

# ***Research on the Issues and Strategies of Visitor Service Facilities in National Scenic Areas from the Perspective of All-Age Friendliness: A Case Study of Dianchi Lake, Yunnan***

**Yixuan Ge**

*College of Forestry, Inner Mongolia Agricultural University, Hohhot, China  
13662079292@139.com*

**Abstract.** Dianchi Lake is a core ecological scenic area in Kunming. It is not only an important ecological barrier for the local area but also a popular place for local residents' daily leisure time and tourists from home and abroad. But from the angle of all-age friendliness, the lake has big shortcomings in facilities that fit the needs of children and the elderly. This study focuses on the two core ideas of "child-friendliness" and "elder-friendliness" within the all-age friendly framework. The researchers do deep field investigations and analyze relevant policy documents. Through these works, they find three main problems in Dianchi's waterfront public spaces, which are about safety, comfort and educational value. The study mixes the principles of elder-friendly design with the key needs of children. Then it puts forward systematic improvement strategies. These strategies aim to turn Dianchi's waterfront scenic area from a traditional "landscape-oriented" place into a "service-oriented" all-age friendly destination. They can also offer a reference for updating similar public spaces and help build a safe, convenient, comfortable and inclusive all-age friendly waterfront environment.

**Keywords:** All-age friendly, Child-friendliness, Elder-friendliness, Waterfront space renovation, Dianchi Lake

## **1. Introduction**

In 2019, the Beijing Planning and Natural Resources Commission released the Beijing Accessible Urban Design Guidelines. For the first time, it put forward the concept of all-age friendliness under the principle of "leaving no one behind." Article 32 of the Laws and Regulations on the Protection of Scenic Spots says that management institutions of scenic areas should do some things. They need to protect ethnic and folk traditional culture according to the scenic area's features. They also should organize healthy and good tourism, sightseeing and cultural entertainment activities. Besides, they need to spread historical, cultural and scientific knowledge. This rule was promulgated by Order No. 474 of the State Council of the People's Republic of China on September 19, 2006. It was revised according to the Decision of the State Council on Amending Certain Administrative Regulations on February 6, 2016. This shows that scenic areas are not just places for tourists to visit. They also have public functions in social education and cultural spread. The goal of universal education is not only

limited to formal school education. It also includes social and environmental education. It can provide informal learning experiences for people. This reflects not only policy requirements but also a social trend toward fairness, inclusivity and harmony.

Dianchi Lake lies in the southwestern part of Kunming, Yunnan Province. It is a plateau freshwater lake. Administratively, the Dianchi lakeside wetland area is situated at 20°30'49"N–25°13'14"N and 102°32'58"E–102°58'28"E.

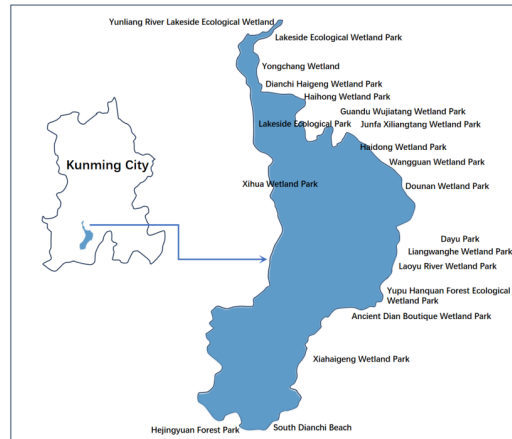


Figure 1. Location map of Dianchi Lake and distribution of the Dianchi Wetland Park [1]

The Dianchi watershed is on the central Yunnan Plateau. It is in the political, economic and cultural center of Yunnan Province. And it is also in Kunming, a nationally recognized historical and cultural city. Dianchi Lake is about 10 km away from Kunming's city center in the southwest direction. According to data from the Kunming Dianchi National Tourism and Vacation Zone Management Committee, the zone received 7.6601 million visitors in 2022. The number went up to 23.6806 million in 2023. And in the first half of 2024, it had 12.1801 million visitors [2].

