

# Analysis and Evaluation of Public Behavior in Waterfront Space of Happiness River based on Environmental Behaviors

## -- Take Hangzhou Section of Qiantang River as an Example

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### Abstract

As the link to realize the harmonious development of the natural environment of cities and rivers, waterfront space, relying on the landscape environment, extends from the landscape to the ecological environment, recreational environment, educational environment, humanistic environment and other aspects, with a comprehensive effect to enhance people's happiness from inside to outside, and promote the sustainable development of the city. Based on environmental behavior, this paper investigates the waterfront space of the section from the Third Qianjiang Bridge to the Fuxing Bridge in the Qiantang River basin as the research area, analyzes from the perspective of recreational people, and aims to provide some reference for the improvement of the happiness quality of the "Happy River" waterfront space.

### Keywords

"Happy River"; Environmental Behaviors; Operational Research.

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## 1. The Theoretical Study of Waterfront Space under Environmental Behavior.

**Table 1.** Components of waterfront space value of Happy River

Composition factor of main prime elements	Sub-factor component	Composition factor
Administrative elements	Functional zoning elements	Location and functional zoning
Traffic elements	Traffic and travel elements	Sign-oriented, travel
Elements of public facilities	Elements of public infrastructure facilities	Infrastructure and supporting services
ecological environment factors	Natural ecological environment elements	Plant landscape, water landscape, natural landscape
	Architectural landscape elements	Architectural style and connotation display
Humanistic elements	Interactive elements of human activities	Historical allusions, folk customs, festivals and celebrations, competitions, leisure and entertainment, recreational activities and cultural communication.

Environmental ethology analyzes the influence of individual behavior characteristics on the surrounding society, material environment and culture. It covers ecological perception theory, Maslow's hierarchy of needs theory, Gestalt organization principle and other theories. Different from psychology, it can interpret all the factors that affect people's quality of life in all aspects[1]. According to this feature, this method is used to study how to improve the happiness of people's interaction in waterfront space and thus improve the overall quality of life. All the elements in the waterfront space determine the attraction of the area, and the introduction of the concept of "Happy River" is an important evaluation index for the success of waterfront space planning and development. Generally speaking, waterfront space is mainly influenced by environmental factors, human factors and ecological factors. In this analysis of improving the happiness quality of waterfront space, around the human resource demand, with three main elements as the starting point, the composition factors are refined, and the specific classification is as follows.

## 2. Investigation and Questionnaire Survey

The research object selected this time is the Hangzhou section of Qiantang River Basin, and the basin between Fuxing Bridge and Qianjiang Third Bridge. The waterfront space on both sides of the river is 8.5km, and the overall basin area is 3.8 square kilometers. In the study area, the Qiantang River as a whole runs west to east. The south bank belongs to Binjiang District, and the north bank belongs to Shangcheng District. The two sides cover many landmark buildings, including Hangzhou Seal, Hangzhou Science and Technology Museum, Qian Jianglong and Qianwang Shechao. Because of the distribution of nearby shopping malls and residential land, there are frequent personnel activities in the space, and the number of waterfront space interactions has surged[2], and the regional scope has become a comprehensive area integrating city, culture, sports and commercial space.

In the planning of the whole research area, its main core areas include the core ecological protection area of river bank protection, the peripheral ecological protection area, the river bank interaction area and the commercial exchange area, and various types of planning are integrated into a harmonious waterfront space area. Based on the theoretical basis of environmental behavior, the following five specific systems are investigated.

### (1) Road traffic system

There are various pavement forms in the waterfront space of the research site, including shallow grass road, wooden plank road, asphalt road and cement road, which can distinguish the site well, among which the science and education path and leisure path have different pavement forms. The waterfront space is adjacent to Zhijiang Road and Wentao Road along the coast, and there are many entrances and exits, so the overall transportation is convenient.

### (2) Landscaping system

The plants planted in the waterfront space are mainly subtropical evergreen broadleaf plants and seasonal plants, the most distinctive ones include cherry blossoms and plum blossoms. The coastal greening blends with the characteristics of modern cities, with evergreen seasons and blooming flowers. Every spring, the Sakura Avenue scenic spot in Nan'an Park attracts many tourists to stop and take photos[3]. The spring breeze blows, the cherry blossoms on the runway fall with the wind, and the overall environment is romantic and comfortable.

### (3) Public function places

The waterfront space is relatively rich in various activity spaces, including parks, squares, sports centers, rest and entertainment areas, etc. Due to the high population density and mild weather in the residential areas on both sides of the north and south, there are many people coming for exercise and walking in the Spring and Autumn. Especially during the cherry blossom season, tide watching season or major events such as Hangzhou Marathon, the green bank of the riverbank is often "overcrowded". However, because there is no sheltered area, the number of tourists and aborigines will be greatly reduced in midsummer and winter.

