeutic landscapes, spas can be understood as open spatial systems in which treatment extends into the surrounding environment, incorporating natural features, cultural heritage, and patterns of movement and perception. This shift in perspective provides the theoretical basis for examining spa territories not as isolated enclaves, but as integrated landscapes of well-being.

In the context of this study, the concept of therapeutic landscapes serves as the primary analytical lens for reassessing the Slankamen Spa area. Rather than focusing on clinical outcomes, the analysis emphasises spatial relationships, experiential qualities, and symbolic dimensions of the landscape. This framework legitimises the investigation of historical layers, protected natural areas, and cultural heritage as active components of a therapeutic environment, thereby setting the stage for a spatially oriented exploration of well-being.

2.2. Landscape, memory, and place attachment

While therapeutic landscape theory provides a broad framework for understanding healing environments, the concept of landscape memory introduces a critical temporal and cultural dimension. Landscapes are not static backdrops, but repositories of historical events, practices, and meanings that persist through spatial forms, material traces, and patterns of use. As Assmann (2011) argues, cultural memory is anchored in material and spatial media that enable societies to transmit meaning across generations. In this

sense, topography, built structures, and circulation routes function as carriers of memory, embedding past events into the lived experience of place.

The embeddedness of memory into landscape morphology plays a significant role in shaping place attachment, as preserved physical features and "urban reminders" mediate place memory and strengthen emotional bonds with place (Lewicka, 2008). Persistent spatial elements – such as paths, fortifications, landmarks, or riverbanks – create continuity between past and present, allowing historical narratives to be encountered through everyday movement and perception. These spatial traces do not merely represent history; they actively structure how individuals experience and interpret their surroundings. Through repeated engagement, landscapes of memory foster emotional bonds and a sense of identity rooted in place.

Within the framework of therapeutic landscapes, such mnemonic dimensions acquire particular significance. Emotional attachment to place has been identified as a key factor in restorative experiences, contributing to feelings of security, familiarity, and meaning. When individuals engage with landscapes that convey historical depth and cultural significance, the therapeutic effect is amplified by narrative and symbolic layers that extend beyond sensory perception alone. The landscape thus becomes a medium through which personal experience intersects with collective memory.

For spa landscapes, this relationship between memory and place attachment is especially relevant. Many spa sites are historically layered environments, shaped by long-term interactions between natural resources and human activity. The persistence of historical spatial structures – whether in the form of settlement patterns, infrastructural corridors, or commemorative landmarks – offers opportunities to interpret these environments as landscapes of memory. Engaging with such spaces through walking, observation, and interpretation can strengthen experiential continuity and enhance the holistic character of therapeutic settings.

In this research, the concept of landscape memory provides a theoretical justification for the analysis of historical cartographic sources and their comparison with contemporary spatial configurations. By identifying enduring spatial axes and corridors, the study seeks to reveal how historical events remain inscribed in the present-day morphology of Stari Slankamen. This approach positions memory not as an abstract cultural category, but as a spatial phenomenon that can be examined through mapping and morphological analysis, thereby linking heritage research directly to the study of therapeutic landscapes.

2.3. Cultural landscape and cultural ecosystem services as operational tools

In order to translate the abstract principles of therapeutic landscapes and landscape memory into a spatially analyzable framework, this study draws on the concept of the cultural landscape and the notion of cultural ecosystem services. Unlike the regulatory framework that treats nature and culture as separate domains, the cultural landscape concept explicitly recognises landscapes as the combined outcome of natural processes and long-term human activity. According to UNESCO, cultural landscapes represent the "combined works of nature and of man," emphasising the inseparability of environmental features and cultural practices in shaping lived space (UNESCO World Heritage Centre, n.d.).

This integrative understanding is particularly relevant in historically layered spa environments, where natural resources, settlement patterns, and built structures have co-evolved over extended periods. Within such contexts, cultural heritage cannot be reduced to isolated monuments, nor can natural areas be understood solely as ecological reserves. Instead, both constitute interdependent layers of a single spatial system. The concept of the cultural landscape, therefore, provides a theoretical justification for examining cultural and natural heritage as overlapping spatial phenomena rather than as administratively or functionally separate entities.