Dianchi Lake itself is like a "living museum." It combines geological history, ecological evolution, human civilization and contemporary challenges perfectly. Its geological history and ecological evolution are closely connected with each other. Educational activities about Dianchi's history and geological conditions can cover all age groups. These activities can show its "universal" value clearly. Children can learn natural sciences from these activities. Adolescents can join in ecological monitoring and research work. Adults can understand how urgent environmental protection is. The elderly can think about the changes in history.

This paper first analyzes the existing problems in the Dianchi scenic area. These problems include insufficient age-appropriate facilities, weakened ecological education functions and underdeveloped cultural displays. Then the researchers use field investigations, comparative case studies and multidisciplinary analysis methods. Through these methods, they put forward goals for changing Dianchi into a national-level scenic area. The area should be all-age friendly, pay attention to ecological education and actively protect cultural heritage. The paper also gives strategies for spatial renovation, service enhancement and policy support. These strategies can help carry out the set goals smoothly.

## 2. Policies and design concepts for all-age friendly national scenic areas

### 2.1. Elder-friendliness in national parks

#### 2.1.1. Policy requirements for elder-friendliness

In 2022, the National Health Commission and 14 other departments issued the 14th Five-Year Plan for Healthy Aging together. The plan points out that China's population aging will become more serious. The proportion of elderly people in society will go up year by year. Their overall education level is rising too. And these changes lead to growing health-related demands [3]. The core concept of this plan is to build living environments and public facilities. These facilities should fit the physiological and psychological characteristics of the elderly. The goal is to meet their necessary outdoor activity needs and make sure they are physically and mentally healthy and safe.

From a more basic view, humans have an inborn love and dependence on nature. "Biophilic design" comes from the concept of "biophilia." In 1984, biologist Edward O. Wilson defined biophilia in his book *Biophilia*. He said it is an inherent emotional connection between humans and nature [4]. For the elderly especially, parks are accessible natural spaces in cities. They not only provide green views and places for physical exercise but also play an important role in promoting psychological relaxation, social connection and cultural identity. Parks can meet the elderly's comprehensive needs well. These needs include daily exercise, leisure time, social interaction and contact with nature. They can offer a safe, comfortable, oxygen-rich and ecologically diverse green environment.

The definition of "elder-friendly design" usually refers to the principles of barrier-free design and universal design. From the angle of design practice, this paper divides elder-friendly design into three levels:

**Safety:** The elderly's physiological functions like mobility, reaction speed and vision are declining naturally. So the first important thing for parks is to ensure safety during outdoor activities. Specifically, it includes several points. First, roads should be flat and have anti-slip surfaces. They need to avoid slippery materials and prevent water or moss from staying on the ground after rain. Second, pathways should have enough lighting at night and clear traffic signs. Third, motor vehicle access should be strictly limited. People can set up separate pedestrian zones and safety barriers to achieve this. Fourth, conspicuous warning signs should be installed at intersections.

**Comfort:** The elderly have great needs for convenient and comfortable movement. They walk more slowly and get tired easily. So pathways should connect functional areas and scenic spots effectively. They need to avoid detours or steep slopes. Resting places like benches and pavilions should be placed reasonably along the route. These places can let the elderly recover their energy at once. In park renovations, the design of these nodes is very important. The elderly are familiar with historical events and the past. So it is necessary to keep characteristic facilities at these nodes.

**Educational Value:** Successful design for the elderly depends on "respecting their agency." This means that older adults should not be treated as passive learners. Instead, people should provide spaces for them to pass on knowledge and share experiences. These spaces can let them feel their ongoing social value and life vitality. Adding local memories and nostalgic elements can make the elderly have emotional resonance and take part in activities actively.

## 2.2. Child-friendliness in national parks

### 2.2.1. Policy requirements for child-friendliness

Child-friendly construction should not only have basic features of child-friendly spaces like safety, comfort and playfulness. It also should deeply explore and enhance the space's cultural and intellectual educational functions [5]. It should help children have meaningful interactions with local culture. It can let children learn about local customs, traditions and historical background in a natural and immersive way. In this way, children's cultural understanding can be enhanced. The introduction of nature-based education can provide multi-layered developmental support for children. On one hand, natural environments are important places for children to know the world and develop cognitive abilities. On the other hand, interacting with nature can promote children's physical and mental health, make their bodies stronger, relieve stress and help them form values like respecting life and protecting the environment. Analyzing children's physiological characteristics is the foundation of building child-friendly environments. The core focus is to meet their physical needs. Park spaces have two responsibilities. They are both ecological classrooms for nature education and practical platforms for social education. So an ideal child-friendly park should combine natural experiences, cultural heritage, physical exercise and social learning. It can really create an inclusive, child-centered environment for children to grow up.

