

RESEARCH

Open Access



Evolution of cultural landscape heritage layers and value assessment in urban countryside historic districts: the case of Jiufeng Sheshan, Shanghai, China

Xufang Li¹, Xiangpin Zhou^{1*}, Feifan Weng², Fanzhuo Ding³, Yijing Wu¹ and Zhenxin Yi⁴

Abstract

The heritage value of the historic urban countryside, as a remnant in the transition between the urban boundary and the natural environment, is a consequence of the spatial and temporal evolution of the city. However, through repeated social transformations, the conflicts between urban construction and cultural landscape heritage preservation have increased, resulting in the gradual disappearance of their cultural landscape heritage. This study takes the Sheshan Urban Countryside Historic District in Shanghai and interprets the layers of Sheshan's cultural landscape heritage into five periods, Emergence, Development and Exploration, Diversity and Prosperity, Turbulence and Change, and Stability and Precipitation. It analyzes the evolution of the layers of the cultural landscape heritage by applying Historic Urban Landscape Historic Land use Assessment (HUL) and interpreting the layers of the cultural heritage of Sheshan using Historical Landscape Assessment (HLA) to identify the characteristics and values of Sheshan's layers of heritage. The study indicates that the cultural landscape heritage of Jiufeng Sheshan exhibits four types of stratigraphic relationships: accretion, juxtaposition, overlay, and decline. This findings suggest a continuous evolutionary feature of superposition of multiple stratigraphic patterns. Moreover, the heritage value of the cultural landscape layers of Jiufeng Sheshan has shown a higher growth rate in the modern period. The integrity and survival status of modern religious and scientific buildings are more complete compared to the literati gardens and Buddhist relics. Based on the knowledge and value assessment of its cultural landscape heritage, it is necessary to intervene in the concept of living conservation and renewal of landscape heritage. This involves devising a conservation and renewal strategy for cultural landscape heritage that conforms to the law of historical stratification and connect the scattered historical and cultural relics. This study provides a reference for the conservation and inheritance of cultural landscape heritage in urban countryside historical areas and the organic renewal of urban and rural heritage.

Keywords Landscape architecture, Urban countryside historic districts, Cultural landscape heritage, Layering perceptions, Value assessment

*Correspondence:

Xiangpin Zhou
1977130169@qq.com

Full list of author information is available at the end of the article



© The Author(s) 2024. **Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>. The Creative Commons Public Domain Dedication waiver (<http://creativecommons.org/publicdomain/zero/1.0/>) applies to the data made available in this article, unless otherwise stated in a credit line to the data.

Introduction

As an important heritage of urban cultural landscape, the historic countryside area has been given an important heritage value in the development stage of "stock renewal" of the city under international advocacy. However, the conflict between urban construction and heritage preservation has intensified over time. The historic countryside area, which embodies the city's cultural continuity, has been gradually neglected in the rapid urban development, facing the challenge of the loss of historical landscape and heritage value. In order to promote the cultural inheritance of urban and rural heritage, the traditional isolated conservation paradigm has been replaced by dynamic and holistic conservation under spatial and temporal stratification [1, 2]. There is urgent need for in-depth research on the evolution of spatial and temporal values and perceptions.

The meaning of "countryside" can be traced back to the Zhou Dynasty, as described in the "Erya Shidi", which states: "Outside of the Yi is called Jiao, outside of Jiao is called Mu, outside of Mu is called wilderness, outside of the wilderness is called forest, and outside of the forest is called Tong" [3]. This means that the term "wild" is used to refer to the area further away from the city than "suburb", and then the term "countryside" was combined to refer to the vast area outside the city, but not reaching the mountains and forests [4, 5]. Review of the development of Chinese garden history, "country garden" in China has long been. During the Shang and Zhou dynasty, emperors and aristocrats established parks in the natural surroundings of suburban areas. Similarly, scholars during the Wei, Jin, North and South dynasties constructed private villa estates amidst mountains and water in suburban locales. Notable examples include Xie Lingyun's manor during the Eastern Jin dynasty and Wang Wei's Wangchuanbieye during the Tang dynasty, serving as paradigms of private countryside gardens. To the Sui and Tang dynasties, such as Chang'an Qujiang and other areas in the city's corners with luxuriant forests and beautiful ponds and lotuses were developed as public tourist attractions, also known as country gardens [6]. The countryside historic district discussed in this paper is similar in that. It refers to an area that has historically been located at the boundary of a city, serves the city with easy access to the city, and combines natural tranquillity with a rich historical and cultural heritage that has survived to the present day.

The term "urban countryside historic districts" is not unique to landscape terminology but originates from the concept of "country park." Unlike traditional country parks, this study investigates cultural landscapes historically situated in rural areas on the outskirts of cities, which persist into the present day. However, the cultural

landscape heritage in country parks is the major focus of exploration, and it is necessary to review the conceptualization of country parks and the process of academic research to distinguish the lack of research on countryside historic districts. The construction of country park in China was proposed in 2000, and many studies on country parks have focused on planning and design, ecological restoration, and tourism perception. For example, Xia Zheyi integrated the perception of ecosystem services into the adaptive management of country parks to promote environmental justice [7]. Gu Xiaokun analyzed the influencing factors of Shanghai residents' access to and use of country parks with a logit model [8]. Yuan Fei investigated the tourism image perception of the country park at the Liangzhu ancient city ruins in Hangzhou based on network text analysis [9]. However, very few studies have been conducted on historical countryside areas that have survived for a long time. Zhou Xiangpin, from a historical perspective, combed through the wisdom of ancient countryside gardens, and combined with the challenges faced by contemporary countryside gardens to propose design ideas [4]. Sun Ruotong and other scholars, based on excavating and sorting out the history and current situation of Shanghai Jiufeng Countryside Area, introduced the perspective of cultural landscape to explore the organic evolution of the cultural landscape of the historical countryside scenic recreation area and the feature identification method [2]. Other scholars have analyzed the historical flavour of ancient countryside historic districts from the perspectives of gardening, traditional aesthetics and cultural connotations, as well as their implications for modern times, and quantitatively assessed their capacity for sustainable development [10, 11].

International research on "countryside" originated in Europe in the late 18th and early nineteenth centuries. The industrial revolution and the acceleration of urbanization led to the rapid expansion of cities and the gathering of people at the crossroads of the city and the countryside to escape from the hustle and bustle of the city [12]. Subsequently, in 1966, the British Government issued the White Paper on "Guidelines for Countryside Recreation", formally proposing the establishment of country parks, defining them as green spaces located in suburban areas with a natural environment and rural characteristics, which were then imported to Hong Kong and used by China [13]. International research on country parks covers the intersection of multidisciplinary academic research and international practice. Academic research includes the following aspects, regarding heritage protection, this research underscores the significance and integrity of both cultural and natural heritage. It features a more robust system for assessing, protecting, and

preventing disasters related to heritage values. However, the predominant focus is on monumental architectural heritage. The emphasis lies in fostering bottom-up public participation for shared governance and protection efforts [14]. In urban planning and environmental sciences, Khahro used GIS to analyze the accessibility of different country parks in Pakistan to provide opportunities for sustainable urban development [15]. On the ecological side, Macarena used the example of two Chilean country parks to analyze the integration of socio-ecological knowledge in the collaborative design process [16]. On the sociological front, Ryan has analyzed the impact of North Carolina's countryside on the physical and mental health of residents to explore the relationship between countryside and mental health [17]. In the area of international practice, international organizations such as the United Nations Environment Programme (UNEP) and the World Wide Fund for Nature (WWF) are actively promoting the conservation and sustainable use of country parks. However, there is still a lack of research on the recognition of the cultural landscape heritage value and assessment of urban countryside historic areas.

The cultural landscape and heritage value embedded in urban countryside historic districts are crucial to the continuation of the city's cultural lineage and sustainable development. Nevertheless, few studies have analysed the evolution of the layers of urban countryside historic districts from the perspective of cultural landscape. Furthermore, there is lack of examination of spatial layers and their perceived landscape value under the perspective of dynamic evolution, which is in urgent need of in-depth investigation. Therefore, this study takes the Jiufeng Sheshan Urban countryside historic district located in Shanghai's international metropolis as the object of research. It explores the process of cultural landscape heritage accumulation in different periods, and establishes a "heritage spatial-temporal model" in order to take a holistic look at its heritage value and the pattern of its accumulation and evolution. The Historic Land use Assessment (HLA) is used to construct an assessment system of the cultural landscape stratum heritage value of Jiufeng Sheshan. The results of the assessment are interpreted in depth and strategies to propose a strategy for the conservation and renewal of Jiufeng Sheshan's cultural landscape heritage. This will provide theoretical and practical references for the conservation and development of urban countryside historical areas and the cultural heritage of urban and rural areas.

Materials and methods

Study area

As shown in Fig. 1, Sheshan is one of the "Nine Peaks and Three Mao" in Shanghai, and the Nine Peaks of Sheshan,

located in the western suburb of Shanghai, Songjiang District, covers an area of 64.08 km². The area is divided into East and West Sheshan, boasting elevations of 100.8 m and 97 m, respectively, and is the only inland countryside historical area of Shanghai with hills and flatlands. The twelve hills are arranged in a south-west to northeast direction, symbolizing the pinnacle of scientific and cultural prominence in Shanghai. There is no way to find out when Jiufeng was created. According to the research and analysis of some geologists and archaeologists, it is the oldest geological landmark of the Yangtze River Delta. As early as about 70 million years ago with tens of thousands of years of geological changes and alluvial deposits of the sea, Nine Peaks served as a land-forming centre of the Yangtze River Delta, and it was not until about 6,000 years ago that human beings began to appear. Jiufeng Sheshan is located in the Songjiang District of the cosmopolitan city of Shanghai, in the southwest of the city. Since the economic rise of the late Yuan and early Ming Dynasties, culture has emerged, attracting luminaries like Chen Jiru, Dong Qichang from across the region. Relying on the dense network of rivers and lakes nearby, the trend of gardening by literati was set off, and the countryside of the Nine Peaks and the Three Mao Mountains has been particularly prosperous [18]. In the Ming and Qing dynasty, the literati were keen to build a separate business in Sheshan Jiufeng. For example, Dong Qichang built Sheshan Cottage in Sheshan, he built a stone worship hall in Fenghuang Mountain. Wang Hongxu purchased Li Fengjia's separate business built in the Ming Dynasty and rebuilt it into Hengyun Mountain Villa. For a while, the Jiufeng area became a gathering place for literati. The garden gathering activities have improved the awareness and influence of Sheshan, but now the pattern of Jiufeng Sanmao has basically disappeared. The mountains are occupied by other land, and most of the traces of celebrities in the past have been obliterated. Sheshan, as the most prestigious among the nine peaks and continues to this day, has important cultural landscape heritage value. The majority of extant sites primarily encompass historical landscapes, religious and astronomical facilities of the Ming Dynasty. Notable examples include the first church in the Far East, the first observatory in modern China, and other few modern heritage, which have multiple values of culture, history, science and technology, and ecology in contemporary times.