#### (4) Science, education and entertainment system

There are many scientific, educational and recreational areas within the waterfront space, including Constitution Park, Low-carbon Science and Technology Museum, Qianwang Shechao, Qian Jianglong Sculpture, Hangzhou Seal, Night Tour Wharf, etc. Rich natural landscape and a series of historical and humanistic allusions integrate the unique Qiantang River culture into the spiritual culture of every space participant, and sublimate the spiritual thought while satisfying the knowledge richness of modern people.

#### (5) Sign guidance system

Sign guidance system: There is a high green belt between the waterfront space of the riverbank and the urban roads, and the overall form is similar but the overall guidance is insufficient. There is no guidance for leaving the waterfront space of the riverbank, and many paths are not marked, so the guidance is not perfect. Because there are some infrastructures such as sluices and dams in the space, it is different from the current overall environment and has a certain degree of recognition.

### 3. Survey Data and Analysis

In this sample plot survey, 93 questionnaires were distributed for the waterfront space of Qiantang River Basin. If the survey time was from 19: 00 to 21: 00, 85 valid questionnaires were collected, with a recovery rate of 91.4%.

The questionnaire is in the form of multiple-choice questions. The questions are mainly set to understand the basic information of the venue users, the purpose of activities in the venue, the evaluation of different waterfront spaces, and express their overall impressions and suggestions on the waterfront spaces on both sides of the strait. Through the statistical analysis of the survey data, in terms of population structure, a total of 85 respondents participated in the survey, including 43.5% male respondents and 56.5% female respondents, and the proportion of male respondents was lower than that of female respondents.

In terms of age structure, the respondents are mainly middle-aged and elderly people over 40 years old, accounting for 62.4% of the total number. The waterfront space construction index based on environmental behavior is 82.4%. From the survey results, it can be found that most people, especially middle-aged and elderly people, often go to Qiantang River for leisure with their families or accompanying their children, followed by teenagers. Most of them finish parties with friends in nearby supermarkets and bring friends to the river to relax.

According to the summary of field research, tourists who come here for sightseeing include those who come to Hangzhou. Most of them stay in hotels by the river and spend their evenings walking along the Qiantang River. These tourists are willing to live in such an environment, but the situation is not clear due to factors such as work, space and holidays.

There are also many people who come here several times a month. The waterfront space of Qiantang River is only about 500m away from the nearest residential area, and the journey is relatively short, which is very convenient.

Parks, runways and sports venues in waterfront space are frequently used, and people spend less than three hours in the area, mainly from 7: 00 pm to 9: 00 pm. For the respondents, the main types of dynamic recreational activities to Qiantang River waterfront space are walking and sightseeing, followed by running and fitness, tide watching and so on. The survey shows that recreational and fitness facilities and seats are the most needed by the participants, accounting for 41.18% and 23.53% respectively; Comfort is the most important requirement of the respondents for facilities, accounting for 29.41%, followed by safety, accounting for 21.18% and fitness, accounting for 17.65%.

33.7% of the respondents hope to set up rest facilities in the green belt between waterfront space and urban roads, so that they can not only experience the improvement of life quality brought by waterfront space, but also enjoy the landscape enjoyment brought by green plants, and also feel the rare natural atmosphere, which plays an important role in improving happiness.

In terms of path preference, on the existing basis, 27.06% of the respondents hope to increase cobblestone roads (Figure 5), and 17.65% hope to increase wooden plank roads to match the now perfect park greening environment, so as to increase the diversity of roads and increase certain hydrophilicity and interactivity, so as to have a better experience effect and enrich spiritual civilization. During the interview, the interviewees were satisfied with the existing fitness track and bicycle lane, but they still hoped that the existing roads would be integrated and extended.

#### 4. Conclusion

Environment has a great influence on people's behavior. Based on the theory of environmental behavior, this paper analyzes the factors that can focus on improving happiness in waterfront space by starting from different behavior patterns and space environmental needs of people. By combining field research and questionnaire survey, taking the waterfront space from the third Qianjiang Bridge to Fuxing Bridge in Qiantang River Basin as the research area, this paper makes an in-depth study on people's daily behavior patterns and obtains the content points that can be improved. Combining with the research results, it summarizes the ways and means of transforming waterfront space into "Happy River" waterfront space and improving happiness from five aspects: road traffic system, landscaping system, public function places, science and education entertainment system and sign guidance system, which is intended to be the overall construction of Happy River in the later period.

#### References

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