To further operationalise this integrative perspective, the study adopts the framework of cultural ecosystem services (CES). CES refer to the non-material benefits that people derive from ecosystems, including aesthetic appreciation, recreation, spiritual enrichment, sense of place, and connections to cultural identity and history (Millennium Ecosystem Assessment, 2005; Daniel et al., 2012). These services are inherently experiential and relational, aligning closely with the emphasis on perception, meaning, and attachment found in therapeutic landscape theory.

Importantly, the CES framework offers a vocabulary through which sensory and symbolic qualities of landscapes can be discussed without resorting to clinical or biomedical indicators. In the context of spa landscapes, CES, such as attention restoration, stress reduction, aesthetic experience, and engagement with cultural narratives, provide a means of articulating how protected natural areas and heritage assets contribute to well-being. While these effects are not measured quantitatively in this study, the CES perspective legitimises their consideration as spatial potentials embedded within the landscape.

Within this research, the concepts of cultural landscape and cultural ecosystem services function as operational tools that enable the translation of theoretical insights into spatial analysis. Cultural heritage sites, protected natural zones, and historically persistent spatial structures are treated as tangible proxies through which experiential and symbolic dimensions of well-being can be inferred. This approach enables the study to transition from abstract discussions of healing and memory to a concrete examination of how cultural and natural layers intersect within a specific territorial context.

2.4. Conceptual synthesis: from theory to spatial analysis

Bringing together the preceding theoretical perspectives, this study conceptualises the spa landscape as an integrated spatial system in which therapeutic potential emerges from the interaction of natural features, cultural heritage, and historically embedded spatial structures. Therapeutic landscape theory provides the overarching framework by positioning space as an active participant in processes of well-being. The concept of landscape memory introduces a temporal dimension, emphasising the role of historical continuity and cultural meaning in shaping place attachment. Finally, the notions of cultural landscape and cultural ecosystem services offer an operational language through which these abstract concepts can be examined spatially.

Based on this synthesis, the research adopts a spatial-analytical approach centred on three interrelated components. First, landscape memory is examined through the identification of persistent spatial axes, corridors, and morphological traces derived from the comparison of historical and contemporary cartographic sources. These elements are understood as material expressions of collective memory, embedding past events and practices into the present-day landscape. Second, cultural heritage is addressed through the spatial distribution of immovable cultural assets, which represent focal points of historical and symbolic significance. Third, natural heritage is considered through existing protection regimes, whose spatial extents define areas of ecological, aesthetic, and environmental value.

The intersection of these components forms the analytical core of the study. By overlaying historical spatial structures with the distribution of cultural monuments and protected natural zones, the research identifies areas where cultural and natural layers converge, as well as areas where they remain fragmented or disconnected. These overlaps are interpreted as zones with heightened potential for cultural ecosystem services and, by extension, for

therapeutic landscape development. Conversely, areas of separation highlight spatial and institutional discontinuities that may limit holistic experiences of well-being.

This conceptual framework directly informs the methodological design of the study. Rather than measuring well-being outcomes, the analysis focuses on spatial configurations that enable or constrain therapeutic experiences. Mapping and comparative cartographic analysis are thus employed not as descriptive tools, but as interpretive methods for revealing the latent relationships between memory, heritage, and protected nature. Through this approach, the spa landscape is redefined as a dynamic field of interaction in which historical depth, environmental protection, and experiential qualities collectively shape the conditions for sensory and emotional well-being.

3. METHODOLOGY

3.1. Research approach and scope

This study adopts a qualitative, interpretative spatial-research approach grounded in landscape and heritage studies. Rather than aiming to quantify well-being outcomes, the research seeks to identify spatial configurations and heritage vs. nature relationships that enable therapeutic and restorative experiences. The methodological framework is aligned with the concept of therapeutic landscapes and landscapes of memory, emphasising spatial continuity, symbolic meaning, and experiential potential.

The research design is structured around three complementary methodological steps:

(1) a focused review of selected literature that motivated the initiation of the study;

(2) observational abstraction of persistent spatial elements from historical and contemporary cartographic sources; and

(3) spatial overlay mapping of cultural and natural heritage protection regimes.

Together, these steps enable a synthesis of historical, cultural, and environmental layers into a coherent analytical framework.

