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Activating Urban Grey Spaces: Creating Sustainable Development Environments

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Abstract: How to activate urban gray spaces has become a topic of increasing global interest. What constitutes a good urban gray space, what constitutes a bad one, and how should urban gray spaces be activated? These three contrasting urban issues are continually analyzed through comparisons to draw conclusions. This article primarily explores the specific criteria for evaluating gray spaces and the methods for their activation, providing insights into the necessary conditions and strategies for transforming these often overlooked or underutilized areas into vibrant, functional parts of the urban environment. The goal is to enhance urban livability and community engagement, fostering sustainable development and social cohesion in cities.

1. Introduction

Urban spaces are constantly changing, and the concept of urban gray spaces has become a focal topic in the fields of design and sustainable environmental development. These spaces play a decisive role in the sustainable development of the environment. This article primarily discusses how urban gray spaces affect environmental sustainability and illustrates through practical examples how to better activate these spaces to achieve sustainable development goals. The article focuses on the definition of urban gray spaces, the good and bad of urban gray spaces, and how they can promote ecosystems. In the following sections, the article will discuss the positive and negative impacts of urban gray spaces on sustainable environmental development, and explain how design interventions and multidisciplinary cooperation can drive sustainable environmental progress.

2. Methodology

2.1 What are Urban Grey Spaces? What is their relationship with sustainable environmental development?

Initially, the term "grey space" referred to transitional zones between the interior and exterior environments of buildings [5]. However, over time, this concept has been extended to encompass urban planning and landscape design. Broadly, these are areas in cities that are neglected or

underutilized. Following the COVID-19 pandemic, the rapid development of individual economies within cities has once again prompted people to reflect on the relationship between urban grey spaces and sustainable environmental development.

Sustainable development cannot be achieved without re-energizing these grey spaces, as they are an indelible part of the larger environment [7]. It is akin to how, when the human body has a cold, some organs may hinder metabolic functions, yet these organs are reasonably necessary. Moreover, before these grey spaces are redefined and utilized, they are often regarded as useless, such as muddy, abandoned wetlands that people tend to avoid. This provides cities with forward-looking development opportunities and ecological guidance, not only fulfilling people's spatial needs but also offering the environment a chance for ecological recovery [4]. Therefore, activating urban grey spaces is a necessary pathway to achieving sustainable environmental development.

2.2 What are bad urban grey spaces? What impact do they have on sustainable development?

When we examine urban spaces from a spatial design perspective using critical thinking, we often define those spaces that are either untransformed or unsuccessfully transformed as poor urban grey spaces, such as parks that have lost foot traffic or abandoned industrial sites. It is undeniable that these spaces, due to a lack of long-term management and maintenance, not only pollute the environment but can also become hotbeds for illegal activities. Yet, this abnormal phenomenon often seems to be overlooked in urban planning and spatial design. At the same time, these grey areas are often neglected by relevant management authorities [2]. Increasingly, research indicates that public health is a major factor in sustainable environmental development [10].

More importantly, sociologists predict that by 2050, two-thirds of the world’s population will live in cities. Currently, limited urban space is already competing with the needs for housing, commerce, and transportation infrastructure. Moreover, the large-scale construction of these facilities serving the people not only leads to an excess of urban grey spaces but also creates more impervious surfaces, increasing the risk of urban flooding and posing greater challenges to green sustainable development. This global issue has been listed as a primary sustainable development goal by the United Nations [2].

The Packard Automotive Plant was established in 1903(Figure 1&2). It was originally a symbolic landmark of the American automotive industry, attracting numerous researchers and tourists from the automotive industry to visit. However, after the Packard Automotive Plant company announced its cessation of production in 1950, the vast factory complexes gradually lost their vitality and eventually became ruins. Today, these abandoned factory complexes have been filled with garbage, and graffiti on the walls has severely damaged their cultural and historical value. Some homeless people choose to gather here, but collapses caused by the aging structure occur occasionally, posing a direct threat to their personal safety. Due to excessive waste, this abandoned factory has caused serious environmental pollution, not only reducing the property values of the surrounding buildings but also adversely affecting the quality of life of nearby residents.