Methods

Historic Urban Landscape (HUL)

Historic Urban Landscape (HUL) was first proposed as a noun in the UNESCO Recommendation on Historic Urban Landscapes in 2011 and has since evolved into

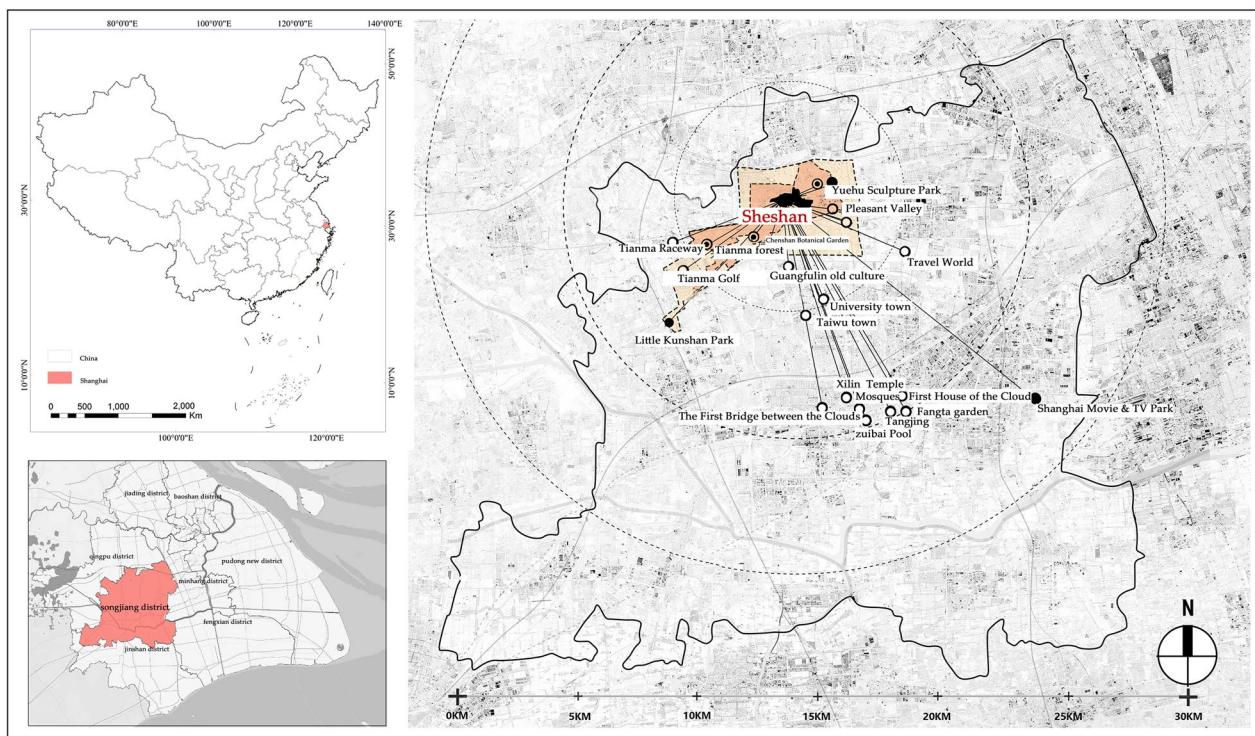


Fig. 1 Study area

a verb in the methodology of studying historic landscape heritage [19]. It emphasizes the evolution of cultural landscape heritage in historical layers, placing it together with value connotations in a larger historical context, and seeking dynamic associations between landscape representations and value connotations [20–22]. HUL integrates cultural landscape heritage into urban governance and sustainable development in a living urban heritage conservation and inheritance system. It is not only the objective existence of the historic urban landscape, but also a landscape approach and mindset that emphasises the multidimensional connection between people and the landscape heritage in time, space and perception [23, 24]. The dynamic perspective of correlation, wholeness, and timeliness is used to condense the layering pattern of cultural landscape heritage and to more accurately identify the landscape elements, landscape features, and value attributes of different historical stages. As an urban countryside historical and cultural area, Sheshan Jiufeng Sheshan is analyzed in depth by the HUL method to balance the relationship between the natural environment and the urban environment, the historical heritage and the contemporary development, in order to avoid isolated heritage protection.

Historic Land use Assessment (HLA)

Historic Land Use Assessment (HLA) is a method of describing and evaluating land use patterns and historic landscape features in England [25, 26]. It aims to establish a heritage assessment system centered on the depth of historic layers and the richness of historic landscapes [27]. Additionally, it interprets the landscape qualities of each historic period in the vertical dimension of time in conjunction with the historic landscapes of the whole region [28, 29]. The methodology aims to help understand how historic landscape heritage intersects with contemporary landscape. It delves into the historical evolution of the cultural landscape heritage at small and medium scales (towns, suburbs, countryside) and the mechanisms of its influence. Moreover, it endeavors to assess the important landscape elements that contribute to the interpretation of the cultural landscape heritage values [30]. The scale range of Sheshan and the characteristics of historical layering fit well with HLA. It focuses on East and West Sheshan as the scope of the study, and conducts image translation through the collection of historical images and historical materials. Subsequently, historical elements of each historical period with corresponding spatial labelling in multiple layers.

The formula for Historic Layering Depth is as follows:

$$HLD = \sum_{i=1}^Z HPV(i) \tag{1}$$

HLD=Historic Layering Depth, HPV=Historic Period Value, Z=Total historical layers, i=Historic period.

The formula for Historic Landscape Richness is as follows:

$$HLR = \sum_{i=1}^Z HLE(i) \tag{2}$$

HLR=Historic Landscape Richness, HLE=Historic Landscape Elements, Z=Total historical layering, i=Historic period.

Add Historic Layering Depth and Historic Landscape Richness to get Historic Layering Value with the following formula:

$$HLV = HLD + HLR \tag{3}$$

HLV=Heritage Layering Value, HLD=Historic Layering Depth, HLR=Historic Landscape Richness.

Research flow

As shown in Fig. 2, firstly, the cultural landscape heritage features of Sheshan, Jiufeng were analyzed and different historical phases were delineated through historical data search. Secondly, data interpretation of cultural landscape heritage in each period is carried out to project the landscape heritage elements into the ephemeral stratified space and determine their distribution locations. Thirdly, to establish an assessment system for the layered value of the cultural landscape heritage of Jiufeng Sheshan. This involves analyzing the layered value and contemporary value of its cultural landscape heritage. Ultimately, the aim is to clarify the focus and direction of conservation, and to provide a reference for the heritage conservation of the cultural landscape in the Countryside Historic District. The historical layer data and historical map information in this study come from the Songjiang Fu Annals and Shanghai Annals. The author interpreted the information and ArcGIS projection positioning of the historical map of Jufeng Sheshan according to the descriptions in the ancient documents, and finally drew the cultural landscape heritage layer map of Jufeng Sheshan. In addition, data on the current status of heritage distribution

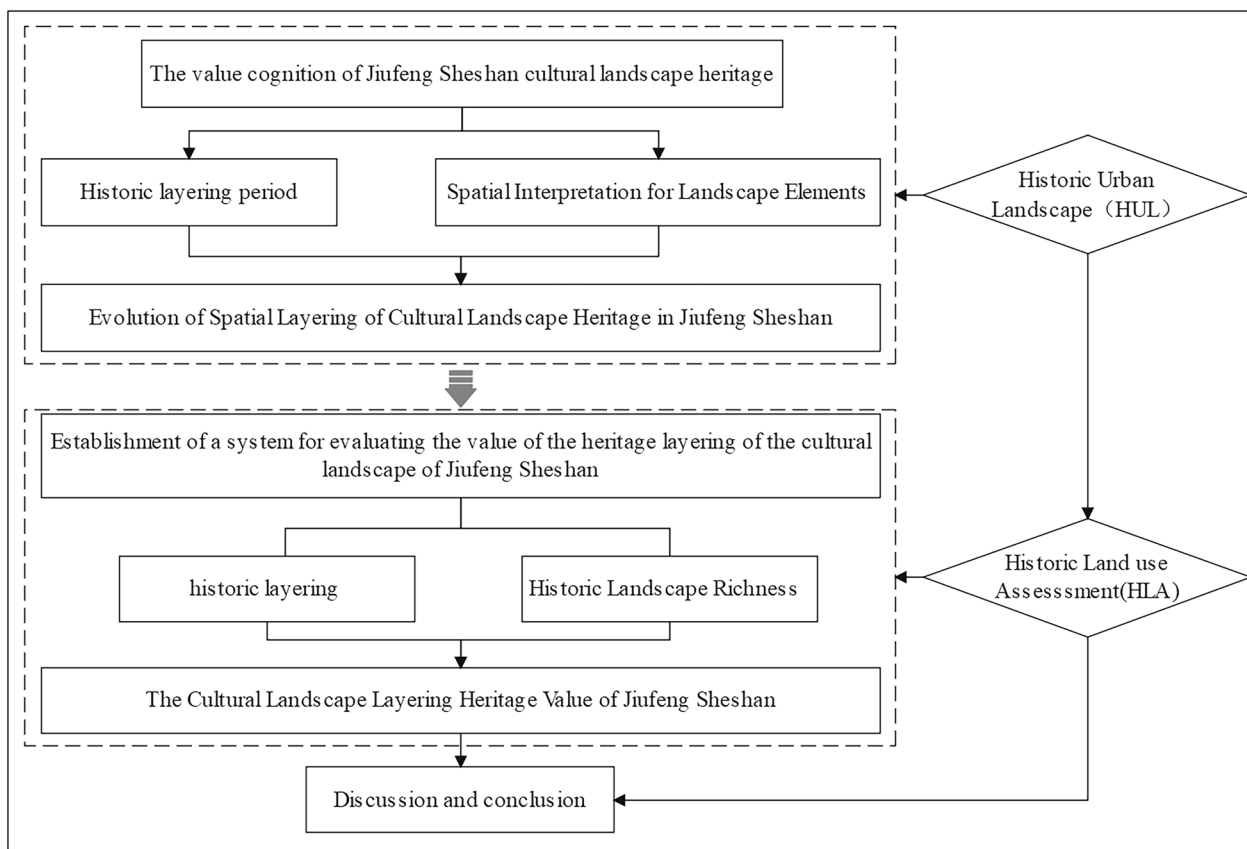


Fig.2 Research flow

was obtained from the author’s field research and the Sheshan Planning website (<https://www.songjiang.gov.cn/zjsj/stepin.html#page1>).