3.2. Focused literature review as research motivation

The research builds upon a targeted selection of scholarly works that directly informed the formulation of the research problem and methodological approach. These studies established the conceptual relevance of therapeutic landscapes, cultural ecosystem services, and the relationship between heritage and well-being, thereby providing the intellectual impetus for initiating the present investigation.

Key contributions include Gesler's (1992) foundational articulation of therapeutic landscapes, which framed healing as a spatial and experiential phenomenon, and Williams's (1998) emphasis on emotional and experiential attachment to place. Together, these works justified the spatial and phenomenological orientation of the study. The relevance of cultural and natural heritage for well-being was further supported by research on cultural ecosystem services (Millennium Ecosystem Assessment, 2005; Daniel et al., 2012) and by recent studies demonstrating the restorative and psychological benefits of engaging with green cultural heritage (Xie et al., 2023).

Additional motivation for the research was drawn from studies addressing heritage and well-being beyond traditional cultural institutions, including investigations into heritage-based interventions and memory-oriented practices (Thomson et al., 2017; D'Andrea et al., 2022). In combination, these works highlighted the potential of heritage-rich landscapes to support sensory, emotional, and cognitive dimensions of well-being, while also revealing a gap in spatially explicit methodologies applicable to spa landscapes and protected areas.

3.3. Observational abstraction of spatial memory elements

The second methodological step consists of an interpretative observation and abstraction of spatial elements derived from historical and contemporary cartographic materials. The primary sources for this step include an early-eighteenth-century map depicting the Battle of Slankamen (created: 1702) and an image obtained from a contemporary open-source mapping platform – MapTiler. These maps are treated not as objects of strict cartographic comparison but as spatial documents that enable the identification of recurring morphological features across time.

Through close visual inspection and interpretative reading, similar spatial elements were identified and abstracted from both sources.

These elements include:

- dominant directional axes aligned with the fortress and the settlement core;
- persistent corridors and spots corresponding to historic movement routes;
- spatial relationships between elevated terrain, riverbanks, and defensive structures;
- traces of former river courses and embankment configurations influencing contemporary land use.

Rather than measuring geometric correspondence, the analysis focuses on the persistence of spatial logic and orientation. This process of data abstraction allows historical memory to be understood as a morphological phenomenon, embedded in the terrain and urban structure of Stari Slankamen. The extracted elements serve as indicators of spatial continuity and as potential carriers of collective memory, forming the basis for subsequent synthesis with heritage and protection layers.

3.4. Spatial overlay of cultural and natural heritage protection regimes

The third methodological step involves the spatial overlay of cultural and natural heritage datasets in order to assess their degree of interconnection and potential for the development of memory-based therapeutic landscapes. Data on protected natural areas and their protection regimes (Zones 2 and 3) were obtained from the *GeoSrbija* platform and relevant legal documents, while information on immovable cultural heritage assets was drawn from official heritage registers.

Using cartographic overlay techniques, the spatial positioning of cultural monuments was examined in relation to the boundaries of protected natural areas. This process made it possible to identify zones of overlap, partial intersection, and separation between cultural and natural heritage layers. Based on these spatial relationships, the study delineates three areas characterised by differing levels of cultural–natural integration.

These areas are not interpreted as finalised planning zones, but as analytical categories that reveal latent opportunities for developing memory-oriented and restorative landscape interventions. The overlay analysis thus functions as a diagnostic tool, highlighting spatial configurations where cultural ecosystem services and therapeutic landscape potentials are most likely to emerge.

