

An Analysis of the Healing Characteristics of Landscape Plants in Shanghai Dongtan Wetland Park from an Eco-ethical Perspective

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Abstract: As urbanization accelerates and mental health issues among residents become increasingly prominent, effectively promoting urban dwellers' recovery and alleviating mental health problems has become a critical concern for urban societies. From the perspective of eco-ethics in natural landscapes, this study focuses on the symbiosis and harmony between nature and humanity, as well as the positive impacts of nature on human health. Using Shanghai Dongtan Wetland Park as a case study, this research explores the healing characteristics of wetland plant landscapes. The analysis includes human-nature relationships, symbolic meanings of plants, and their psychological, emotional, ethical, and spiritual effects on visitors. Optimization strategies for landscape design are proposed, aiming to provide philosophical insights and practical references for wetland park plant landscape design, contributing positively to building public health environments.

Keywords: Healing Landscapes; Wetland Parks; Plant Design; Eco-Ethics

1. Introduction

The 21st century has witnessed China's rapid economic growth and the evolution of urban living. People's aspirations have shifted from meeting basic physiological needs to pursuing happiness and physical and mental well-being. In urban spaces, high-rise buildings, hectic work schedules, and fast-paced lifestyles often lead to psychological issues such as anxiety and depression among city residents. Sedentary habits, lack of exercise, and disconnection from nature have also contributed to chronic conditions like obesity, diabetes, and cardiovascular diseases. Health is fundamental to individual growth and

achieving a fulfilling life. Therefore, fostering urban residents' recovery and addressing mental health concerns have become critical issues in urban development.

Studies have shown that exposure to natural environments can alleviate stress, promote mental health, and prevent stress-related diseases [1]. For example, residents using ecological recreational spaces like parks tend to have better overall health than others [2]. Forest therapy and horticultural therapy are medically proven landscape approaches with strong restorative effects on human health. Among various ecosystems, wetlands play an essential role by combining ecological conservation with significant healing potential [3]. However, existing studies on wetland landscapes primarily focus on ecological functions and aesthetic value, with limited research on the therapeutic functions of wetland landscape elements, particularly plant landscapes. This gap hinders the development of wetland environments for health benefits and the fulfillment of visitors' well-being needs.

Strengthening research on wetland plant landscapes also optimizes environmental quality and supports the sustainable development of wetland ecological resources. This study investigates the healing properties of wetland plant landscapes in Shanghai Chongming Dongtan Wetland Park. As a vital stopover and wintering site for migratory birds in the Asia-Pacific region, Dongtan Wetland Park is internationally significant for wetland conservation. The park boasts rich plant resources and ecological systems, supporting conservation, environmental education, and ecological healing functions. The distinct wetland landscapes, characterized by unique plant systems, offer restorative environments for visitors. This paper begins with the philosophical and healing significance of

wetland plant landscapes and examines their spatial morphology, community structures, landscape features, and seasonal dynamics. It explores the deep psychological, emotional, and ethical impacts of these landscapes on visitors, emphasizing the integration of eco-ethics and natural healing. The research seeks to advance the harmonious relationship between humans and nature in design studies, fostering the creation of healthy natural environments.

2. Theoretical Foundations

2.1 Philosophical Perspectives on Natural Landscapes

Throughout history, philosophers worldwide have explored and analyzed nature. The natural world, with its inherent laws and order, provides a foundation for psychological and physiological balance, while philosophy aids in understanding the essence of self and nature. In ancient Greece, Aristotle highlighted that nature is not only the source of growth and transformation but also the essence and purpose of things [4]. In his aesthetic theories, Kant proposed that nature's sublimity evokes awe for its great power and inspires the pursuit of spiritual elevation [5].

In Eastern philosophy, Daoism emphasizes "following the way of nature," advocating the organic unity of humanity and nature [6]. Confucianism promotes the idea of "the unity of heaven and humanity," encouraging adherence to natural laws for physical and mental harmony [7]. This concept also forms the core of Chinese gardens, reflecting the harmonious unity between humans and nature. Zen philosophy encourages "quiet observation of nature," believing that contemplating natural scenes can achieve inner peace and enlightenment. These philosophical perspectives align with the eco-ethical principles pursued by healing landscapes.

2.2 Eco-ethical Philosophy of Wetlands

Ecology asserts that all life forms possess intrinsic value, deserving protection beyond their utility to humans [8]. This perspective advocates for an equal relationship between humans and nature. In natural environments, sustainable development depends on respecting nature's inherent laws and characteristics.

