Planning of Humanistic Ecological Landscape in Urban Waterfront Area

Song Ying
School of Business, Wuzhou University, Wuzhou, Guangxi 543002

Abstract. In order to relieve the mental pressure in urban life, the ecological landscape park in waterfront area has become the first choice. However, most urban rivers are currently polluted, and worsen the quality of waterfront greening. The paper puts forward the ecological landscape planning of urban waterfront area. The paper expounds the meaning and characteristics of urban waterfront landscape based on Landscape Ecology, including ideas and principles of waterfront ecological landscape design. The waterfront area could be built into humanistic ecological garden landscape and designed rationally plants. The results show that the planning of ecological landscape in waterfront area is consistent with the real landscape, and its idea is expected to provide reference to the planning of waterfront ecological landscape for the city’s future.

1. Introduction
The form and function division of ecological landscape are closely related to the economic development of the city, human history and residents' needs, which could not only provide outside public space with multi-functional, free and open for urban residents, but also improve urban ecological environment and promote economic development. There will be great significance to completing future planning with more reasonable and higher quality through analyzing the landscape planning, solving the existing problems and integrating advantages.

Landscape design is defined as a protecting planning process that combines social goals and values with established biological protecting goals, and describe future programme of specific biological goal which is achieved and measurable based on Landscape Ecology. Division of time and space damages the long-term safety of urban greening programs (Foo K., McCarthy J. & Bebbington A., 2018). In their study, Foo K. et al. suggest the scientific design of landscape ecological governance framework to make landscape design sustainable. In river landscape planning, low-costed and weakly managed wildflowers are used to construct the intention of plant landscape, according to hydrological theory and actual conditions of rivers(Crumley C.L., Kolen J.C., de Kleijn, M. & Van Manen N., 2017). It shows that the planning should be people-oriented and serve the people.

There exist acute problems in urban waterfront landscape design, including (1) the connection between the building space is insufficient to form a continuous ecological sightseeing landscape; (2) waterfront landscape design lacks the regional characteristic, similar to other cities. (3) lacking practical social effects, landscape is just for served users without landscape guidance function. So this paper puts forward the humanistic ecological landscape planning in urban waterfront area.

2. Planning positioning, ideas and principles
Urban waterfront landscape includes two aspects. The understanding of waterfront firstly, which is a special spatial area, and refers to land or building in a city adjacent to a lake, water flow, and
waterfront, namely the part adjacent to a water body in town (Wu J., Li J., & Ma Y., 2019). Landscape is also applied in different fields, including natural landscape, economic landscape and human landscape. It is a characteristics collection which consists of natural and socio-economic spatial components as well as a space system (Koc, CB, Osmond, P., & Peters, A., 2017). It is showed that the waterfront landscape of the city focuses on shaping landscape space. Both natural landscape and human landscape should be shaped according to regional characteristics. Based on the presently city’s waterfront situation, make full use of the urban building space and utilize the urban ecological landscape and greening idea to form a harmonious landscape relationship, and create a beautiful urban waterfront environment with rich cultural background.

2.1 Positioning
Fully coordinate terrain conditions and building space in the waterfront. Highlight the construction of the spatial environment along the river bank, focus on the functional characteristics, and fully reflect the design theme of "harmony between man and nature ". It is the theme to embody ecological landscape culture.

2.2 Designing idea

2.2.1 Protecting natural landscape in the utmost
Human beings’ living environment is closely related to the city. Only if the function of natural environment is preserved wholly could the operation of the city be normal.

2.2.2 Building good ecological security pattern
Considering natural condition, plan and improve non-constructive land firstly without damage ecological environment, and then involve in waterfront tourist attractions to plan and design city. The regional environmental protection facilities protect the original land system and truly form the ecological security pattern with interdependence between the city and the primitive ecology.

2.2.3 Adjusting unreasonable landscape structure
The landscape of waterfront scenic area is usually composed of artificial landscape imitating natural landscape. The original natural landscape structure has changed greatly, function reduction and unstability. Ecological scientific planning must be carried out to balance the development of waterfront scenic spots and natural ecology.

2.2.4 Maintaining the balance and stability of ecosystem pattern in waterfront scenic spot
Ecological planning should be considered firstly, improve the construction of ecological fragile areas, build a good ecological security pattern, adjust human behavior, limit the behavior of destroying nature, and then maintain the dynamic and stability of urban waterfront scenic spots.

2.3 Designing principles

2.3.1 Ecological coordination
Planning should focus on balance between ecological environment and city’s development, using ecological knowledge to form perfect landscape design and realize the ecological beautification.

2.3.2 Natural first
Landscape planning should be in accordance with local plant characteristics, soil types and surrounding water resources. Make use of natural environment resources, and the aesthetic value of waterfront landscape plants based on ecology and natural law.

2.3.3 Comprehensive development
From the perspective of ecological effects and Landscape Ecology, problems of waterfront landscape
3. Landscape function design
The design of greening landscape must consider function division, highlighting the characteristics of each functional area, and meet the basic functional requirements. So divide the waterfront area into waterfront ecological culture exhibition area, lake landscape agglomeration area and ecological leisure and recreation area. The exhibition area adopts simple, streamlined design, showing the cultural personality of the main entrance, integrating traditional culture and green space. Lake landscape agglomeration area takes lake body as frame, coordinates north and south high-rise building, takes water as surface, bank as line, and scenery as point, creating the path of cultural and leisure space along the bank. Ecological leisure recreation area utilizes site space to realize various functions and creates rich ecological landscape.