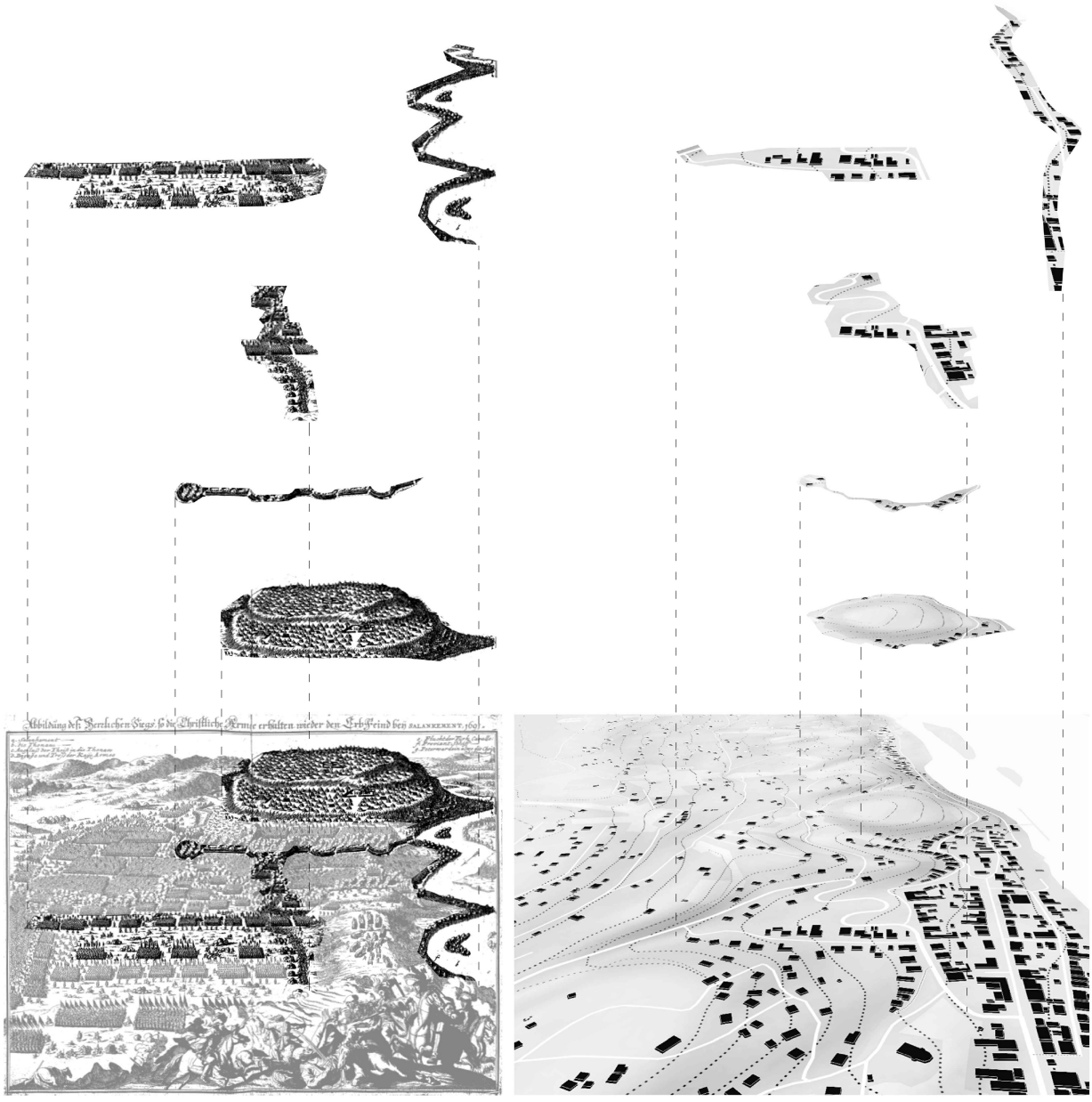


FIGURE 2. Interpretative observation and abstraction of spatial elements derived from historical and contemporary cartographic materials: (a) historical engraving of the Battle of Slankamen area, 18th century; (b) contemporary topographic map abstraction. Sources: (a) Wikimedia Commons (public domain); (b) MapTiler Cloud (n.d.).