### 2.2.2. Design requirements for child-friendliness

Children aged 7–12 are usually between 112 cm and 160 cm tall. Their visual field is much smaller than that of adults in both horizontal and vertical directions. But designing for children is not just making adult spaces smaller. It needs to think about their behavioral psychology and physical dimensions systematically.

**Safety Design:** Children have weak risk awareness. Natural waterfront areas that are not modified have risks like falling into water or slipping on wet surfaces. Children are small in size and have limited judgment. They are also very curious and like to explore new things. So they may enter potentially dangerous zones. Therefore, park signage systems should clearly mark hazardous areas like water bodies and steep slopes. They also need to provide corresponding warnings to help children stay away from danger [6].

**Comfort:** Compared with adults, children rely more on visual cues to know and recognize things. So color is a very important visual element for them. Children tend to focus on nearby environmental features. They like colors, shapes and other visually intuitive details more. In terms of behavior, they prefer interactive landscape facilities.

**Educational Value:** Scenic areas can provide ecological education about aquatic invasive species in the Dianchi Lake basin and their impacts. They can explain why water quality gets worse and why submerged plants are declining. This can let children learn ecological knowledge and understand the importance of environmental protection at the same time. Dianchi has rich biodiversity including various bird and fish species. These also provide good chances for children to learn through hands-on experiences.

3. Basic geomorphology and current issues of the dianchi scenic area

3.1. Dianchi's topography, water bodies, and scenic spot distribution

Dianchi Lake is popular among both local and out-of-town visitors for two main reasons. First, its natural topography and waterscape have unique charm. It is a typical fault-subsidence lake on the Yunnan–Guizhou Plateau. So it is rare and easy to recognize. It is the largest lake in Yunnan Province in terms of water area. It not only has an important ecological position but also is a core part of Kunming's "mountain-and-water city" landscape. Second, its natural environment is very attractive. It has both good visual appeal and recreational value. Different parts of the lake have different landscape features and leisure experiences. For example, Haigeng Dam has many red-billed gulls during the bird-watching season. Guanyin Mountain has beautiful sunset views. Baiyukou has a good wetland ecology. Dounan Wetland has a big sea of flowers. Each of these zones has its own unique viewing themes and activity modes. According to reports from some experienced photographers and travel bloggers, scenic spots like Haihong Wetland Park, Wangguan Wetland's "dreamlike sunset" and Nandianchi Beach Park have become classic places for tourists to take photos and check in.

Table 1. Overview of Dianchi Wetland Parks

| Wetland Park Name         | Location                  | Area (hm <sup>2</sup> ) | Recreational Activities and Unique Features                                       |
|---------------------------|---------------------------|-------------------------|-----------------------------------------------------------------------------------|
| Haigeng Wetland Park      | East bank of Dianchi      | 50.25                   | Main attraction: thousands of red-billed gulls during annual bird-watching season |
| Haidong Wetland Park      | Northeast bank of Dianchi | 8.93                    | Main activities: walking, cycling, kite flying                                    |
| Xihua Wetland Park        | West bank of Dianchi      | 52.08                   | Main activity: fishing                                                            |
| Laoyu River Wetland Park  | East bank of Dianchi      | 438.15                  | Main activities: catching crayfish, cycling, sightseeing, bird-watching           |
| Dongda River Wetland Park | South bank of Dianchi     | 1220.00                 | Main activities: walking, sightseeing                                             |

3.2. Analysis of existing visitor service facility issues at Dianchi Lake

3.2.1. Issues with safety facilities

The author did field investigations and systematic observations. From 2023 to 2024, he carried out six on-site surveys of the Dianchi lakeside area. These surveys covered spring, summer and autumn to make sure the data is representative and comprehensive. The survey included 11 core scenic spots along the lakeshore. These spots are distributed in a linear pattern. The average distance between them is about 8 km. The existing facilities still have a lot of room for improvement. The problems are shown in three aspects:

Accessibility Facilities (Pathways and Transportation): Many main pedestrian paths are not wide enough. Or their slopes do not meet the required standards. This makes it hard for wheelchairs and strollers to pass through. The cable car in Xishan Scenic Area does not have barrier-free carriages. So people in wheelchairs cannot take it to the summit for sightseeing. There are not enough accessible restrooms. And barrier-free routes are often interrupted. For example, the lakeside pathway from Haigeng Park to the Baofeng Wetland has many steps. These steps cut off wheelchair access to docks and viewing platforms. It is suggested that people should add zigzag ramps in a systematic way to make the routes more continuous and safe.