Wetlands, often referred to as the "kidneys of the Earth," are indispensable ecosystems. They include marshes, tidal flats, rivers, lakes, reservoirs, and rice paddies. Urban wetlands effectively control floods, prevent soil desertification, and filter pollutants, thereby improving environmental quality. They also provide habitats for diverse flora and fauna, offering significant ecological and environmental benefits. Wetlands embody a balance of life through continuous material cycling, energy flow, and species migration and reproduction.

The plant landscapes within wetland ecosystems exemplify the core values of ecological philosophy through their symbiotic relationships. Each plant holds irreplaceable ecological functions, providing food and shelter for other organisms and reflecting the interconnectedness of life. The biodiversity presented by wetland landscapes reminds humanity of its small yet vital role within the broader community of life, fostering a sense of awe and respect for life. This realization carries ethical significance and promotes psychological healing by inspiring reverence and love for nature.

2.3 Symbolic Meanings of Plant Landscapes

In wetlands, the seasonal changes of plants (e.g., the cycle of green and withered reeds) echo the cycle of life, resonating with Daoist principles of following natural ways. This dynamic of life offers insight into nature's rhythms, alleviating inner anxiety and stress. Aquatic plants create a tranquil environment, with the gentle swaying of reeds and ripples under the breeze encouraging meditation and emotional calmness.

Expansive water surfaces and continuous plant zones create sublime scenery, evoking a sense of human smallness while inspiring profound contemplation of life's essence. This experience provides spiritual healing, aiding individuals in escaping personal struggles. The harmony and order reflected in natural features like the swaying of reeds and the rhythm of aquatic plants provide psychological comfort and inner balance when facing stress.

3. Analysis of the Current Plant Landscape in Dongtan Wetland

3.1 Overview of Dongtan Wetland Park

Landscape

Shanghai's Dongtan Wetland, located at the mouth of the Yangtze River, is one of the world's important coastal and estuarine mixed wetlands, boasting a rich ecosystem. Dongtan Wetland Park began construction in 2005, and through decades of development, it has become an essential ecological space in the Dongtan region. Due to its favorable habitat and food conditions, it serves as a crucial stopover along the migratory route of birds in the Asia-Pacific region and one of the primary wintering habitats for waterfowl [9]. Covering an area of 4,000 hectares, the park focuses on preserving the integrity of the original wetland ecosystem while restoring and rebuilding damaged wetland areas, thereby creating a relatively complete wetland ecological environment. The park provides a superior wetland ecosystem for species such as the Yangtze alligator, water birds, waders, and waterfowl, enriching regional biodiversity and protecting environmental forms. At the same time, the overall environment of the park is beautiful, with fresh air, clean water, well-planned visitor routes, and diverse touring options. It offers visitors a multi-layered landscape experience both on land and water, along with excellent environmental healing functions.

3.2 Plant Community Structure

The plant community structure in Shanghai Chongming Dongtan Wetland Park is complex and diverse, influenced by factors such as tidal gradients, soil physicochemical properties, and plant competition, resulting in a rich array of characteristics. Currently, the park contains 86 species of woody plants from 47 families and 70 genera, with a ratio of native to non-native species at 32.56% and 67.44%, respectively [10]. This indicates that the park's vegetation is predominantly composed of non-native tree species, with native species playing a secondary role, meaning the value of native plants is not well reflected. The average diameter at breast height (DBH) of the tree species is 8.64 cm, with most trees falling in the 5–15 cm range. Additionally, the park's ratio of trees, shrubs, and grasses is 14.52:14.97:48.83:100, indicating a relatively high proportion of herbaceous plants. From a vertical structural perspective, the park's vertical structure shows limited layering of

tree, shrub, and herbaceous plants, with a severe imbalance between trees and shrubs. The number of trees is slightly lower than shrubs. Overall, the spatial structure is relatively flat, and the visual experience is somewhat monotonous.