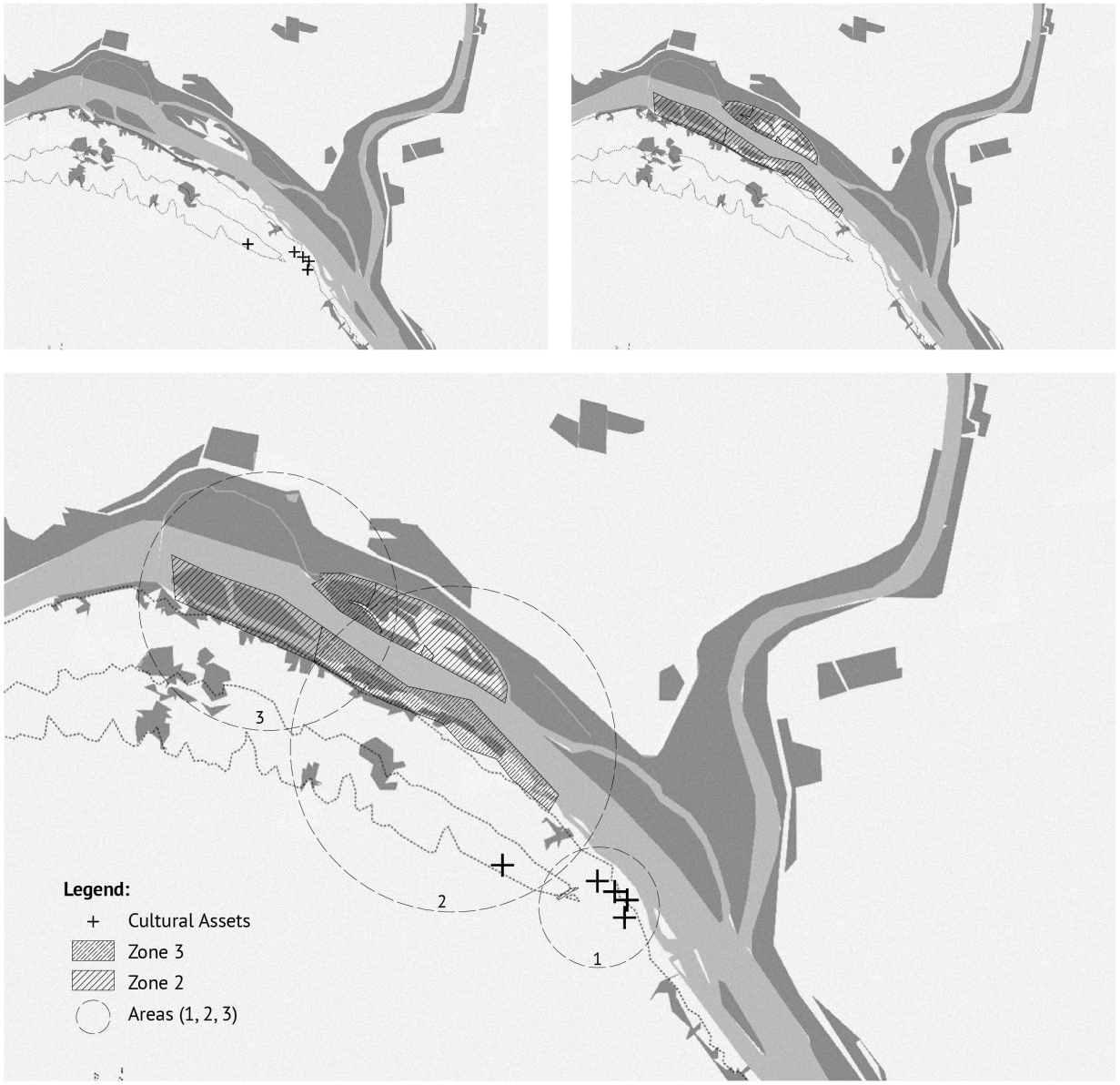


FIGURE 3. Spatial overlay of cultural and natural heritage datasets
Source: MapTiler, n.d.

3.5. Methodological limitations

The research is subject to several limitations. The historical map used in the analysis varies in scale and precision, which restricts the possibility of exact spatial alignment with contemporary map imagery. Furthermore, the study relies primarily on cartographic and desk-based analysis, without extensive field verification or user-based evaluation of experiential effects. Consequently, the findings should be interpreted as indicative rather than definitive, serving as a conceptual and spatial foundation for future, more detailed investigations.

4. ANALYSIS AND RESULTS

4.1. Analytical orientation

The analysis follows directly from the methodological framework outlined above and is structured in accordance with the three-step research approach. Rather than evaluating therapeutic effects directly, the analysis focuses on identifying spatial configurations and heritage–nature relationships that enable the emergence of memory-oriented and restorative landscape potentials. The results are therefore interpretative in nature and grounded in cartographic observation, spatial abstraction, and overlay mapping.