Results

Perceived heritage value of Jiufeng Sheshan cultural landscape

Cultural landscape heritage is an area where cultural and natural attributes have cascaded and accumulated throughout history [31], Sheshan’s physical and spatial form has evolved organically with the development of society and the environment is shown in Fig. 3. Spatial layer is the representation of the value layer [32]. So this study tries to establish a "heritage spatio-temporal model" of Sheshan, taking into account the history and the present. By elucidating the correlation of the layers in different stages of development, interpreting the value of Sheshan’s cultural landscape heritage in depth. This effort will culminate in a comprehensive framework of Sheshan’s cultural landscape over time. So as to provide references for the living conservation of the heritage of the cultural landscape of the present-day countryside and historic districts of the city. Taking into account the development of Jiufeng Sheshan, the evolution of its cultural landscape heritage is interpreted into five stages: the period of germination, the period

of development and exploration, the period of diversification and prosperity, the period of turbulence and change, and the period of stability and accumulation.

The period of germination:60 million years ago - North and South Dynastie

In the late Mesozoic era, 70 million years ago, the continent of the Yangtze River Delta was formed, and the Sheshan area appeared as a purely natural land landscape with no traces of human beings. 60 million years ago, Nine Peaks was raised above the sea level, and human habitation began to occur at this time according to the archaeological sites and artifacts left behind. As can be seen in Fig. 4, with the development of the Stone Age, the Chinese clans moving south introduced advanced farming techniques to Songjiang, making it the agricultural economic center of Jiangnan. Concurrently, the aristocrats built manor houses in the fertile fields of Jiufeng and Mao, resulting in the emergence of agricultural landscapes. Jiufeng served as the location of the aristocrat’s productive manor houses and hunting grounds, which were characterized by the natural elements of the landscape, presenting the beauty of the natural wilderness [33].

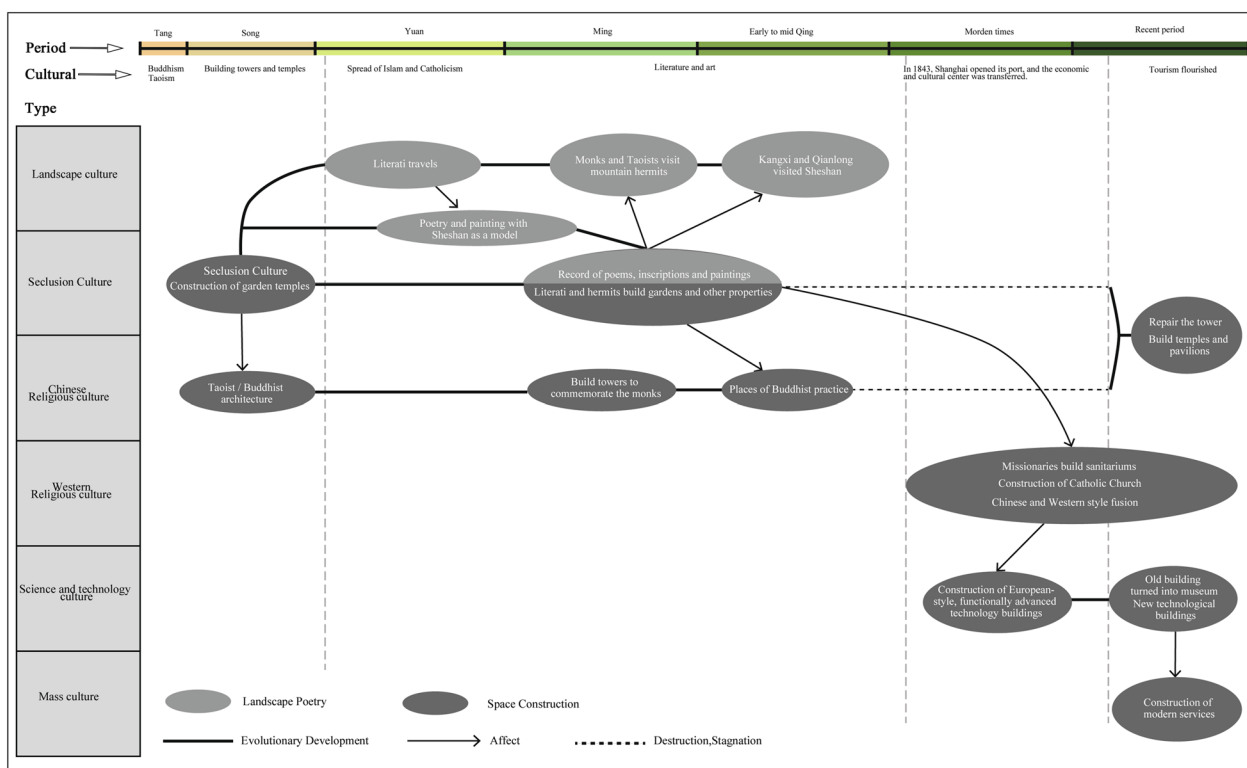


Fig.3 Historical Genealogy of Sheshan Cultural Landscape Heritage Compilation

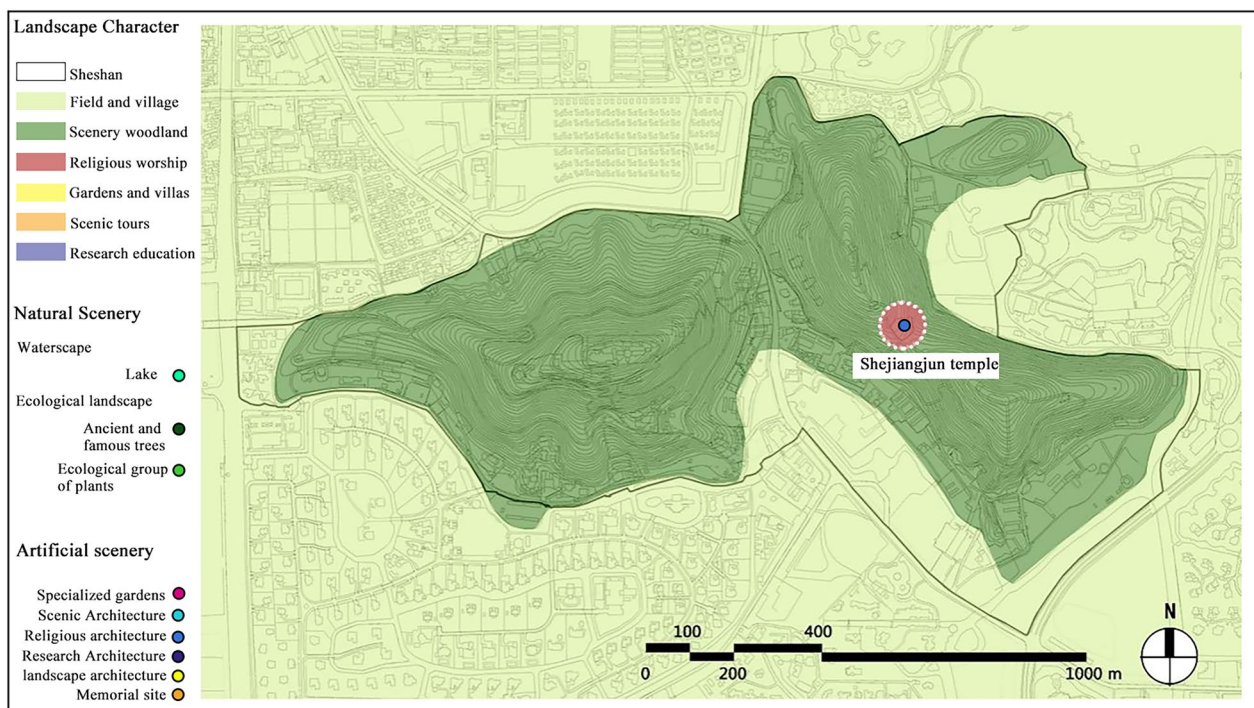


Fig. 4 The cultural landscape structure of Jiufeng Sheshan in the germination period

The period of development and exploration: Song-Yuan Dynasty

With the emergence of the country garden with the nature of manor in the Northern and Southern Dynasties, Huating County was set up in Songjiang area in the Sui and Tang Dynasties, and the economy and culture were prosperous. A large number of Buddhist temples began to be built, but the gardening activities were rare, which accumulated strength for the rise of gardens in the Song and Yuan Dynasties. The further development of agriculture in the Song Dynasty led to the struggle between farmers and water for land, and the management of polders led to the shrinking of the area of San-mao, but the numerous Buddhist temples in the Jiufeng area attracted a large number of literati to visit. The supremacy of the literati in this era and the prosperity of landscape painting led to the extensive participation of the literati in gardening and the penetration and fusion of painting and literature [34], resulting in the Song Dynasty's unique landscape gardens. Until the end of the Yuan Dynasty, Songjiang was in a relatively stable political and economic environment, and gradually developed into a cultural and economic town alongside Suzhou [35]. As shown in Fig. 5, it has become a chaotic Chinese group of people to avoid the place, attracting a diverse array of Chinese individuals seeking refuge. The garden has become the spiritual habitat of the Jiangnan scholars to

return to the spirit of cultivation, "hidden" as the main purpose of the garden to promote the development of the garden. And the "mountain residence" of the isolation of the countryside garden to become a hermit's fashion. Sheshan has become a natural mountain and forest in the cultivation of the hermit's residence within Taoism and Buddhism. This is an important stage in the history of the development of the Songjiang Garden, laying a foundation of the later generations of Ming and Qing Dynasty, the Songjiang gardens to maturity.

The period of diversification and prosperity: Ming-Mid Qing Dynasty

In the early Ming period, capitalism began to sprout under the commodity economy, and although the state-imposed heavy taxes on the Jiangnan region, the rapid rise of the cotton textile industry in the Songjiang region did not affect the Songjiang region [36]. On the contrary, the development of socioeconomic and cultural levels triggered rapid urbanization, which provided an opportunity for the development of gardens in Songjiang. Literati and gardeners, merchants merged to raise a gathering of gardening style, fostering a flourishing landscape of garden activities. Over time, garden scale became grander, the density increased. These gardens had significant "elegant" cultural characteristics, and luxurious, grand vulgar attributes (Fig. 6). In



Fig.5 The Cultural Landscape Structure of Jiufeng Sheshan during the development and exploration Period