4. Plant ecological landscape design

4.1 Plant allocation principles
Plants are the key elements of landscape creation and the dominant factor reflecting ecological culture. Therefore, allocating plants should consider the needs of landscaping, and appropriately select evergreen plants. The principles are as follows, strengthening landscape, seasonal variation of plant seasons, beautifying ecology and culture, and selecting and integrating existing plants in waterfront areas.

4.2 Plant selection ideas and layout
Focus on the layout of plants, ecological enrichment. Not all plants can be planted at the ecological level, but natural ecological creation is the direction of greening design in waterfront area. Plant configuration emphasizes that higher tree species should be simple, and intermediate plants need to be tolerant to negativity, while lower plants are mainly ground cover plants, which require plants to be flaky landscape. Finally, plants imply the aesthetic feeling of emotion. It mainly uses the understanding formed in traditional aesthetics to choose plants and to create them from the perspective of ecological culture. In the greening design, art plants are particularly important. So this aesthetic configuration should be fully considered.

5. Case studies

5.1 Restoration of Hongmao Bridge and chilled water road in Bishan, Singapore
As the only large park, in Singapore, Bishan Hongmaoqiao Park is the most popular and popular park. The park was completed in 2012 and covers 62 hectares. The original chilled water concrete ditch was restored to a natural waterway, and the redesigned waterway increased the water transport capacity by nearly 40 percent. The maximum width of the flood has expanded from 17 to 24 m to nearly 100 m., biodiversity by 30 percent, human activities by 12 percent. Figure 1 shows the situation before and after modifying the park(https://www.gooood.cn/).

Fig. 1. Comparison of watercourse repairs.
The project aims to retrofit Bishan Park and restore chilled water. The dynamic fusion of parks and water flow creates a green water flow that satisfies people's entertainment and communication space need and urban drainage functions. It narrows the distance between people and water and establishes a sense of responsibility to protect the environment. Designers removed concrete dams and adopted 12 new technologies, such as hydraulic models, soil bioengineering techniques and computer testing. Plants were adjusted according to plant growing density and root strength, soil conditions, and different slopes of the waterfront to restore water flow to the state of natural water floodplain. Finally, a 2.7km long concrete straight channel becomes a 3km long natural water. The integration and innovation of water flow restoration and ecological culture bring new ideas to the subsequent reconstruction and restoration of waterfront landscape. It provides a direction for managing water flow and rainwater, integrating cities with nature, balancing human activities with the growth of plants and animals, and conducting multidisciplinary off-road monitoring of plants to restore water flow revetment.

5.2 East Tyrol, Lake Paprokani
Paprocany Lake is the first choice for leisure in Polish remainder. Robert Skitt were invited to design seaside landscapes. In order to add more modern elements to the local regional culture, designers add some leisure and entertainment spaces and integrated ecological culture to tourists’ integrating into nature. The key point is to build wooden riverside promenade along the waterfront, part of which extend to the lake and others to the shore green space. Visitors walking along the corridor then could switch to various spatial. Designers use natural materials to increase the affinity of websites. Gallery area uses a softer wood, partially permeable mineral and EPDM permeable material for special shape paving (figure 2).

https://mp.weixin.qq.com/s?__biz=MjM5NzIwMTMwOA%3D%3D&idx=1&mid=400127290&sn=49b1424ce3918b23f5b5ce81a578d425

Figure 2. Landscape of the east coast of Poland Tychy Black Paprocany Lake

The whole project has developed a 400m waterfront covering about 2 hectares area. Before the decoration, it was just a prairie, and fishermen could enjoy music. After it, the site has carried out more and more activities according to the original geographical characteristics, becoming the first choice for locals party. The landscape fully integrates ecological culture, designs and decorates natural landscape with natural materials, and exerts the application of ecological culture in ecological
landscape to the extreme, which makes the east bank of Lake Papakani have a good ecological pattern.

6. Conclusions
The paper gives some advice on design for the ecological landscape planning of urban waterfront area. In ecological landscape planning, must keep up with the concept and requirements of ecological culture to ensure that the natural environment is not destroyed. Waterfront landscape construction should firstly grasp the overall situation from a macro perspective, and reasonably divide and layout the overall resources and space of the city. Secondly, from the micro combination, take the waterfront landscape as the goal. At the same time, in the development of modern science and technology, both waterfront landscape and other types of landscape should be combined with new technology, new materials and other disciplines, which has injected new vitality into the city. The paper provides a heuristic to construct landscape for waterfront area.

Acknowledgements
This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

References
[1] A.M.Bartuszevige, K.Taylor, A.Daniels, M.F.Carter, WILDLIFE SOC B, 40, 3 (2016), 411-422
[2] R.J.Chou. Sustainability, 8,11(2016), 1159.
[3] C.L.Crumley, J.C.Kolen, M.de Kleijn, N.van Manen. Landscape Res., 42,8 (2017),880-890
[4] E.C.Ellis. Ecol. Monogr., 85,3 (2015),287-331
[5] K.Foo, J.McCarrthy, A.Bebbington. Landscape Ecol., 33,5 (2018),675-689
[6] S.Gibson, A.Loukaitou-Sideris, V.Mukhija. J. Urban Design, 24,3 (2019),385-405
[7] C.Gonzalez-Mathiesen, A.March. Planning Practice & Research, 33,2 (2018),97-119
[8] C.B.Koc, P.Osmond, A.Peters. Urban Ecosys., 20,1 (2017),15-35.
[9] J.L.Wang, J.P.Ni, C.L.Chen, D.T.Xie, J.A.Shao, F.X.Chen, P.Lei. J. Mount. Sci., 15,2 (2018),327-339
[10] J.Wu, J.Li, Y.Ma. Sustainability, 11,12 (2019), 3298