4.2. Abstraction of persistent spatial elements and memory structures

The observational abstraction of spatial elements from historical and contemporary cartographic sources revealed a number of persistent morphological features that structure the landscape of Stari Slankamen. Through interpretative reading of the early-eighteenth-century battlefield map and the contemporary orthophotographic image, several shared spatial characteristics were identified.

First, a dominant directional axis aligned with the position of the Slankamen fortress remains legible in the present-day settlement structure. This axis continues to organise movement and visual orientation within the settlement, indicating a long-term persistence of spatial logic rooted in historical defence and control of territory.

Second, a network of corridors corresponding to historic movement routes can be discerned in the contemporary landscape. These corridors follow topographic conditions and connect elevated terrain with the riverbank, reflecting a continuity between historic and present-day patterns of access and movement.

Third, the relationship between the built environment and the river landscape demonstrates morphological continuity. Traces of former river courses and embankment configurations, visible in the historical map, correspond to present-day landforms and settlement edges, suggesting that hydrological and defensive considerations have had a lasting influence on spatial organisation.

Together, these elements constitute material expressions of landscape memory. Rather than representing isolated historical remnants, they form a coherent spatial structure through which past events and practices remain embedded in the contemporary morphology of Stari Slankamen. These persistent features provide the spatial foundation for interpreting the area as a landscape of memory with potential therapeutic significance.

4.3. Spatial distribution of cultural and natural heritage assets

Building upon the abstraction of spatial memory structures, the analysis proceeded with the examination of the spatial distribution of cultural and natural heritage assets. Data obtained from official heritage registers and the "GeoSrbija" platform revealed a distinct pattern in the territorial organisation of protected elements.

Protected cultural heritage assets are distributed across the settlement as discrete points, each subject to individual protection status. These monuments include archaeological sites, historic buildings, religious structures, and commemorative landmarks. While collectively representing a rich cultural layer, their spatial isolation limits their perceptual and functional integration into a broader landscape experience.

In contrast, protected natural heritage is organised into contiguous zones defined by different protection regimes. The protected area known as "Riverine Islands and Escarpments near Slankamen [Ade i odseci kod Slankamena]" preserves paleofloristic localities containing fossilised remains of tropical and subtropical vegetation, along with numerous examples of fossil fauna that testify to the evolution and extent of the former Pannonian Sea. Areas under active protection (Zone 2) and proactive protection (Zone 3) form continuous spatial systems characterised by ecological value, landscape quality, and relative inaccessibility. The active protection regime primarily includes aspects of nature and resource conservation, while the proactive regime introduces the domains of cultural-historical heritage and traditional architecture (Article 35, Paragraphs 4, 5, 7, and 8 of the Law on Nature Protection). These zones possess strong potential for restorative and sensory experiences but are not systematically linked to cultural heritage sites.

This spatial distinction between point-based cultural assets and area-based natural protection highlights an underlying fragmentation between cultural and natural heritage layers. Identifying locations where these layers intersect becomes critical for understanding opportunities for integrative therapeutic landscapes.

4.4. Overlay mapping and delineation of analytical areas

The overlay mapping of cultural heritage assets and natural protection regimes resulted in the identification of three analytical areas characterised by differing degrees of cultural–natural interconnection.

Area 1 corresponds to the central part of the settlement, where the highest concentration of protected cultural monuments coincides with a segment of natural heritage under active protection. Mapped cultural assets within the considered area are the Church of St. Nicholas, the birthplace of Đorđe Natošević, the house in Stjepan Radić Street, where in the basement there are the remains of a Ottoman bath with built-in materials dating back to the Roman period, and finally the remains of a medieval fortress built over a Roman fortification – the Acumincum (Republic Institute for the Protection of Cultural Monuments, n.d.). Due to its accessibility and proximity to the existing spa facilities, this area exhibits the strongest potential for integration into therapeutic and cultural landscape infrastructure. The spatial overlap suggests opportunities for reinforcing place attachment through everyday engagement with both heritage and natural features.

Area 2 extends toward the zone surrounding the monument commemorating the Battle of Slankamen and adjacent landscapes under proactive protection. The area involved is distinguished by the intersection of natural and cultural strata, which is less dense but nonetheless noteworthy. Its open character and historical associations support the development of outdoor memory-oriented and restorative spaces, particularly through walking routes and interpretative landscape elements.

