Research of Place-keeping in Urban Wetland Park Management

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Abstract. In recent years, urban wetland parks have gone through a rapid development. More and more authorities, public and researchers have focused on urban wetland parks. But most attention is put on the design and planning, conservation and long-term management of urban wetland parks that have not received enough attention in many cities in China. This study takes Chengdu Bailuwan Ecological Wetland Park as a case study to analyse place-keeping and explore what extent place-keeping happens in Chinese urban wetland parks.

1. Introduction

The study of urban wetland parks is a new area of concern in recent years. Urban Wetland Park refers to the “Within the urban planning area, the purpose of the park is to protect urban wetland resources, and also with functions of popular science education, scientific research and leisure tour.”[1] At present, most of the urban wetland parks in China are funded by the government. Since the urban wetland parks generally have a large area and the ecological system inside the park is relatively complex, experts with professional knowledge are needed to solve the management and maintenance of the wetland parks. This paper discusses the application of place-keeping in wetland park management with the case of Chengdu Bailuwan Ecological Wetland Park.

2. Overview

In the landscape architecture profession, a term “place-making” is often mentioned. Currently in Europe, another corresponding word “place-keeping” is gradually entering the landscape profession. Place-keeping is increasingly used for discussion of landscape public spaces, such as parks, children's playgrounds, and river landscapes. The concept of ‘place-keeping’ was coined by Wild et al. (2008) and relates to what happens after high-quality places have been created[2]. This means maintaining and enhancing the qualities and benefits of places through long-term management (Dempsey and Burton, 2012)[2-3]. In China, the current place-keeping does not have a systematic framework, often a process of direct transition from place-making to place-keeping. It is precisely because of the lack of support of place-keeping, and that the current domestic site construction and site maintenance are still in a singular relationship, we need to discuss the theory. To apply place-keeping in current landscape management work in China to achieve the vision of sustainable landscape development.

Place-keeping explains the complexity of urban landscape changes, the diversity of different scales, and the importance of various configurations and systems. Place-keeping should focus on the site's characteristics, the needs of users, behavior and perception. There are six dimensions that need to be
emphasized in the place-keeping process. The six dimensions are governance, partnerships, policy, funding, evaluating, design, management and maintenance activities.

3. Object
The total area of Chengdu Bailuwan Ecological Wetland Park is 2,000,100 square meters, of which the water surface area is 666,667 square meters. The park is located in the Jinjiang Ring City Ecological Zone in the southeast of Chengdu City. The east side of the park is bordered by the lotus pond in San Sheng Township. It is the first ecological wetland built by Chengdu to integrate ecological protection, urban agriculture, natural landscape, popular science education and leisure tourism. In January 2017, Chengdu Bailuwan Ecological Wetland Park was approved as “National City Wetland Park” and became the first “National Urban Wetland Park” in Chengdu.

4. Methods

4.1 Questionnaire survey
This study mainly uses questionnaire survey method. A total of 400 questionnaires were distributed and 322 valid questionnaires were issued.

4.2 Interview
The interviewees were mainly tourists from Chengdu Bailuwan Ecological Wetland Park and residents living nearby, including the site management staffs and project managers of the park.

4.3 Environmental Monitoring
The water environment quality and sound environment quality of Chengdu Bailuwan Ecological Wetland Park were monitored.

5. Analysis of results

5.1 Questionnaire survey and interview results analysis
According to questionnaires and interviews, it was found that the people who came to the park were more concentrated in spring and summer, and the purpose of coming to the park was generally leisure and fitness.

| Activity to the park | Research method       | Research time          | Survey results |
|----------------------|-----------------------|------------------------|----------------|
| Frequency of park    |                       |                        |                |
| Occasionally         | Questionnaire, interview | May-October 2017      | 187 persons    |
| Once a month         | Questionnaire, interview | May-October 2017      | 57 persons     |
| 1-2 times a week     | Questionnaire, interview | May-October 2017      | 42 persons     |
| 3-4 times a week     | Questionnaire, interview | May-October 2017      | 18 persons     |
| Everyday             | Questionnaire, interview | May-October 2017      | 18 persons     |

| Leisure              | Questionnaire, interview | July 2017-January 2018 | 182 persons |
| Reading              | Questionnaire, interview | July 2017-January 2018 | 4 persons   |
| Photography          | Questionnaire, interview | July 2017-January 2018 | 21 persons  |
| Exercise             | Questionnaire, interview | July 2017-January 2018 | 66 persons  |
The overall planning of the park is good, and it has certain scientific value and aesthetic value. However, the infrastructure and management work in the park is insufficient. There is no suitable management duty system in the park, and the management facility offices are in a closed state. In the park, public facilities such as seats, bridges, lamps are damaged, and no relevant management personnel perform maintenance and renovation. There is a serious phenomenon of traffic flow on road management, and there are no clear warning signs. In the questionnaire interview on safety issues, post-maintenance maintenance was considered to be a major unsafe factor.