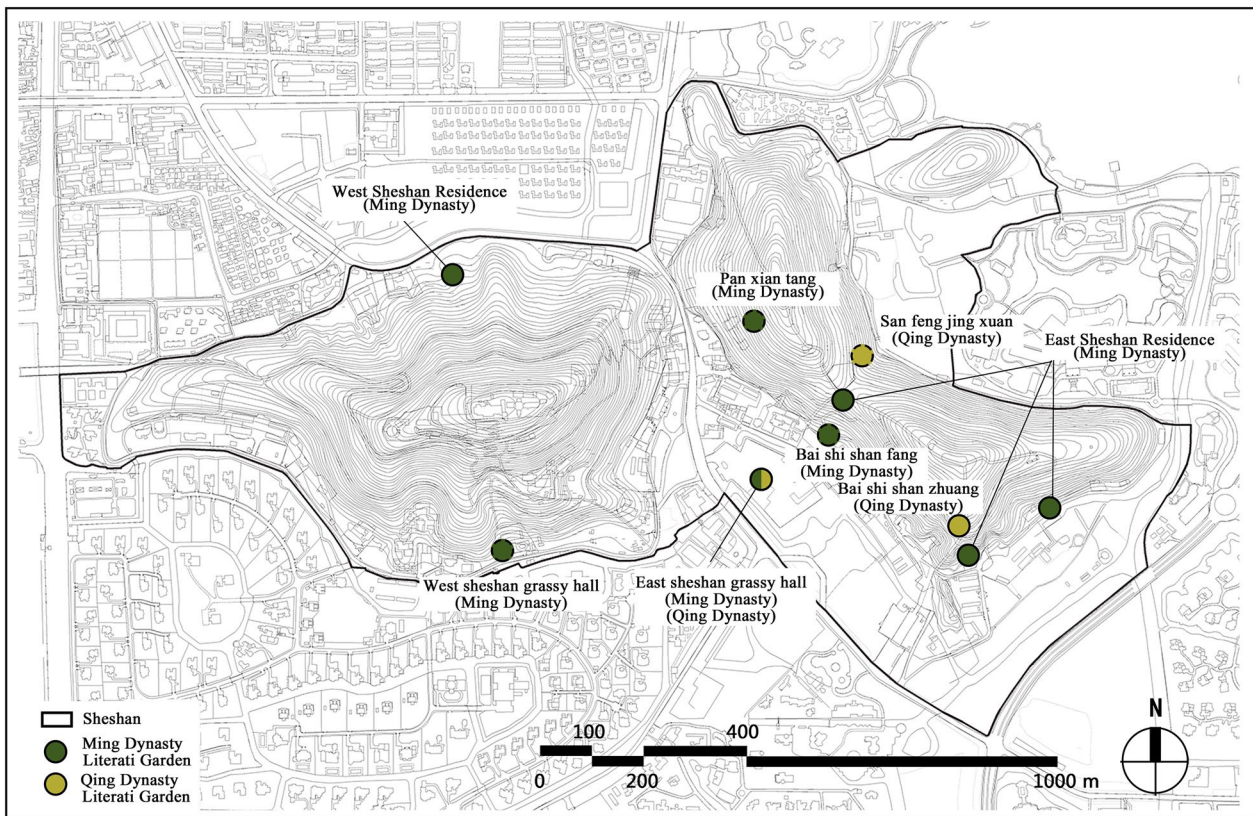


Fig.6 Distribution of Literati Gardens in Sheshan during the Ming and Qing Dynasty

addition, the Ming and Qing dynasties were a period of cultural exchange and fusion between China and Europe, and foreign cultures were introduced to the Songjiang area in the form of religions, making Sheshan a scenic spot combining natural scenery, literati gardens, and historical relics. After the middle of the Ming Dynasty, the political turmoil forced many scholars to stay away from the imperial court and return to the mountains to enjoy the landscape. Sheshan became a place for the literati to live in seclusion, gather in elegance, and visit, and at the same time, the spread of religion has also made it a holy place of cultivation and pilgrimage, with a strong humanistic flavour. Xu Xiake, Chen Jiru, and other outstanding literati of the late Ming Dynasty all lived in the Sheshan area, making it a hermitage for literati and officials. They left many poems and deeds in the area, making the natural and humanistic landscape of Sheshan rank first among the twelve mountains of the Nine Peaks. During the transition from the Ming to the Qing Dynasty, societal upheavals and shifts in economic structures altered the role of gardens from sites of "elegant gatherings" to bustling marketplaces. However, Sheshan's gardens remained unaffected by these changes, maintaining their purpose as secluded retreats (Fig. 7).

The period of diversification and prosperity: Late Qing Dynasty - Mid Republic of China

From the late Qing dynasty to the middle of the Republic of China, after the end of the Opium War, Shanghai was opened as a trading port. Influenced by the colonial invasion, western religion, science and technology, gardening concepts into China, the city for large-scale industrial construction opened up the indiscriminate mining and digging wind. Part of the near to the nine peaks and other hilly mountains mining caused by the mountains were destroyed, a large number of missing resources, Hengshan, Tianma, Sheshan, Fenghuang Mountain and other parts of the mountain exposed. Cinnabar Mountain only half of the mountain left, the nine peaks of Sheshan original natural idyllic landscape damaged, the whole mountain landscape level weakened [37]. A new Western-style Catholic church and an astronomical observatory for scientific research were constructed atop west Sheshan. The west Sheshan has gradually become a Catholic activity center in the Jiangnan region and a Chinese astronomical observation activity center. From the perspective of landscape experience, the landscape of this period lost the aesthetic subject of literati. The new western-style buildings were not integrated with the classical literati garden style, but to some extent promoted the modernization transformation (Fig. 8).

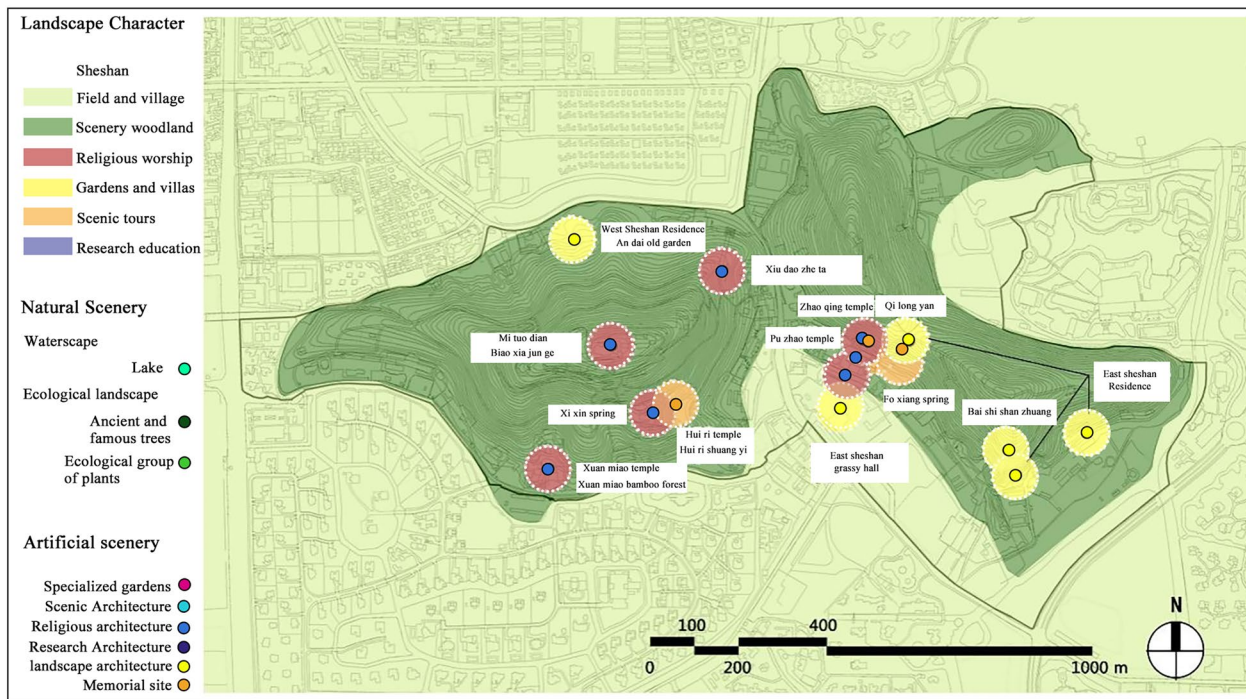


Fig.7 The Cultural Landscape Structure of Jiufeng Sheshan during the Period of Diversification and Prosperity

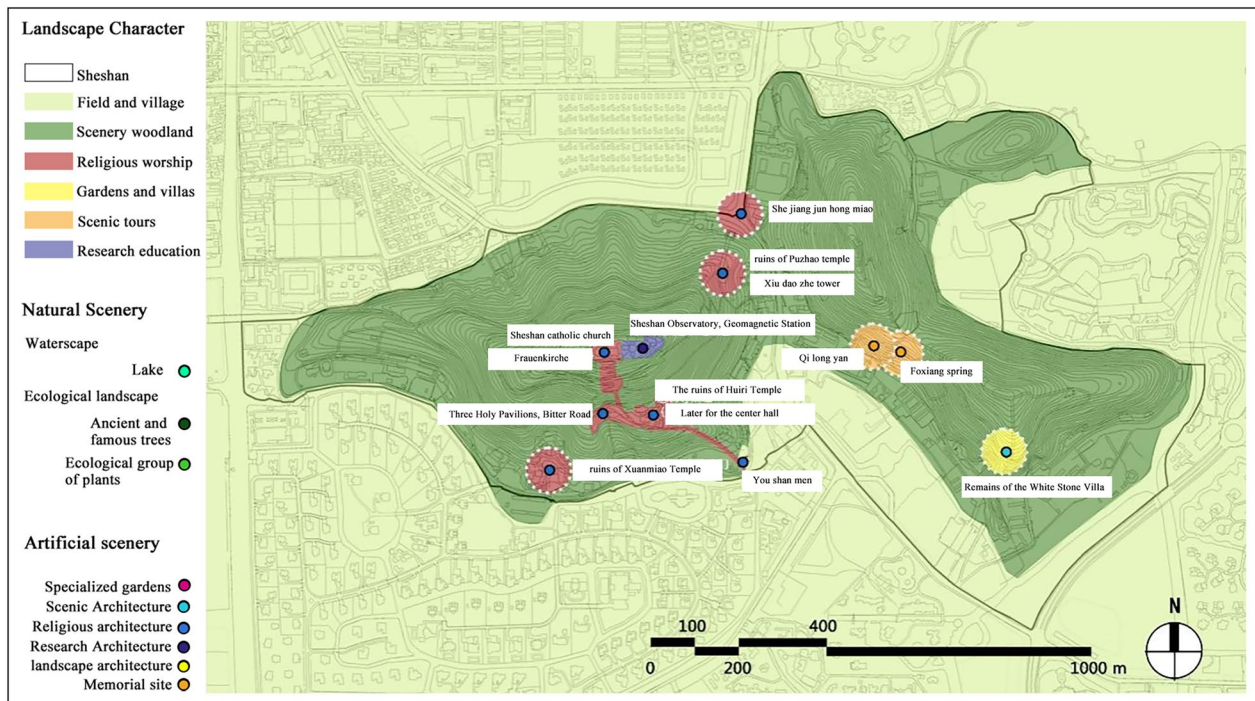


Fig.8 The Cultural Landscape Structure of Jiu Feng Sheshan during the period of turbulence and change

The period of stability and accumulation: Late Republic of China - present

From the end of the Republic of China to the present, especially after the founding of the People’s Republic of China, urban and infrastructure construction began. The ecological environment was gradually restored, and Sheshan became a scenic tourist and convalescent resort. With the development of Sheshan National Tourist Resort, west Sheshan became the centre of Catholic activities in Jiangnan, one of the centres of astronomical observation activities in China, and an important base of popular science education in the country (Fig. 9). The spatial and temporal evolution of the cultural landscape heritage of Sheshan is the result of the interaction of multiple mechanisms such as the natural environment, economic development, and historical and geographical changes. It is a testimony to the survival of the city’s historical space and the dynamic development of cultural heritage [38–40].