Area 3 encompasses the furthest protected environment from the urban surroundings and also the island territory across the river, which is subject exclusively to natural protection regimes. While this area offers a high degree of ecological integrity and immersive natural experience, it lacks direct spatial overlap with cultural heritage assets. Within the scope of this study, Area 3 is therefore interpreted as possessing limited potential for memory-based therapeutic landscapes, while retaining value as a complementary natural environment.

4.5. Synthesis of results

The combined results of observational abstraction and overlay mapping confirm that the landscape of Stari Slankamen exhibits varying degrees of spatial integration between memory, heritage, and protected nature. Areas such as Area 1, where historical spatial structures, cultural assets, and natural protection overlay demonstrate the strongest potential for therapeutic landscape development grounded in cultural ecosystem services.

These findings support the central premise of the study: that therapeutic potential in spa landscapes extends beyond medical facilities and can be spatially identified through the analysis of landscape memory and heritage–nature relationships. The delineated areas provide an analytical foundation for further discussion on landscape-based strategies aimed at enhancing sensory and emotional well-being.

5. DISCUSSION

The results of this study confirm that the therapeutic potential of spa environments goes beyond the mere presence of medical facilities or natural healing resources. Instead, the analysis demonstrates that therapeutic landscapes emerge through the spatial interweaving of natural features, cultural heritage, and historically embedded morphological structures. In the case of Stari Slankamen, this interweaving is neither uniform nor accidental, but shaped by long-term interactions between geography, historical events, and contemporary protection frameworks.

Interpreted through the lens of therapeutic landscape theory, the identified spatial structures and heritage–nature overlaps can be understood as enabling conditions for holistic well-being. As articulated by Gesler and Williams, therapeutic effects arise from the interaction of physical settings, symbolic meanings, and lived experience. The persistent spatial axes and corridors identified in the analysis function as materialised anchors of memory, structuring movement, orientation, and perception. These features support place attachment by providing continuity between past and present, thereby reinforcing emotional and experiential connections to the landscape.

The abstraction of spatial memory elements highlights the importance of historical morphology as an active component of contemporary landscape experience. Rather than representing static remnants of the past, the identified axes, corridors, and river-related landforms continue to shape everyday spatial

practices. In this sense, the landscape of Stari Slankamen operates as a medium of cultural experience, in which memories of historical events – most notably the Battle of Slankamen – remain embedded within the terrain and settlement structure. This mnemonic dimension contributes to the therapeutic properties of the landscape by providing a sensory experience with historical significance and symbolic meaning.

The overlay analysis of cultural and natural heritage further reveals a structural tension between point-based and area-based protection regimes. Cultural heritage assets, protected as isolated monuments, remain spatially fragmented, while natural heritage is organised into continuous spaces governed by ecological criteria. This institutional and spatial separation limits the potential for integrated landscape experiences. However, the delineation of Areas 1 and 2 demonstrates that despite this fragmentation, zones of meaningful overlap do exist in situ. These areas concentrate cultural memory, accessibility, and protected natural environments, making them particularly suitable for the development of memory-oriented therapeutic landscapes.

From the perspective of cultural ecosystem services, these overlapping zones can be interpreted as areas with heightened potential for non-material benefits such as aesthetic appreciation, attention restoration, sense of place, and engagement with cultural narratives. Importantly, these benefits are not inherent properties of individual heritage assets or natural features, but emerge through their spatial configuration and accessibility. The findings thus support the argument that therapeutic potential is a relational quality of landscape, produced through the interaction of cultural and natural elements rather than through their isolated presence.

Area 1, located in the settlement core, exemplifies this relational potential most clearly. Its proximity to the existing spa facilities, combined with the density of cultural monuments and protected natural spaces, creates conditions for everyday engagement with heritage-rich environments. Such engagement can support restorative experiences through routine practices such as walking and observation. Area 2, while spatially less concentrated, offers opportunities for more contemplative and narrative-based experiences, particularly through the development of interpretative routes linked to historical events and open landscapes. In contrast, Area 3 illustrates the limitations of purely natural protected environments in supporting memory-based therapeutic landscapes when cultural layers are absent, despite its ecological and sensory value.