Universal Facilities (Railings, Signage, Step Heights): From the angle of universal design, the core of safety facilities is to prevent potential risks through forward-looking design. This can ensure that all users including children, the elderly and persons with disabilities can use the environment safely and fairly. In the Dianchi scenic area, some viewing platforms and pathways have great panoramic views and fit well with the landscape. But they still have big shortcomings in refined safety design and inclusivity. Especially, the safety facilities along Dianchi Dam do not fully consider the behavior patterns and physical abilities of different users. At present, some lakeside sections of the dam only use simple warning ropes as safety barriers. These ropes are soft and easy to deform. They also lack stability.

Lighting Facilities: Nighttime lighting systems are very important for ensuring the safety of elderly visitors during evening activities. But insufficient lighting limits where they can go and increases potential risks [7]. In some areas, lighting is not even. This problem is especially serious along forested pathways and less-traveled parts.

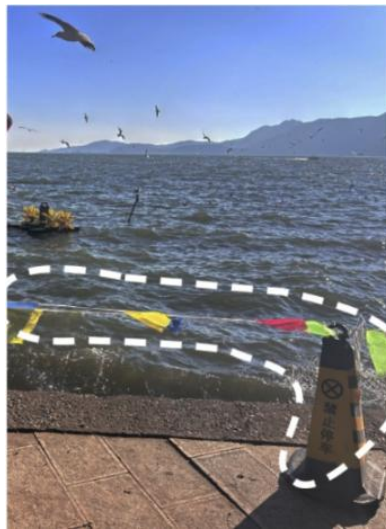


Figure 2. Soft rope barriers along Dianchi Lake present significant safety hazards

### 3.2.2. Issues with comfort facilities

In terms of comfort, park design should fully consider the physiological and psychological needs of different groups. It should provide a suitable environmental experience for them. But in reality, groups like the elderly and children still face many difficulties. In terms of spatial cognition and navigation, they are easy to get lost or disoriented. Many of them do not know the park layout well. And they may have trouble using digital maps to find their way.

Potential for Getting Lost: Dianchi has many scenic spots and attractions. These include Haigeng Dam, Xishan Park cable car area and boat tours. There are nearly 13 wetland parks around the lake. But there are no signs or maps to guide visitors along the lake's perimeter. What's more, for visually impaired or low-vision visitors, the park does not have Braille signage or audio guide rental points. This makes navigation extremely difficult for them.

Potential for Walking Fatigue: Dianchi Dam is not directly served by subway or convenient bus lines. The nearest subway station is Yuhu Village Station. It is 2 km away from the lakeshore. Inside the park, the number and distribution of service stations like resting pavilions and teahouses are very important for vulnerable groups' experience. Problems like uneven terrain, slippery surfaces and



lack of rest points affect accessibility and environmental safety. They also make visitors feel uncomfortable.

### 3.2.3. Issues with educational facilities

Educational and Recreational System Facilities. As large scenic areas develop into a new stage, a key question is how to deeply combine cultural narratives and experiences. The goal is to "let cultural relics speak and make history come alive" [8]. Haigeng Dam has a poetry wall at the base of its steps. The wall is engraved with poems, historical documents and geographical introductions related to Dianchi. But it has not fully caught visitors' attention. There are no interactive or tangible exhibits. This limits emotional engagement and fails to make people have a resonance with the region..



Figure 3. The Nie Er statue at Dianchi Dam

## 4. Design and renovation strategies

This chapter focuses on improving and renovating the service facilities in the Dianchi lakeside area. It puts forward specific design strategies and renovation ideas in three core dimensions: safety, comfort and educational value.