Evolutionary patterns of cultural landscape heritage layers at Jiu Feng Sheshan

Overlaying the landscape information of multiple periods in Jiu Feng Sheshan yields a stratigraphic slice map of the cultural landscape heritage of Jiu Feng Sheshan (Fig. 10). Combing through the temporal changes of its stratigraphy, and according to the results of stratigraphic

interpretation, the stratigraphic relationship patterns of Jiu Feng Sheshan are mainly augmentation, juxtaposition, coverage, and recession. Augmentation refer to the generation of new landscape states, Jiu Feng Sheshan’s landscape base has been retained, in different periods along with the evolution of society and civilization derived from a number of functional landscape heritage to adapt to the changing development of the times. For example, in the Song, Yuan, Ming and Qing dynasty, the power of the emergence of religion, the emergence of the literati seclusion of the culture, to promote the activities of gardening in the mountainous terrain, the emergence of a large number of literati gardens, temples, and gardens. Juxtaposition refers to the coexistence of the same landscape cultural heritage in the stratification slices of different periods, and constantly enriches its own heritage value. From the Song and Yuan Dynasties to the Ming and Qing Dynasties, on the basis of retaining the original temple gardens, many new literati garden residences and Mituo Hall were added around, and the landscape elements were continuously incorporated into the new stratification state and endowed with new heritage value. Coverage refers to the vertical historical dimension, the social background turbulence triggered by changes resulting in the replacement of landscape elements. The Song, Yuan, Ming and Qing dynasty of the temple gardens in the modern period gradually replaced by the

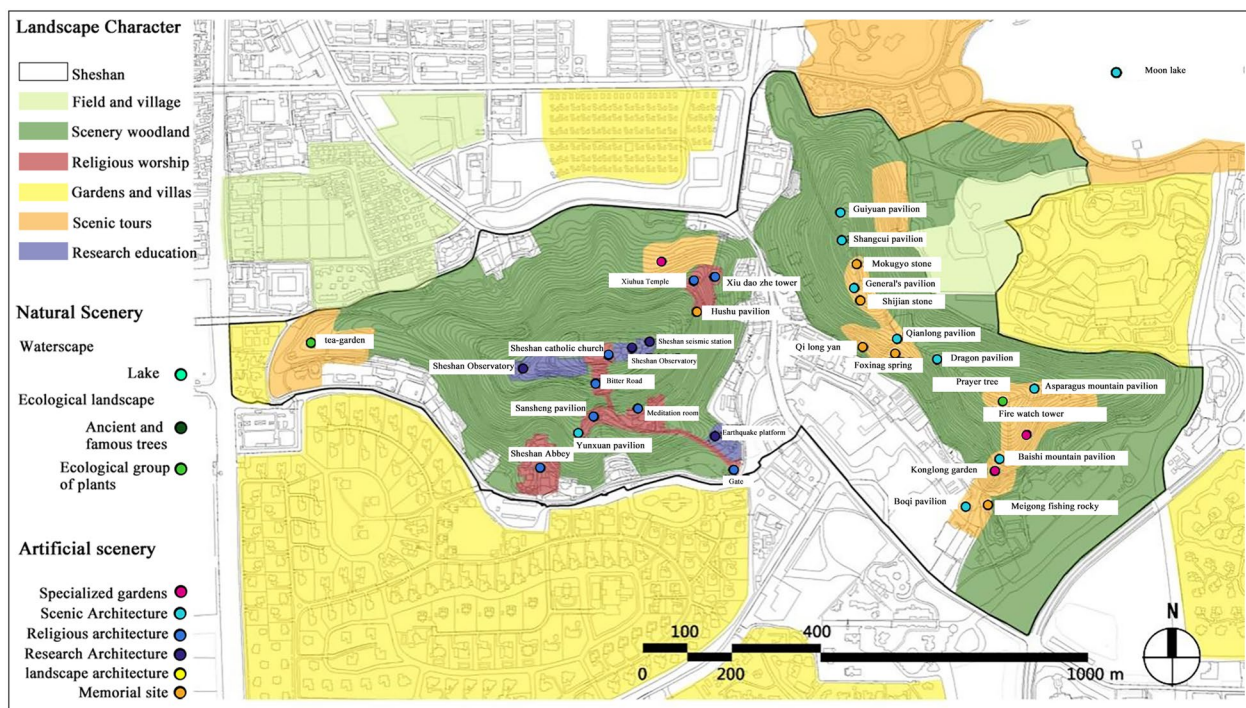


Fig.9 The Cultural Landscape Structure of Sheshan Jiu Feng in the Period of stability and accumulation

Catholic Church, the Observatory and other modern scientific and technological buildings reflecting the distinctive coverage of the laminar pattern. Recession refers to the loss or damage of landscape elements from one historical period to the next. During the period of turmoil and change, the pattern of Mao disappeared with the development of the city, and little remains of the literati gardens of the Ming and Qing dynasty, as social patterns and developments impacted on the state of the layers. The continuous dynamic evolution of Jiu Feng Sheshan through several dynasties is the result of multiple layering patterns superimposed on each other, and the cultural and landscape heritage that remains continues the historical memory of different times and spaces (Fig. 11), with multiple historical, cultural and landscape heritage values.

Heritage value assessment of cultural landscapes in Jiu Feng Sheshan

Heritage valuation of cultural landscape layers in Jiu Feng Sheshan

The cultural landscape heritage stratum value of Jiu Feng Sheshan is a weighted overlap of the heritage value of each historical stratum, which is analyzed according to the five historical periods of Jiu Feng Sheshan. Among them, HLD is based on the assumption that HPV diminishes gradually with the change of dynasties, assigning

HPV to five historical strata in Jiu Feng Sheshan, and the historical landscape elements of each period were counted (Table 1). To derive the values of HLV and Layer change chart, mapping the layers heritage values and layers changes in each period (Fig. 12). According to the trend of layered heritage change, it can be seen that the cultural landscape heritage value and HLR of Jiu Feng Sheshan show a steady growth trend with the weakening of HLD but show a faster growth rate from Historic Period IV to Historic Period V. During the Republican period, the introduction of western architecture and culture led to a large number of religious, scientific, and technological buildings in Jiu Feng Sheshan, which enriched the historical landscape elements. Afterward, with the strengthening of China’s protection of urban cultural heritage, the development and construction of humanistic tourism in Songjiang district. The national forest park, its landscape style and historical heritage value have shown higher values. As the period with the highest value of Sheshan’s cultural landscape layered heritage, the modern period is a presentation of the fusion of Chinese and western architecture, gardens and arts. This era bears witness the diversified convergence of civilisations, so the modern period can be used as a reference to incorporate the conservation of Sheshan’s cultural landscape heritage in Jiu Feng into the framework of urban and rural development, as well as ecological civilisation