The discussion also highlights broader implications for the planning and management of spa landscapes in post-socialist contexts. The spatial fragmentation observed in Stari Slankamen reflects wider processes of the post-socialist transition. By revealing latent connections between heritage and protected nature, the study suggests that landscape-based approaches can serve as mediating frameworks capable of reconnecting fragmented spatial systems. Rather than introducing new large-scale interventions, such approaches emphasise the reinterpretation and reactivation of existing landscape structures.

From an architectural and landscape-architectural perspective, the findings underscore the importance of viewing spa environments as open systems rather than enclosed clinical complexes. Therapeutic landscapes are shown to operate across scales – from regional protected areas to local corridors – requiring integrative design strategies that engage with cultural memory, landscape morphology, and environmental protection simultaneously. The concept of memory-oriented therapeutic routes emerges as a particularly promising strategy, offering a means of linking heritage nodes, natural zones, and experiential sequences into coherent spatial narratives.

Finally, the study demonstrates the value of interpretative spatial analysis as a methodological approach in heritage and landscape research by focusing on spatial relationships and morphological persistence. The research provides insights into the experiential and symbolic dimensions of well-being that are often overlooked in conventional planning frameworks. While the findings are context-specific, the analytical logic and mapping protocol developed in this study are transferable to other spa landscapes and protected areas with rich cultural and natural heritage.

6. CONCLUSIONS AND RECOMMENDATIONS

This research set out to examine whether spa environments can be reinterpreted as integrative therapeutic landscapes through the spatial interweaving of cultural and natural heritage. Focusing on the case of Stari Slankamen, the study demonstrated that therapeutic potential extends beyond medical facilities and mineral water springs, emerging instead from historically embedded spatial structures, protected natural environments, and cultural memory. By adopting a landscape-based perspective, the research contributes to a broader understanding of how well-being can be supported through spatial continuity, experiential richness, and place attachment.

The analysis confirmed that the landscape of Stari Slankamen contains persistent morphological elements that function as carriers of memory. Spatial axes, circulation corridors, and river-related landforms derived from historical cartographic sources remain legible in the contemporary settlement structure, allowing a flow of past events into everyday spatial experience. These findings support the interpretation of the area as a landscape of memory, in which historical depth and spatial continuity enhance the experiential and symbolic dimensions of place.

Through overlay mapping of cultural and natural heritage protection regimes, the study identified three analytical areas characterised by differing degrees of cultural–natural integration. Areas where protected natural zones intersect with concentrations of cultural heritage assets (particularly Areas 1 and 2) were shown to possess the strongest potential for the development of memory-oriented therapeutic landscapes. These areas combine accessibility, narrative depth, and environmental quality, creating favourable conditions for sensory restoration and emotional engagement. In contrast, areas lacking cultural heritage overlap, while ecologically valuable, were found to offer more limited potential for memory-based therapeutic experiences within the scope of this research.

From a theoretical standpoint, the study reinforces the relevance of therapeutic landscape theory by demonstrating its applicability to heritage-rich spa environments. By integrating concepts of landscape memory, cultural landscape, and cultural ecosystem services, the research advances an interdisciplinary framework that links spatial morphology, heritage studies, and environmental psychology. Importantly, the study illustrates how these concepts can be operationalised through interpretative spatial analysis and mapping, offering a methodological contribution to landscape and architectural research.

The findings also carry practical implications for the planning and management of spa landscapes, particularly in post-socialist contexts characterised by spatial fragmentation and institutional separation between cultural and natural heritage protection. Rather than proposing large-scale redevelopment, the research emphasises the potential of landscape-based strategies that reinterpret and reconnect existing spatial structures. The development of memory-oriented therapeutic routes, interpretative landscapes, and green cultural infrastructure emerges as a promising approach for enhancing holistic well-being while respecting existing protection frameworks.

As a pilot study, this research has certain limitations due to its reliance on cartographic analysis and the absence of empirical user-based evaluation. Any future research should be conducted through fieldwork, participatory methods, and interdisciplinary collaboration among architects, landscape architects, conservators, and health professionals. Such studies could further explore how engagement with cultural–natural landscapes contributes to measurable aspects of well-being and inform the design of inclusive, place-sensitive therapeutic environments.

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