3.3 Plant Landscape Features and Seasonal Changes

Dongtan Wetland Park primarily maintains its native wetland plant landscapes, while optimizing them by introducing salt-tolerant, high-carbon, and cold-resistant plant materials, creating diverse and layered vegetation configurations. In specific areas, such as the roads from the visitor center to the Earthquake Museum, forest community optimization demonstrations have been carried out, with ornamental plants like Mexican bald cypress and seaside hibiscus being planted. Large seasonal flower beds have been planned near Flower Island and the Sea Viewing Tower for artificial management and planting to compensate for the limited variation in the native wetland landscape. In terms of color, green predominates in the spring and summer, showcasing the vigorous vitality of wetland plants. In autumn and winter, reed grasses and shrubs turn golden yellow and red, creating a warm and healing atmosphere. Regarding plant form, large water plants and the natural waterbody shapes create soft lines (e.g., reeds, sedges), mainly distributed in the wetland's flat areas, while wetland trees, such as water pines, form rigid shapes and are primarily distributed along the paths. These plant characteristics contribute to a wetland aesthetic experience characterized by stillness as the main feature, with movement as a secondary element. Overall, the plant landscape of Dongtan Wetland Park is marked by a diversified plant community structure, with the most distinct seasonal features in the summer and autumn. However, in the winter and spring, the landscape is characterized by limited ecological function and seasonal monotony. See Figure 1.

4. Therapeutic Functions of Dongtan Wetland's Plant Landscape for Visitors

4.1 Visual Healing – Relieving Fatigue

The plant spaces of the wetland park provide a visual impact that evokes a spiritual sensation

in visitors. Firstly, the open view of the expansive, soft reed beds, with their flowing lines, contrasts with the solid visual focal points (the sparse clusters of trees in the wetland), creating a psychological and visual contrast that appeals to the visitors. The soft, curved plant shapes typically occupy open spaces and lack shelter, encouraging emotional release and relaxation. In contrast, the stable trees symbolize safety, providing psychological refuge for visitors. Secondly, the Dongtan Wetland's plant landscape also uses visual guidance to create pathways for quiet observation, encouraging visitors to deeply connect with nature in a slow-paced environment. By shifting perspectives, it is easy to trigger visitors' natural perception, fostering a deep sense of harmony between

humans and nature. Lastly, in the spring and summer, the dominant greenery of wetland plants gives visitors a sense of vibrant life, helping to calm the mind. Green plants not only alleviate psychological fatigue but also evoke deep memories of the natural environment. In autumn and winter, the wetland plants present golden yellow and expansive reed blossoms, symbolizing hope and harvest through the life cycle. This simple yet clear seasonal color pairing forms a visual healing experience, guiding people to reflect on the passage of time and the cycle of life. The ecologically natural environment provides rich visual perceptions that promote a sense of connection with the environment, aiding in relaxation and fatigue relief.



Figure 1. Tour Routes and Major Plant Distribution in Dongtan Wetland Park

4.2 Emotional Healing – Psychological Rehabilitation

The wetland landscape promotes physical and mental health by providing natural healing powers, stimulating inner emotions and feelings. On one hand, the strong life force demonstrated by the Dongtan Wetland plants in the saline-alkali soil gives them cultural symbolic characteristics, thus having an emotional therapeutic effect on visitors. Plants like camphor trees and Chinese tallow trees symbolize hope and continuity, while aquatic plants such as lotuses and water lilies represent the flow and balance of life. Wetland plants like reeds and water celery, with their unique

ecological adaptations, show remarkable resilience to saline-alkali soil and tidal changes, symbolizing contemporary spiritual needs. On the other hand, the design of local plants in the wetland park also evokes a sense of place and belonging for visitors. For example, the park plants many native species like water pines, camphor trees, and Chinese tallow trees, which activate emotional memories for visitors. The buffer zones surrounding the wetland conservation area feature the planting of local crops such as rice and vegetables, providing a comforting psychological return to rural life. These productive, native landscapes not only stimulate nostalgic emotions for rural nature but also help alleviate stress, promoting

psychological health rehabilitation.

4.3 Ethical Healing – Moral Enhancement

Dongtan Wetland Park is not only an ecologically significant park but also plays a role in wetland culture dissemination, wetland education, and popular science. The wetland plant landscape, as an educational medium, subtly enhances the public's environmental awareness. The diversity and interconnectivity of the wetland plant communities illustrate the complexity and harmony of ecosystems. By observing the symbiotic relationships between plants and animals, visitors become aware of the importance of all life forms in the ecosystem, internalizing the concept of ecological equality. This awakening encourages people to rethink the role and responsibility of humans in nature. Specifically, the display of rare wetland plant communities, the wild habitat of the Yangtze alligator, and the biodiversity of the wetland help visitors recognize the importance of wetland conservation. This recognition not only contributes to individual ecosystem maintenance but also acts as a therapeutic moral enhancement process, creating unexpected effects after the landscape is experienced.