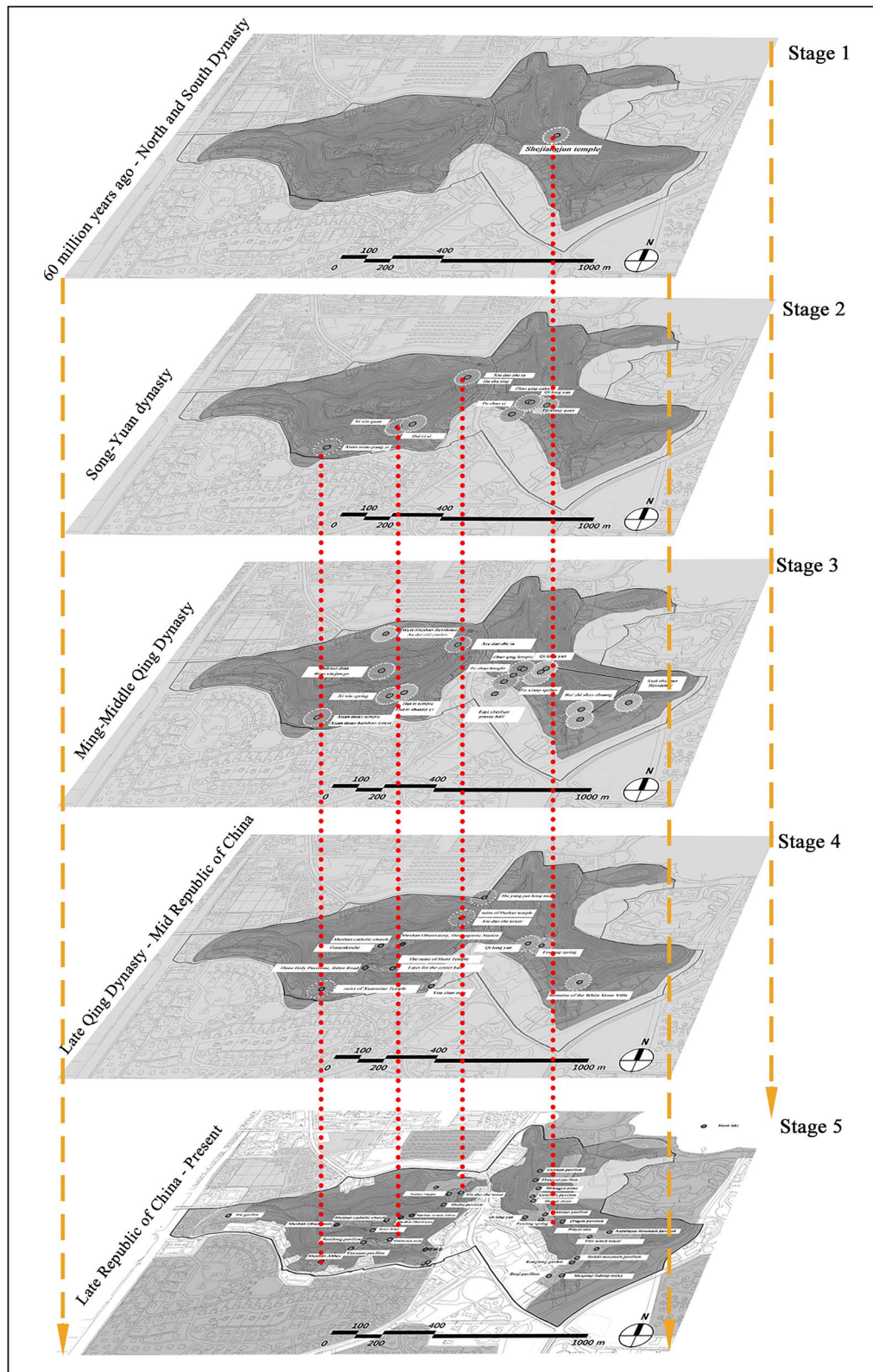


Fig.10 Layered Sections of Cultural Landscape Heritage at Jiufeng Sheshan

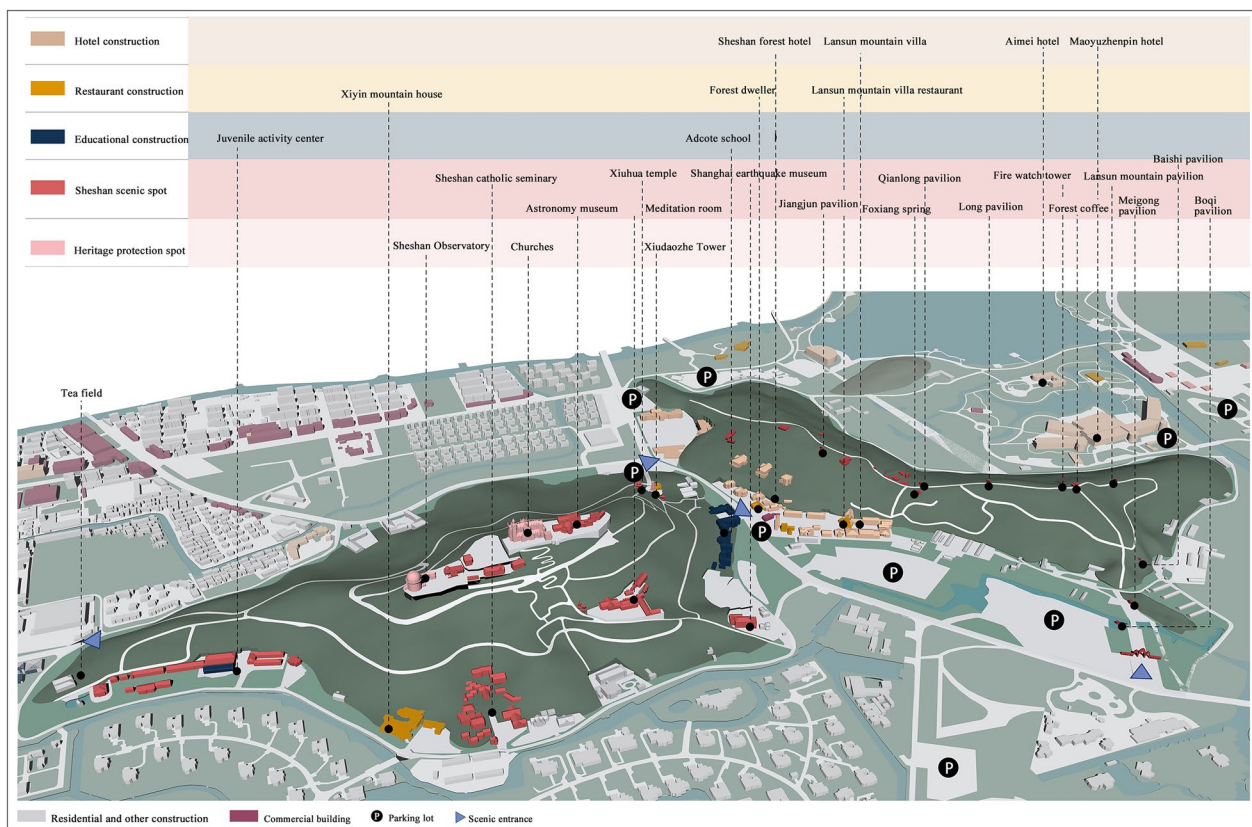


Fig.11 Map of the current distribution of the cultural landscape heritage of Jiufeng Sheshan

Table 1 Results of the historic layering value assessment of the Jiufeng Sheshan cultural landscape

Historical period number	Historic period	Historic Period Value (HPV)	Historic landscape Elements (HLE)	Historic Layering Depth (HLD)	Historic Landscape Richness (HLR)	Heritage layering Value (HLV)
I	The period of germination	5	4	25	60	80
II	The period of development and exploration	4	6	20	90	110
III	The period of diversification and prosperity	3	8	15	120	135
IV	The period of diversification and prosperity	2	10	10	150	160
V	The period of stability and accumulation	1	15	5	225	230

construction. This approach ensures its continuous vitality as a living inheritance in the contemporary times.

Assessment of the contemporary values of the cultural landscape heritage of Jiufeng Sheshan

Jiufeng Sheshan has multiple built heritage values including architecture, landscape, ecology. On the basis of the assessment of the heritage value of its cultural and landscape layers, the integrity and survival status of its current situation is evaluated as a whole (Table 2). This

evaluation, combined with the characteristics of the survival of the landscape remnants and the current situation (Table 3), serves to clarify the direction of conservation. Overall, the scenic woodland, religious buildings, scientific research and educational buildings exhibit high levels of integrity. Despite ecological damage incurred during urban development throughout history, restoration efforts have effectively reinstated the ecological environment, rendering it in a commendable state with significant ecological value. However, the water system

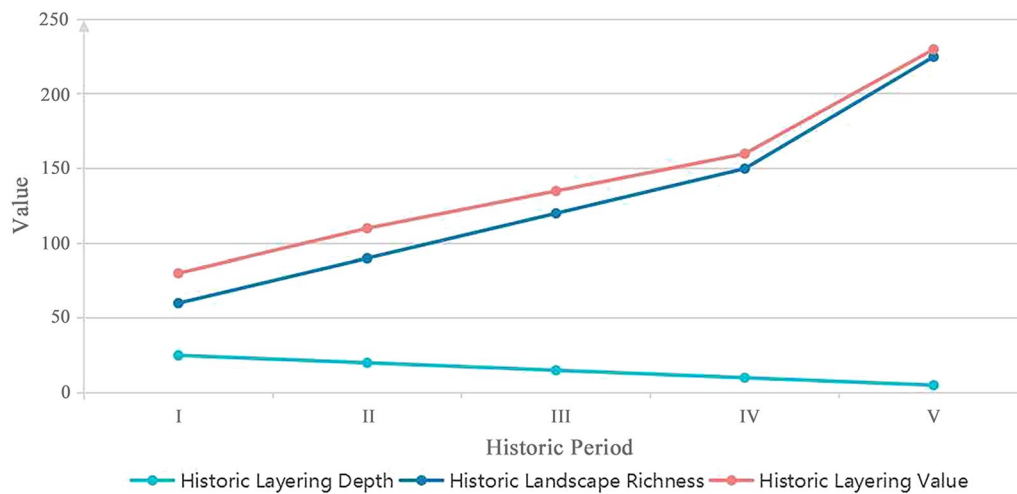


Fig. 12 Trends in the value of layering heritage at Jiufeng Sheshan in various historical periods

Table 2 Heritage integrity assessment of Jiufeng Sheshan cultural landscape

	Farmlands and villages	Scenic woodlands	religious veneration Buddhism and Taoism	Catholicism	Garden Villas	Scenic tours	research education
Degree of elemental integrity	Low	High	High	High	Low	High	High
Degree of elemental fragmentation	High	Low	Low	Low	High	Low	Low
Architectural survivability	Low	Low	Low	High	Low	High	High
Maintenance of historical characteristics	Low	Low	High	High	Low	Low	High

Low
High
Completeness

of Sheshan has suffered encroachment during development, resulting in the drying up of Foxiang Spring and Xixin Spring, leaving only ruins in their wake. Religious buildings in modern times before the Buddhist and Taoist pagodas, temples, pavilions as the main side reflecting the Song to Ming and Qing dynasty in the Jiufeng area of Buddhism and Taoism flourished. But after modern times with the introduction of the Catholic Church, the religious in Shanghai after the opening of the port to expand the influence of the missionary, the Buddhist temples and

other buildings gradually disappeared. Literati gardens in the rich garden of the Pavilion and Pavilions and other garden buildings are also only a few remnants left. In the Republic of China, the three major temples in Sheshan were abolished, including the East Puzhao Temple and the Central lingfengan Temple. Only the west Miaoxuan temple and the Xiudao pagoda remain, which is China's first ancient pagoda to be displayed as a model in the form of "ruins". Many of the remaining Catholic churches have been replaced by Chinese and western style Catholic

Table 3 Survival of cultural landscape remains in Jiufeng Sheshan

Historic period	Ancient feature					Modern feature	Contemporary feature	Present state					
	Before tang	Song	Yuan	Ming	Qing			Excellent	Good	Neutrality	Bad	Worse	
Geomorphology	Topography of volcanic peaks					West sheshan 97.2 m, east sheshan 68 m ; mines in some areas							
Natural element	Plant	Unqualified There are many flowers, among which pine bamboo is the best (there are lotus flowers in the western sheshan literati garden).					The richest botanical area in shanghai	Damage caused by deforestation followed by forest restoration					
	Animals	Unqualified		Few species are recorded, with mountain birds			Richness of species						
Water system		Unqualified			Sparse hedges at the foot of the mountain, curved water, flat bridges, streams, boat trips available		Unqualified	Artificial river, artificial lake moon lake					
	Spring	Unqualified			Xixin spring		Foxiang spring	Scenery is still, the spring has dried up					
Humanistic element	Landscape architecture	Unqualified			Literati gardens, pavilions		Unqualified	Site commemoration as a tourist attraction					
	Buddhist architecture	Unqualified	Appearance of towers and temples		Nunnery, hall, temple, pavilion		Mostly gone						
(material)	Catholic architecture	Unqualified					Catholic architecture has become a symbol, the style of chinese and western integration	Another renaissance gothic style building complex was built.					
Science education architecture	Unqualified					European style, advanced function	The function of old buildings has been transformed into popular science education and historical exhibition.						
Carved stone	Unqualified			Rocky path		Bitter road	Systematic garden path system						
Road	Unqualified			Literati traveled and left stone carvings		Unqualified		Very small number of rocky islets commemorating ancient allusions					
Humanistic element	Artistic creation	Unqualified	Many creations based on natural landscapes.					Unqualified					
	(immaterial) Literati activity	Unqualified	Monks live and die	Poetry and painting creation	Literati seduction in sheshan	Famous emperors travel ; repair ancient buildings, visit historical sites		Unqualified					
Social activities	Unqualified					Pilgrimage resort, daily religious life place	Study, camping, leisure						

churches and continue to this day. The most famous of which, the Cathedral of Our Lady of the Angels, is known as the "First Church of the Far East". Chen Congzhou mentioned in "Shanghai pagoda" that "Sheshan is a scenic spot in Shanghai, but in the past hundred years, the construction of the Catholic Church has changed Sheshan, which is full of woods and ancient temples and gardens, into a completely different place. In such a beautiful place, the only remaining relic of our ancestors is a tower of Xiudao in the middle of the mountain", which truly reflects the decline of Buddhist architecture and the rise of Catholic architecture in Sheshan in modern times. Starting from the pagoda at the foot of the south side of the mountain, through the winding Bitter Road, to the Zhongshan Sanctuary, the Residency, the Three Holy Pavilions halfway up the mountain, to the church at the top of the mountain. The Catholic architecture has reshaped the cultural landscape of Sheshan in modern times, making Sheshan a pilgrimage site for the faithful.