Table 2. Facility satisfaction and safety situation questionnaire

| Category            | Satisfaction level | Research method                  | Research time             | Satisfaction % |
|---------------------|--------------------|----------------------------------|---------------------------|----------------|
| Utilization of facilities | satisfy           | Questionnaire, interview         | March-April 2017         | 10%            |
|                     | Basically satisfy  | Questionnaire, interview         | March-April 2017         | 65%            |
|                     | Not very satisfied | Questionnaire, interview         | March-April 2017         | 22%            |
|                     | Dissatisfaction    | Questionnaire, interview         | March-April 2017         | 3%             |
| Safety situation    | security           | Questionnaire, interviews, data monitoring | May-June, October-December 2017 | 58%            |
|                     | some unsafe factors| Questionnaire, interviews, data monitoring | May-June, October-December 2017 | 40%            |
|                     | many unsafe factors| Questionnaire, interviews, data monitoring | May-June, October-December 2017 | 2%             |

5.2 Environmental quality monitoring results
The acoustic environment quality has a certain regularity in time distribution, 40.7 decibels in the morning (7:00 to 11:30), 46.6 decibels in the noon (11:30 to 14:00), and afternoon (14:00 to 18:30) is 57.9 decibels and 48.9 decibels at night (18:30 to 22:00). The average ambient noise is 47.0 decibels, which meets the requirements of the Class 2 standard of the Acoustic Environmental Quality Standard (GB3096-2008) and belongs to the “good” level. The highest value during the day is 69 decibels and the lowest is 29 decibels.

Table 3. Noise Test Form for Bailuwan Ecological Wetland Park

| Point Period of time | Gate one | Visitor center | Flower field | Under the terraces | Water purification station | Gate two | Viaduct | Time average |
|----------------------|----------|----------------|-------------|--------------------|----------------------------|----------|---------|--------------|
| (7:30-11:30)         | 47       | 62             | 31          | 29                 | 36                         | 44       | 42      | 30           | 44          | 41       | 29       | 34           | 50          | 51       | 40.714        |
| (11:30-14:00)        | 51       | 52             | 30          | 30                 | 63                         | 6        | 40      | 34           | 57          | 51       | 37       | 35           | 54          | 57       | 46.571        |
| (14:00-18:30)        | 62       | 60             | 51          | 53                 | 60                         | 56       | 53      | 57           | 69          | 67       | 47       | 49           | 62          | 65       | 57.929        |
| (18:30-20:00)        | 53       | 52             | 40          | 39                 | 55                         | 57       | 40      | 39           | 55          | 56       | 46       | 44           | 55          | 53       | 48.857        |
| Test point average   | 54.875   | 37.875         | 43.5        | 41.875             | 55                         | 40.125   | 55.875  | 47.018       |

The task group monitored the water quality of Bailuwan Ecological Wetland Park in Chengdu, which did not meet the standard water limit of the "Surface Water Environmental Quality"(GB 3838-2002) V category. The excess pollutants were ammonia nitrogen and total phosphorus.
Table 4. Quality Test Table for Bailuwan Ecological Wetland Park

| Project | PH | Dissolved Oxygen | Permanganate Index | Ammonia Nitrogen | Total Phosphorus | Petroleum |
|---------|----|------------------|--------------------|------------------|------------------|-----------|
| Standard | 6~9 | ≥2               | ≤15                | ≤2.0             | ≤0.4             | ≤1.0      |
| Average | 6.88~7.49 | 3.9-4.4         | 4.9-5.3            | 5.94-8.5         | 0.93-1.29        | 0.13      |
| Excess Rate % | 0% | 0%               | 0%                 | 75%              | 83.3%            | 0%        |

The ambient air quality of the Bailuwan Ecological Wetland Park in 2017 did not meet the requirements of the Class II standard of the Ambient Air Quality Standard (GB 3095-2012). The number of days reached was 223 days and the compliance rate was 61.4%. The super-standard pollutants are fine particles, inhalable particles, nitrogen dioxide and ozone.