At the safety level, strategies are proposed for key shoreline areas. These areas have significant safety hazards, especially for children. At present, they only use warning lines for protection. At the comfort level, systematic transportation optimization plans are suggested. These plans aim to solve problems like poor accessibility, walking fatigue for elderly and special-needs groups and long distances between scenic spots. At the educational level, the focus is on increasing spatial vitality and edutainment functions. Special attention is paid to creating interesting landscapes that can attract children to take part.

### 4.1. Renovation concepts for safety facilities

Installation of Guardrail Barriers. Double-layer guardrails are proposed to be installed along shoreline warning lines. The core value of the dual-rail system is to balance "viewing experience" and "safety assurance." Single-layer railings are enough for adults. But young children are short.

They may instinctively climb or squeeze through the railings to see the scenery. The upper railing can prevent people from falling down. The lower structure can stop children from crawling through.

The picture below shows Hafencity's waterfront urban public space landscape harbour waterfront space transformation. The lagoon system provides more diversified water-friendly options for the public. It also offers all-round security.



Figure 4. Hafencity landscape harbour waterfront space effect diagram

#### 4.2. Renovation concepts for comfort facilities



Figure 5. One of the key access routes to Dianchi Lake

Dedicated Circular Shuttle Bus. Areas with convenient public transport are considered walkable environments. For elderly visitors, the density of bus stops is more important than service frequency or other attributes. It is a key factor in determining accessibility [9]. On May 19, 2024, Kunming Public Transport Group cooperated with the Cultural and Tourism Group. They launched a double-decker sightseeing bus along Dianchi's "Golden Shoreline." The bus can provide panoramic views for passengers [10]. Although there is a loop bus, Yuhu Village subway station is about 2 km from the lake shore. Field investigations found that most elderly visitors and wheelchair users need 25–40 minutes to walk from the subway or bus stop to the lakeside. There are almost no rest points along the way. This walking time is far beyond the tolerance of these special groups. It is recommended to add a connecting shuttle from Yuhu Village to Haigeng Dam. This can achieve "door-to-door" service for visitors. In addition, such a shuttle can prevent children from running on mixed-use roads where motor vehicles and pedestrians share the same space. This can reduce the risk of accidents.



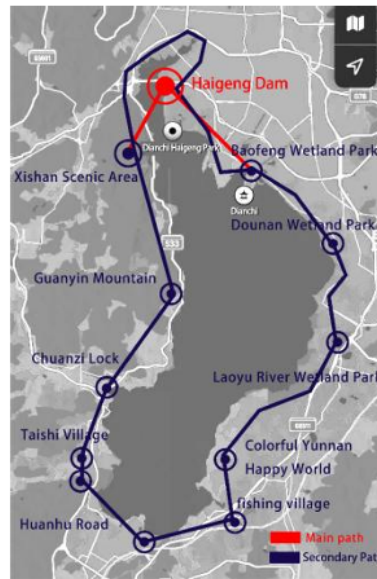


Figure 6. Dianchi loop tour route and key scenic spots



Figure 7. Crowded area at Dianchi Dam

Increase the Number of Seats. On-site surveys show that most visitors have to stand while viewing the scenery along crowded sections of Dianchi. This shows the problem of long distances between scenic spots for vulnerable groups. The park should add more seats. These seats should be integrated with the environment. They can provide more resting points for elderly and special-needs visitors. People can add varied terrain along the Dianchi loop. This can allow for different types of seating. For example, the Hafencity waterfront urban space renovation has irregular-shaped seats. These seats provide enough resting and viewing opportunities. At the same time, they blend in well with the lakeside landscape.



Figure 8. Irregular seating in Hafencity waterfront space—integrating with the landscape while providing sufficient rest areas

### 4.3. Renovation concepts for educational facilities

Engaging Landscapes for Children. Based on children's physiological characteristics and behavioral patterns in unfamiliar spaces, educational and interactive landscape installations should be created. "Flower City" uses floral and plant sculptures to show urban culture. This can increase children's curiosity. It also provides them with knowledge and emotional resonance about ecological civilization [11]. The Dianchi scenic area can do the same thing. It can add interactive installations inspired by local elements. For example, it can build plant-based sculptures or interactive landscapes that reflect regional culture.