As science and technology have advanced, modern facilities such as astronomical observatory and seismic station have emerged, is China's modern astronomy,

earthquake, geomagnetism research began, is now one of China's five major astronomical observatories, on behalf of the current national astronomical research of the highest level. Sheshan presents a pattern of coexistence of religion and science, churches and science and religion and the status quo is complete, well-preserved, with important historical value, scientific research value and aesthetic value. After the emergence of the agricultural civilization, farmland and village land use forced the disappearance of Mao and the traditional spatial pattern of agricultural production in the south of the Yangtze River. However, in recent times, urbanization has led to severe spatial fragmentation as it has been covered by high-density buildings and facilities, resulting in the weakening of the original spatial base and the replacement of it with the commercial and tourism sectors. Anciently used as a sacred place for the literati to reside, travel and worship, and nowadays as a scenic countryside for scientific research, camping and recreation, modern excursions continue the artistic creativity and social interaction of the ancients. However, as the earliest open country tourism destination in modern times, Sheshan has not been

properly utilized in many historical sites in the wave of urbanization. The contradiction between urban construction and cultural landscape heritage protection has surged, and the homogeneous infrastructure has gradually annihilated the cultural landscape characteristics of Sheshan, weakening the value of cultural landscape heritage. Interventions are needed to link the scattered historical and cultural sites into an organic whole and to realise the preservation and continuation of the overall value of the cultural landscape heritage layers of the Sheshan countryside historic district.

Discussion

Based on the analysis of the Historic Layering Value (HLV) of the cultural landscape of Jiufeng Sheshan Urban countryside historic district, this study attempts to establish a time-depth assessment process that clarifies the state of layered evolution in different historical periods. It is great significance for the organic regeneration of urban countryside historic districts and the preservation of urban and rural heritage. The Historic Urban Landscape (HUL) approach removes the historical and cultural heritage from the level of a static physical entity and places it in a macroscopic urban context and geography, endowing it with natural and cultural-historical layered attributes [41, 42]. Scholars in this field mainly focuses on the related emphasis, the evolution and value perception of historical landscape. This approach primarily targets historical urban cultural blocks and parks. The use of HUL to analyse the multilayered value of urban historical landscapes from the spatial and temporal dimensions, and put forward the protection and renewal strategies in the spatial and material dimensions [43–45]. In the assessment of cultural landscape heritage, most scholars have focused on the use of multiple analyses to classify the attributes of contemporary values, including AHP hierarchical analysis, fuzzy comprehensive evaluation methods. However, there have neglected the evolutionary changes in the dynamics of cultural landscape heritage [46]. Historical Land Use Assessment (HLA) offers a comprehensive overview of landscape qualities based on historical land use and landscape elements. It is able to objectively and clearly show the evolution of the relationship between human activities, culture, and nature in the study area, and quantitatively assess the value of complex temporal and spatial heritage. Lai Xin assessed the layered heritage value of the five historical sections of the temple of Heaven in Beijing using the depth of the historical layers and the contribution of outstanding universal value as the criteria, but the assessment was limited to the historical value and lacked knowledge of the current value [47].

Based on the historical development of Sheshan and the evolution of China's macroscopic civilisation system, this study divides the cultural landscape heritage stratigraphy of Jiufeng Sheshan into five period slices and summarises the stratigraphic evolution pattern as the overlapping of four states. It is similar to the historical stratigraphic process of Dang Anrong's study of the Yulin Ancient City [48], which suggests that the cultural landscape heritage interacted with the historical events and human activities, and therefore presents consistency in the stratigraphic landscape features. On the basis of retracing the layer changes of the cultural landscape heritage of Jiufeng Sheshan, the pattern of its layer evolution and the value of its layered heritage are analyzed. The current status and integrity of the existing heritage are assessed in a more thorough and comprehensive manner. The study shows that only a few remnants of the layered Jiufeng Sanmao landscape pattern, Jiangnan farmland pattern, literati gardens and Buddhist culture were gradually replaced by modern religious and technological buildings during the urban construction of the Jiufeng Sheshan urban countryside historic district. However, remnants of these historical elements persist, showcasing a rich historical tapestry within the modern context. This layered heritage holds significant value, highlighting the complex historical evolution of the area. This is similar to Zhou Xiangpin's identification of the evolution and characteristics of the cultural landscape in the Songjiang Jiufeng area, but it does not provide a more objective assessment of the value of the specific layered cultural heritage [4]. The evolution of the cultural landscape heritage landscape in urban countryside historic districts is influenced by multiple mechanisms, involving ancient historical documents and ancient map data of the relevant areas. But most of the ancient maps of Sheshan, Jiufeng, are based on hand-drawn maps and related descriptions, so there are still doubts about the area of the layered heritage in the historical space. Consequently, it is not possible to determine the spatial scales of the historical landscape elements more further, and the contemporary value of the heritage is not only related to the indicators of completeness, posing limitations to this study. Therefore, this study requires excavate excavation of historical documents to obtain more comprehensive and detailed heritage information. It aims to explore the historical layered state of its landscape heritage from multiple directions including natural geography, history, culture, political and social backgrounds. The goal is to conduct a more detailed study of layered slices, and to construct an interdisciplinary and multidimensional assessment system of the value of the historical and contemporary heritage. Drawing from the findings of this study, a comprehensive comparison of the cultural

landscape heritage of Jiufeng Sheshan across different time periods becomes feasible. This analysis enables an assessment of its preservation and current condition. By identifying the most significant cultural landscapes and historical elements of Jiufeng Sheshan, targeted area regeneration efforts can be facilitated, to provide ideas for the living survival of the cultural landscape heritage of the Urban Countryside Historic District and contemporary planning.

Conclusions

The cultural and landscape heritage of urban countryside historic districts, as a built heritage of historical layers, has multiple values such as history, ecology, culture and aesthetics, and is of great significance in preventing urban sprawl and promoting the sustainable development of urban and rural areas. Therefore, for the living conservation and renewal of urban and rural cultural heritage, this study takes Jiufeng Sheshan as the research scope. Through the combing of ancient literature, the spatial deciphering of ancient maps, and the construction of spatio-temporal heritage model by using the Historic Urban Landscape (HUL) method. Through this method, the research systematically analyses the layer state of Sheshan's cultural landscape heritage, delving into the landscape elements, heritage values, and layer patterns across different historical periods. Drawing on the UK's Historic Land Use Assessment (HLA), we use Historic Layer Depth (HLD) and Historic Landscape Richness (HLR) as the main indicators for calculating Heritage Layering Value (HLV). This approach analyze the trend of changes in the value of the heritage, and analysing the integrity and survival of the heritage in its current state, to have a clearer interpretation of the dynamic evolution and assessment of the value of the heritage of the Jiufeng Sheshan countryside historic urban area. The study reached the following conclusions:

- (1) Based on the historical elements, historical events and macro dynastic changes in the background of Sheshan Cultural Landscape Heritage in each period, it is divided into five stratified historical periods. These include the period of germination, the period of development and exploration, the period of diversification and prosperity, the period of diversification and prosperity and the period of stability and accumulation. Each period exhibits distinct characteristics of the historical landscapes of different strata but interrelated to each other. The cultural landscape heritage of Jiufeng Sheshan has gone through a transformation from natural attributes to dual attributes of nature and humanity. Adopting Historic Urban Landscape (HUL) to

clarify the evolutionary process of the historical layers of the cultural landscape of Jiufeng Sheshan provides new opportunities for recreating historical scenes, guiding the public to rethink the relationship between people and land, and participating in heritage conservation.

- (2) The main modes of evolution of the layers of Sheshan's cultural landscape heritage are augmentation, juxtaposition, covering and recession. Analyzing the spatial and temporal layers of the cultural landscape of Jiufeng Sheshan from both horizontal and vertical perspectives, the material elements have been gradually replaced, disappeared, and increased in the process of evolution. But the cultural memories of these elements have been enriched with the deepening of the layers, which is an important carrier of the heritage value of the cultural landscape of Jiufeng Sheshan, and needs to be inherited in a living state.
- (3) The Heritage Layering Value (HLV) of the cultural landscape and the Historic Landscape Richness (HLR) of Sheshan show a steady growth trend with the weakening of the depth of the layering. According to the results of the heritage value and contemporary heritage value assessment of the cultural landscape layers of Jiufeng Sheshan, the inheritance of the traditional spatial pattern and the updating of the landscape elements in the modern period have resulted in a high heritage value. Its landscape and cultural characteristics show a high degree of integrity and authenticity, but in the subsequent period the cultural landscape has been damaged due to the massive encroachment of urbanisation, which has reduced its cultural landscape qualities and heritage value. Therefore, the modern period can be used as an important reference for the cultural landscape renewal of Jiufeng Sheshan, as a way to revitalise the historical landscape features.

This study analyses the logical correlation and systematic assessment of the value connotation of the Jiufeng Sheshan Cultural Landscape Layered Heritage, laying the foundation for conservation practice. In the organic regeneration of the cultural landscape heritage of Sheshan Jiufeng, it is imperative to adopt a layered awareness. Based on the modern historical landscape, comprehensively consider the heritage value and historical spatial narratives of different historical periods. Combined with the whole-area tourism mode of heritage conservation in the context of contemporary stock, and explore the mode of holistic conservation and organic regeneration based on the urban–rural coordination.

Provide an opportunity for the living inheritance and sustainable development of the cultural landscape heritage of the city's countryside historical districts.

Abbreviations

HUL	Historic Urban Landscape
HLA	Historic Land use Assessment
ICOMOS	International Council on Monuments and Sites
HLD	Historic Layering Depth
HPV	Historic Period Value
HLR	Historic Landscape Richness
HLE	Historic Landscape Elements
HLV	Historic Layering Value

Acknowledgements

Not applicable.

Author contributions

Conceptualization: XL and XZ; methodology, software, validation, formal analysis, investigation, resources, and writing—original draft preparation: XL; data curation: FW and FD; writing—review and editing: XZ; visualization: ZY and YW; supervision, project administration, and funding acquisition: XZ. All authors have read and agreed to the published version of the manuscript. All the authors have read and approved the final manuscript.

Funding

This research was funded by National Natural Science Foundation of China: "Research on the Mechanism of Landscape Evolution of Historical Parks and Identification and Conservation of Living Heritage Features" (52278073).

Availability of data and materials

Data sharing is not applicable to this manuscript as no datasets were generated or analyzed.

Declarations

Competing interests

The authors declare that they have no competing interests.

Author details

¹Department of Landscape Architecture, College of Architecture & Urban Planning, Tongji University, Shanghai 200092, China. ²Department of Landscape Architecture, College of Landscape Architecture & Art, Fujian Agriculture and Forestry University, Shanghai, China. ³Academy of Art & Design, Tsinghua University, Beijing, China. ⁴Graduate School of Techno Design, Kookmin University, Seoul, Korea.