Table 5. Statistical Table of Ambient Air Quality Monitoring Results of Bailuwan Ecological Wetland Park (Unit: ug/m³, CO is mg/m³)

| | PM10 | PM2.5 | NO2 | O3 | SO2 | CO |
|---|------|-------|-----|----|-----|----|
| Annual mean concentration | 97   | 59    | 55  | /  | 16  | /  |
| Ambient air quality annual average standard value | 70   | 35    | 40  | /  | 60  | /  |
| Specific percentile concentration | 205** | 142** | 98*** | 180* | 33*** | 1.9** |
| Ambient air quality 24 hours average standard value | 150  | 75    | 80  | 160 | 150 | 4  |

* O3 is the 90th percentile concentration of the 24-hour maximum 8-hour sliding average
** PM10，PM2.5，CO is the average 95th percentile concentration at 24 hours
*** SO2，NO2 is the 24-hour average 98th percentile concentration

6. Place-keeping Analysis

6.1 Evaluation

There are broadly two reasons for evaluating place-keeping. First, it can help participants understand the site itself and the changes. Importantly, systematic evaluation that help people participate in the improvement process and outcomes, and as a result to increase user interest or save public funds. The second reason is that the results of the evaluation can potentially help the site to maintain funding, and it also can reveal the impact of budget cuts on the quality and effectiveness of users, so evidence can be provided to support (or refute) political decisions about site maintenance funding[4].

According to the questionnaire survey and environmental quality monitoring data, and with reference to the National Wetland Park evaluation criteria, the Bailuwan Wetland Park Evaluation System is composed of 23 factors including wetland ecosystem, environmental quality, wetland landscape, infrastructure, management and extra points. The total score is 100 points.

Table 6. Evaluation Index System and Weight Score of Bailuwan Ecological Wetland Park

| Evaluation Item | Wetlands Ecosystem | Environmental Quality | Wetland Landscape | Installation | Management | Extra Point | Total Points |
|-----------------|--------------------|-----------------------|-------------------|--------------|------------|-------------|--------------|
| Ecosystem Typicality (7) | Water (6) | Scientific Value (3) | Direct Teaching Facilities (3) | | | | |
| Wetland Area Ratio (7) | Soil (4) | Overall Scene (3) | Reception Equipment (1) | | | | |
| Ecosystem Uniqueness (5) | Air (3) | The Value of Popular Science Education (3) | Monitoring Equipment (2) | | | | |
| Species Diversity (6) | Noise (2) | Historical and Cultural Value (2) | Landscape | | | | |

6.2 Place-keeping Analysis
At present, the Bailuwan Ecological Wetland Park itself does not have a clear evaluation system and evaluation system. There is a lack of communication and access to information between local governments and wetland users. The wetland environment is constantly changing and needs to be evaluated regularly. From a place-keeping point of view, the evaluation of wetland parks is essential for effective site management.

6.2 Partnership

Partnership describes an association of two or more partners who have agreed to share responsibility for place-keeping [2].

From the preliminary investigation and interview of the project, it was learned that the construction of Bailuwan Ecological Wetland Park in the early stage was under the supervision of Jinjiang Urban and Rural Construction Co., Ltd., and the maintenance of the later site was mainly by Chengdu Bailuwan Wetland Management Co., Ltd. The fund operation, project implementation and personnel deployment of this wetland park are ultimately managed by Sansheng township government. In addition, other companies hold running, cycling and other outreach activities in the park, such as the China Charity Foundation.

Bailuwan Wetland Park Main Partnership:

1) Water treatment: Qionglai City Zhongji Construction Water Purification Co., Ltd. (Bailuwan Wetland Water Treatment and Ecological Restoration Project), Zhonbohui Environmental Protection Technology (Sichuan) Co., Ltd., Shanghai Zhonghui Water Ecology Co., Ltd.

2) Other activities participating partners: Sansheng Township Scenic Area Administration, Jinxiu Xincheng Public Welfare Service Center, Chengdu Forestry and Landscape Management Bureau, Chengdu Jinjiang District Environmental Protection Bureau, Chengdu Botanical Garden, Chengdu Bird Watching Club, Chengdu Jinjiang District Social Organization Development Foundation, China Charity Fund etc.

There is a very representative group named “Friends of” in Sheffield, England. “Friends of” group works primarily with the local government to provide a range of place-keeping activities. “Friends of” is usually made up of local residents who are interested in their green spaces, and the Sheffield City Council (SCC) actively supports their formation. The Bailuwan Wetland Park can also build up a “Friends of” group, to find partners, establish their own regulatory system, and manage their activities on their own.

6.3 Governance

It is generally considered that achieving place-keeping necessitates effective governance and decision-making [2]. There are three modes of decision-making [3]:

The first is state-centred model: state-centred, local authorities, and plans to enter and provide wetland parks with minimal external resources. The construction of wetland parks is mainly based on policy protection and policy investment, and the government department is the last to control wetland parks.

The second is a market-centered model: building a wetland park with a sound market operation model. The private sector and other stakeholders involved will promote the maintenance and governance of wetland parks. A typical example: public-private partnership (PPP), which involves the private sector, and the profit-driven public sector. One party will provide funds and one party will provide policy support.