Figure 9. Peacock flower sculpture art at Dianchi's Luxigon Pier

## 5. Conclusion

This study explores systematic optimization strategies for visitor service facilities at Dianchi Lake National Scenic Area in Yunnan Province. The research is guided by the principle of "universal friendliness." Dianchi Lake is a key ecological and tourism hub in Kunming. It attracts many local residents and tourists. It is also a major recreation space for elderly residents and families with children. But the current facilities have obvious shortcomings. These include a scattered layout, insufficient barrier-free infrastructure, inadequate safety measures and lack of navigation services. All these problems prevent older adults, children and other vulnerable groups from accessing the area fairly.

The study uses a multidimensional approach that combines field surveys, policy analysis and case studies. It evaluates the service facilities from three aspects: safety, comfort and educational value. The key issues are as follows. First, there is no effective protection along waterfront areas. Second, lakeside steps and the Xishan cable car do not have barrier-free access. Third, the distance between attractions is long and walking connectivity is limited. Fourth, there are not enough rest facilities. In addition, there are few interactive installations and environmental education resources for children. This limits their chances of cultural engagement and ecological learning.

To solve these challenges, the study puts forward a "universal-friendly waterfront space" renovation strategy. Safety improvements include installing double-layer guardrails, turning steps into zigzag ramps and optimizing cable car access. Comfort is enhanced by adding shuttle services from Yuhu Village subway station and loop sightseeing buses. Terrain-integrated seating is also

added to create age-friendly rest stops. Educational value is increased through interactive cultural installations and child-focused environmental programs. These programs highlight Dianchi's ecological issues.

These strategies change Dianchi Lake from a scenery-centric destination to an all-age service-oriented area. The safety system reduces waterfront risks. Transport and seating improvements make the area more accessible and comfortable. Cultural and educational interventions strengthen children's ecological awareness and local identity.

## References

- [1] Luosang, Z., Zhang, Z., Yang, Z., et al. (2024). Spatiotemporal characteristics and influencing factors of urban waterfront park vitality: A case study of Kunming [J]. *Southern Architecture*, (08), 69–77.
- [2] Zhang, Y. (2024-11-07). Beautiful Dianchi, delighted tourists, prosperous locals [N]. *China Natural Resources News*, (002). DOI: 10.28291/n.cnki.ngtzy.2024.003049
- [3] Yi, Y., Jiang, T., & Chen, Y. (2025). Research on integrating martial arts into elderly education service system in Yunnan under the healthy aging strategy [J]. *Wudang*, (03), 82–84.
- [4] Wang, M. (2024). Middle school campus landscape design based on biophilia theory [D]. Xi'an University of Architecture and Technology. DOI: 10.27393/d.cnki.gxazu.2024.000428
- [5] Shen, Y. (2011). Themes and expressions in children's parks [D]. Nanjing Forestry University.
- [6] Xiao, X., & Wang, R. (2025). Design research on landscape signage for child-friendly parks [J]. *Shoes & Leather Crafts and Design*, 5(11), 186–188.
- [7] Zhang, C. (2024). Age-friendly study of Zhongshan Park in Wenzhou [D]. Shenyang Agricultural University. DOI: 10.27327/d.cnki.gshnu.2024.000380
- [8] Guo, X., Yu, W., Liu, Q., et al. (2025). Planning and design research of historical and cultural scenic areas under the context of large scenic areas: A case study of Jinyang Temple in Beijing [J]. *Urban Architecture and Space*, 32(07), 69–71.
- [9] Zang, P., Xue, Q., & Lu, Y. (2017). Age-friendliness study of the elderly population in Hong Kong communities [J]. *Architectural Journal*, (S2), 45–50.
- [10] Ma, L. (2025). Exploration and practice of "Bus + Cultural Tourism" in Kunming Public Transport Group: A brief analysis of diversified supply-side development of main bus business [J]. *People's Public Transport*, (07), 61–63. DOI: 10.16857/j.cnki.cn11-5903/u.2025.07.011
- [11] Zhang, L., Tian, F., & Wu, M. (2025). Research on cultivating ecological civilization literacy of adolescents in ethnic regions: Content and paths [J]. *Journal of North China University of Science and Technology (Social Science Edition)*, 25(04), 105–112.