4.4 Spiritual Healing – Reducing Anxiety

The seasonal changes in wetland plants philosophically symbolize the passage of time and the cycle of life. For example, the transition of reeds from the fresh green of spring to the dry yellow of autumn, followed by their total removal in winter to make way for new life in spring, demonstrates the natural cycle from birth to death, helping visitors reawaken their understanding of their place and significance in nature. Furthermore, the natural environment provides openness, safety, and comfort, helping reduce anxiety and depressive emotions. For example, benches on the expansive lawns by the water, along with the quiet environment and the rhythm of natural plants, create a space where visitors can feel nature, safety, and reflection. The semi-hidden areas formed by reed beds, the fresh air, and the water's edge offer comfortable spatial forms. The presence of swans and egrets in the water brings joy to the senses. In the spatial philosophy constructed by the wetland plants, the contrast between

open and concealed spaces, and the opposition between freedom and inclusiveness, help balance the landscape with human interaction, enhancing psychological safety and comfort, thus alleviating daily anxiety and stress.

5. Therapeutic Design Strategy Suggestions for the Dongtan Wetland Plant Landscape

5.1 Guiding Plant Landscape Design through Ecological Zoning

Wetland plants have unique therapeutic effects on visitors' health. Therefore, it is essential to optimize wetland plants based on ecological conservation principles. In terms of enhancing the diversity of wetland plant landscapes, priority should be given to selecting native plants from Dongtan Wetland to maintain ecosystem stability and biodiversity. Based on the current ecological characteristics of the wetland park and the growth needs of plants, it is recommended to implement a zoning design. In the core wetland ecological protection zone, human interference should be minimized, and native vegetation should be restored, focusing on wetland conservation and restoration. In the sightseeing and educational areas, diverse plant landscapes should be used to showcase the complexity and beauty of wetland ecosystems, while also offering therapeutic plant experience activities. In the interactive participation zone, low-intervention planting experiences should be designed to engage visitors in the construction of the wetland ecosystem. Through rational planning, a variety of plant layers can be formed, enhancing the ecological adaptability of habitats, providing richer ecological space for wetland creatures, and better utilizing the therapeutic functions of plants.

5.2 Dynamic Plant Landscape Updates

Given the characteristics of wetland plants, this study suggests dynamically adjusting plant configurations in response to wetland ecological changes and plant growth patterns, ensuring that the landscape maintains a natural vitality. Attention should be paid to natural vegetation succession management, with regular monitoring of plant community changes to adjust plant introduction and maintenance strategies. The dynamic presentation of plant landscapes should be highlighted, designing plant features that are

attractive throughout different seasons to continuously engage visitors. For example, soft-colored plants with significant seasonal changes (such as maples and ginkgos) can create dynamic landscapes that provide a pleasant visual experience. Plant configurations should form natural spatial guidance, combining open and secluded spaces to enhance the feeling of safety and comfort. Aromatic plants like osmanthus and lavender should be added to help relieve visitors' psychological stress through scent. Diverse-textured plants, such as soft reed grass swaying in the wind, can encourage interaction with nature. A variety of plant landscapes and dynamic changes in the environment will enable visitors to better connect with nature, relax, and achieve health recovery.

5.3 Encouraging Public Engagement and Participation

Participation and experience are crucial for visitors to connect with the natural environment. Therefore, the park should not only provide recreational spaces for visitors but also offer public activities like ecological volunteering, inviting the public to participate in plant cultivation, landscape maintenance, and other activities, forming a community for wetland conservation. During the design of space and plant features, regular surveys should be conducted to gather feedback on visitors' perceptions and experiences with plant landscapes, optimizing design strategies. Additionally, enhancing ecological ethics education for visitors can better stimulate their emotional connection to the wetland. For example, setting up educational signage about plant landscapes can communicate ecological ethics, helping visitors understand the importance of protecting wetland plants. Finally, improving visitors' understanding of plant culture is essential. Interactive exhibitions can be designed to showcase the roles of plants in wetland culture and ecology, enhancing the public's sense of ecological responsibility.

6. Conclusion and Outlook

The Dongtan Wetland plant landscape is rich and diverse, featuring a variety of derivative plant communities, native plants, and flowering plants. It has essentially formed an ecological and aesthetically valuable wetland

park that not only holds ecological value but also demonstrates significant therapeutic functions through plant colors, shapes, and spatial layouts. The philosophical significance of its plant landscape is primarily reflected in its profound impact on visitors' psychological, emotional, ethical, and spiritual well-being. Of course, different groups may perceive therapeutic landscapes differently. A more humane and ecological wetland park should approach design from multiple perspectives, including ecology, design, sociology, and philosophy.

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