The third is a user-centered model: user-based organizations, such as local community groups and charities and other NGOs, allow them to participate in the conservation and governance of wetland parks [2]. Considering that these organizations help to understand the use and use of wetland parks, it is an effective measure to maintain wetland parks.
The governance model adopted by the Chengdu Bailuwan Ecological Wetland Park is a state-centered and market-centered model. The user model is weak, and there is a lack of communication and management lag in the management.

6.4 Policy
Bailuwan Wetland Management is mainly managed by relevant government departments, which can learn from Denmark’s “Park Plan”. The plan refers to the development and implementation of a new public green space management policy in 2009 by the Green Space Department of Aarhus, Denmark. The Parks Program is supported by other municipal strategies and programs that enable cross-sector collaboration and common goals and information sharing. The new policy represents a shift from more traditional passive management to a new proactive management approach. Implementation is based on local citizen participation, including the development of local visions, the identification of new investments and the maintenance of priorities for public green space management. It can be seen that through shared principles and processes, policy mechanisms support the public sector to shift responsibility to the most appropriate institutions and to ensure the concept of public interest. Such policies also promote responsibility for promoting public services with local communities and stakeholders.

6.5 Funds
In general, the allocation of funds for public venues is mainly from the public sector and is provided on a local authority scale: as a non-statutory service, such funds are usually not delineated, which means that place-keeping may be a no stable activity. Often, public sector funds are allocated for public utilities, public account services. However, these funds are more likely to focus on place-making rather than place-keeping.

In Europe, due to the establishment of a new public management system, the private sector is increasingly involved in open space and invests funds in venues to maintain activities. Based on public-private partnerships, financing channels are also becoming more diverse, not only in the public sector, but also in the private sector, and even in the third sector and community organizations, including donations and charitable funding. From the beginning of the project (ie at the stage of place-making), there is safe long-term funding for place-keeping.

The protection and restoration of the Bailuwan Wetland Ecosystem is a systematic project that requires huge investment. To build a wetland ecosystem with good water quality, reasonable structure, perfect functions, beautiful landscape and healthy system, it is necessary to invest a lot of money.

6.6 Design, management and maintenance activities
In essence, a site that is designed still requires continuous and effective management and maintenance to improve its quality, ensuring its development and maximizing benefits to some extent. The process of actual design and management is complex, incoherent, and even separate. Most of these problems and challenges stem from traditional design and management. Every open space is unique and faces various problems and opportunities. A well-crafted venue does not necessarily develop into a place that is loved and easy to use.

It is suggested that the relationship between the design and maintenance management of the Bailuwan Ecological Wetland Park will be changed from a single-pointed nature to a compatible one. Designers and managers are involved in the process of building and maintaining their sites to form a good cycle.

7. Suggestions and plans
According to the investigation of the Bailuwan Ecological Wetland Park, through the analysis of the place-keeping, four suggestions were made for the continuous management:

1) Establish an intermediary to mediate the relationship between local governments and wetland users decentralized, as well as two channels for communication and access to information.
2) Built an evaluation system for open space and its long-term management, so as to promote good practices in wetland maintenance and management. For example, many open green spaces and public spaces set up a variety of awards and competitions, including the 'Nations in Bloom Award', 'Blue Flag Award' and so on.

3) Built up a “Friends of” group, to attract more students, volunteers and local residents to participate in management which can establish its own standard system and manage its own activities.

4) The government should take the lead to seek for multi-party cooperation, and make joint efforts through non-profit organizations, development companies and landowners which have the premise of protecting the original ecological environment of wetlands.

References
[1] MOHURD. (2017). Design guidelines of urban wetland park.
[2] http://www.mohurd.gov.cn/wjfb/201710/t20171020_233671.html
[3] Dempsey, N., Smith, H. (2014) Understanding place-keeping of open space. In: Dempsey, N., Smith, H. and Burton, M. (Eds.), Place-Keeping Open Space Management in Practice. Routledge, New York. 13-29
[4] Dempsey N, Burton M. (2012) Defining place-keeping: the long-term management of public spaces. Urban Forestry & Urban Greening, 11: 11-21
[5] Smith, H., Pereira, M., Roe, J., Sosenko, F., Lindholst, A.C. and Mathers, A. (2014) The evaluation of place-keeping unrealised potential. In: Dempsey, N., Smith, H. and Burton, M. (Eds.), Place-Keeping Open Space Management in Practice. Routledge, New York. 151-172
[6] De Magalhaes, C. and Carmona, M. (2009) Dimensions and models of contemporary public space management in England. Journal of environmental planning and management, 52(1): 111-129