Received: 6 December 2023 Accepted: 9 March 2024
Published online: 21 March 2024

References

- Logan W. Managing cultural heritage in Asian cities. *J Urban Hist*. 2020;46(1):181–8. <https://doi.org/10.1177/0096144219873341>.
- Sattayanurak K. Connectivity and Conservation: A Critical Examination of the Relationship Between Infrastructure Development and Cultural Heritage Perception in Chiang Mai, Thailand. *International Conference on Structural Analysis of Historical Constructions*. 2023;47:1269–81. <https://doi.org/10.1007/978-3-031-39603-8102>.
- Guo PZ. ErYa.Hangzhou: Zhejiang Ancient Books Publishing House. 2011. (in Chinese).
- Sun RT, Mai LY, Zhou XP. Analysis of Cultural Landscape Evolution and Characteristic Identification of Historic Countryside Scenic Recreation Sites: A Case Study of Songjiang Jiufeng Area in Shanghai. *China Landscape Architecture Society*. 2021; 306–311. (in Chinese).
- Lu HM. Cold Reflections on the Passion for the Countryside - Tasting the Winds of Country Park Construction from a Historical and Cultural Perspective. *Landscape Architecture Academic Journal*. 2009;08:12–4 (in Chinese).
- Zhou ZP, Wang Q. Drawing Wisdom from Tradition - Ancient Country Gardens on the Design of Contemporary Country Parks. *Landscape Architecture Academic Journal*. 2016;12:12–6 (in Chinese).
- Xia ZY, Yuan CC, Gao Y. Integrating perceptions of ecosystem services in adaptive management of country parks: A case study in peri-urban Shanghai. *China Ecosystem Services*. 2023;60: 101522. <https://doi.org/10.1016/j.ecoser.2023.101522>.
- Gu XK, Li Q, Chand S. Factors influencing residents' access to and use of country parks in Shanghai. *China Cities*. 2020;97: 102501. <https://doi.org/10.1016/j.cities.2019.102501>.
- Yuan F, Pan LF, Pan MF. Study on Visitors' Perceived Image and Enhancement Strategies of Country Parks Based on Network Text Analysis Method-Taking Liangzhu Ancient City Site Park in Hangzhou as an Example. *Operation and Management*. 2023;07:1–16 (in Chinese).
- Shen SY, Zhao J, Xu J, Guo JY, Shi LN. Understanding tourism development of historic districts from a representational perspective. *J Tour Cult Chang*. 2016;14(4):291–306. <https://doi.org/10.1080/14766825.2015.1042388>.
- Dai LL, Xu BX, Wu BH. Assessing sustainable development of a historic district using an ecological footprint model: a case study of Nanluoguxiang in Beijing. *China Area*. 2017;49(1):94–105. <https://doi.org/10.1111/area.12298>.
- Forsyth A. Defining suburbs. *J Plan Lit*. 2012;27(3):270–81. <https://doi.org/10.1177/0885412212448101>.
- Lambert D. The history of the country park, 1966–2005: Towards a renaissance? *Landsc Res*. 2006;31(1):43–62. <https://doi.org/10.1080/01426390500448567>.
- Michael H, David T. *Beyond Price: Value in Culture, Economics, and the Arts*. Cambridge: Cambridge University Press; 2007.
- Khahro SH, Talpur MAH, Bhellar MG, et al. GIS-based sustainable accessibility mapping of urban parks: Evidence from the second largest settlement of Sindh, Pakistan. *Sustainability*. 2023;15(7):6228. <https://doi.org/10.3390/su15076228>.
- Gaete M. Social-Ecological Knowledge Integration in Co-Design Processes: Lessons From Two Resilient Urban Parks in Chile. *Urban Planning*. 2023;8(2):359–73. <https://doi.org/10.17645/up.v8i2.6522>.
- Ryan SC, Sugg MM, Runkle JD. Spatial analysis of Greenspace and mental health in North Carolina: consideration of rural and urban communities. *Fam Community Health*. 2023;46(3):181–91. <https://doi.org/10.1097/FCH.0000000000000363>.
- Liao XJ, Zhou XP. A preliminary study of gardening activities and site selection in Songjiang during the Ming Dynasty. *China Society of Landscape Architecture*. 2016; 4. (in Chinese).
- UNESCO. Recommendation on the historic urban landscape. Paris, 2011.
- Manal G, Claudine H, Jacques T. The Historic Urban Landscape approach to urban management: a systematic review. *Int J Herit Stud*. 2019;25(10):999–1019. <https://doi.org/10.1080/13527258.2018.1552615>.
- Rey-Pérez J, Pereira RA. Historic urban landscape: A systematic review, eight years after the adoption of the HUL approach. *J Cult Herit Manag Sustain Development*. 2020;10:233–58. <https://doi.org/10.1108/JCHMSD-05-2018-0036>.
- WHITRAP. The HUL Guidebook: Managing Heritage in Dynamic and Constantly Changing Urban Environments. A Practical Guide to UNESCO's Recommendation on the Historic Urban Landscape. Shanghai, 2016.
- Chitsazzadeh E, Chizfahm DM, Jahani N. Delineating protective boundaries using the HUL approach a case study: heritage waterways of Isfahan. *J Cult Herit Manag Sustain Development*. 2023. <https://doi.org/10.1108/JCHMSD-03-2022-0035>.
- Xiao J, Zhang QQ, Lyu SW. Multi-Dimensional Identify of the Civic Cultural Values of Urban Landmarks after 1949 Under the Perspective of Historic Urban Landscape: A Case Study of Chongqing Municipality. *J Human Settlements West China*. 2022;37(6):73–9.
- England H. Understanding place: Historic area assessments. *Historical England*: Swindon; 2017.
- Heritage E. Understanding Place: Historic area assessments: principles and practice [J]. London: Institute of Historic Building and Conservation; 2010.

27. Stanik N, Aalders I, Miller D. Towards an indicator-based assessment of cultural heritage as a cultural ecosystem service—A case study of Scottish landscapes. *Ecol Ind*. 2018;95:288–97.
28. Herring PC. Framing perceptions of the historic landscape: Historic landscape characterisation (HLC) and historic land-use assessment (HLA). *Scottish Geograp J*. 2009;125(1):61–77.
29. Fairclough G, Herring P. Lens, mirror, window: Interactions between historic landscape characterisation and landscape character assessment. *Landsc Res*. 2016;41(2):186–98. <https://doi.org/10.1080/01426397.2015.1135318>.
30. Tudor C. An approach to landscape character assessment. *Natural England*. 2014;65: 101716.
31. UNESCO. The operational guidelines for the implementation of the world heritage convention. Paris: Unesco; 1972.
32. Gong ZQ, Zhang ZT, Zhou J, Zhou JQ, Wang WH. The evolutionary process and mechanism of cultural landscapes: an integrated perspective of landscape ecology and evolutionary economic geography. *Land*. 2022;11(11):2062. <https://doi.org/10.3390/land11112062>.
33. Wang D. Wandering among the Jiufeng and Sanmao Waves: A Cultural Study of Songjiang Poetry and Painting in Ancient Time. The Second Jiangnan Cultural Foru. 2013; 278–287. **(in Chinese)**.
34. Wang TX. History of Chinese classical gardens: taking the mature gardens of the song dynasty as an example. *Int J Educ Human*. 2022;4:235–7.
35. Xu YW. A Study of Gardening Ideas and Practices in Jiangnan during the Yuan Dynasty. Beijing Forestry University, 2022. <https://doi.org/10.26949/d.cnk.i.gblyu.2021.000561>.
36. Wang Y, Liu DA, Zhang YZ. Influence of environmental changes on departure ports of Northern Maritime Silk Road in Yangtze River Delta region. *China J Palaeogeography*. 2022;24(4):813–24. <https://doi.org/10.7605/gdxb.2022.04.045>.
37. Wu GF. Ancient Shanghai from the perspective of Yizi. *Journal of Shanghai Normal University (Philosophy & Social Sciences Edition)*. 1982; (04):107–114. <https://doi.org/10.13852/j.cnki.jshnu.1982.04.024>.
38. Xiao J, Cao K. Historic Towns' Preservation Methodologies Based on Analysis of Landscape Narration Grammar and Historic Layering Mechanism. *Chinese Landscape Architecture*. 2016;32(06):20–6.
39. Zhou JM, Wang WH, Zhou JQ, Zhang ZT, Lu ZX, Gong ZQ. Management effectiveness evaluation of world cultural landscape heritage: a case from China. *Heritage Science*. 2022;10(1):1–9. <https://doi.org/10.1186/s40494-022-00660-2>.
40. Zhang Y, Han Y. Vitality evaluation of historical and cultural districts based on the values dimension: districts in Beijing City. *China Heritage Science*. 2022;10:137. <https://doi.org/10.1186/s40494-022-00776-5>.
41. Koyunoglu AB, Gulersoy NZ. What Fundamental Indicators Should Be Used to Measure the Change in the Historic Urban Landscape Approach? *ICONARP Int J Arch Planning*. 2022;10(2):596–613. <https://doi.org/10.15320/ICONARP.2022.217>.
42. Zhou XP, Li SJ. Conservation-Oriented Multiple Heritage Cognition Perspectives for Historical Parks and Analysis Thereof. *Landscape Architecture*. 2023;30(9):114–20 **(in Chinese)**.
43. Wang SX, Gu K. Pingyao: The historic urban landscape and planning for heritage-led urban changes. *Cities*. 2020;97: 102489. <https://doi.org/10.1016/j.cities.2019.102489>.
44. Xiao J, Zhang QQ, Lv SW. Multi-Dimensional Identify of the Civic Cultural Values of Urban Landmarks after 1949 Under the Perspective of Historic Urban Landscape: A Case Study of Chongqing Municipality. *J Hum Settlements West Chin*. 2022;37(6):73–9. <https://doi.org/10.13791/j.cnki.hsfwst.20220611>.
45. Li J, Jing F, Shao Y. Global Practices Of The Unesco Historic Urban Landscape: Ten-Year Review And Insights For Chinese Urban Heritage Protection. *City Planning Review*. 2022;46(11):90–8 **(in Chinese)**.
46. Sang K, Fontana GL, Piovan SE. Assessing railway landscape by ahp process with gis: A study of the yunnan-vietnam railway. *Remote Sensing*. 2022;14(3):603. <https://doi.org/10.3390/rs14030603>.
47. Lai X, Liu Y, Zhang YR. Assessing the heritage value of the temple of heaven in beijing from the perspective of layering properties. *Beijing Planning Construction*. 2022;05:75–9 **(in Chinese)**.
48. Pei Y, Yang R, Dang AR. Historic layering process interpretation and value assessment of the ancient city of yulin based on historic urban landscape approach. *Urban Develop Stud*. 2022;29(07):128–36 **(in Chinese)**.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.