Figure 1: Posnov, The packard automotive plant, Ruined Building Complex, Detroit, Michigan United States. (https://www.gettyimages.com.au/)

Figure 2: Ann Zaniewski, The packard automotive plant, Collapse Due to Building Aging, Detroit, Michigan United States. (https://www.freep.com/)

2.3 What are good urban grey spaces? How do they impact sustainable environmental development?

From the original definition, those grey spaces that have been successfully revitalized represent good urban grey spaces. These high-quality urban grey spaces usually integrate well with the surrounding culture, industry, and the diverse needs of residents, while also providing a healthy ecological environment. As a result, they can attract more foot traffic, reinvigorating the space. Areas with high foot traffic generate business and consumption, having a positive impact on the city's economy and culture. In small to medium-sized spaces, where enjoyment is most accessible, these grey spaces are also the most flexible and malleable [8], such as the increasingly popular transformations of spaces under overpasses, which meet the needs of various groups while

alleviating urban space resource pressures.

From a broader perspective on environmental sustainability, good urban grey spaces positively influence sustainable development in many ways. When these spaces maintain healthy ecosystems, it is certain that they have more green spaces than before, which can integrate into nature. By adding greenery to urban textures, this directly enhances the city's climate adaptability, reducing the likelihood of extreme weather events in urban areas, such as unstable heavy rainfall and high temperatures [6].

The Houston Green Loop project is located in Houston, Texas, USA, and is designed by SWA Group(Figure 3&4). As the highways around downtown Houston face expansion and adjustment, SWA Group aims to reduce urban gray spaces and achieve sustainable environmental development. They created a continuous landscape ecological loop space beneath the highway system, providing high-quality passage and gathering spaces for people of all ages, making reasonable use of terrain and natural resources. This not only adds green ecological spaces but also strengthens the connection between communities and the city, greatly alleviating the pressure on spatial resources within Houston's urban area.

Figure 3: SWA Group, The Houston Green Loop, Aerial View of the Planning Proposal, Houston, Texas United States. (https://www.swagroup.com/projects/houston-green-loop/)

Figure 4: SWA Group, The Houston Green Loop, Rendering of the Space Under the Bridge, Houston, Texas United States. (https://www.swagroup.com/projects/houston-green-loop/)

2.4 How can urban grey spaces be activated to achieve sustainable development?

The iteration, renewal, and emergence of urban grey spaces resemble a vast experimental system. We should focus not merely on outcomes and definitions but more on the process of generating various types of data and taking a holistic view of both urban and external spaces [1]. Therefore, it is crucial to move beyond the direct imagination and self-comforting ideas about public spaces, as these are not absolute stabilizers. Each space, having its own form and attributes, must first be understood in terms of the actual events occurring around it, the characteristics it bears, and respecting the inherent and immutable cultural and historical elements it carries. These elements

should be integrated into the process of activating urban spaces, rather than merely proceeding with imagination, design, and construction [3].

Besides this "naturally occurring" activation method, there is another approach considered as multidisciplinary governance, involving planners, implementers, resource managers, and researchers working together. This method starts from an early vision to the final activation, going through a brief period and utilizing societal material conditions to create new spaces, which can also be understood as a form of governmental management. This approach often relies more on scientific bases but generally lacks a sense of design[1].

Research on urban spaces and sustainable environmental development are inherently two distinct, multi-faceted, and complex academic fields. Secondly, the design aesthetics of urban gray spaces play a crucial role in sustainable environmental development. When these two activation methods are combined, we need to consider not only the natural resources of the space, land terrain, transportation systems, and architectural forms, but also the individual needs and their interaction with the ecological environment [9]. Therefore, the right design planning and intervention methods, when combined, may be the key to achieving sustainable environmental development through the activation of urban gray spaces, requiring interdisciplinary cooperation among researchers.

Since 2009, New York's High Line Park (Figure 5&6), as a representative project of environmental sustainability involving collaboration among multiple disciplinary researchers, has won several international design awards, including the Veronica Rudge Green Prize. The project was jointly completed by Diller Scofidio + Renfro, Dutch ecological plant designer Piet Oudolf, and James Corner Field Operations. Originally, the High Line Park was a 1.5-mile-long abandoned elevated railway on the west side of Manhattan.

Thanks to the close collaboration of multidisciplinary researchers and government support, it has improved the surrounding ecological environment, planting over 100,000 plants, including more than 1,500 species of plants, birds, and insects. It is an extraordinary skywalk garden with a strong sense of space and design, attracting about 7 million visitors from around the world each year. The High Line Park remains an outstanding example of urban gray space transformation and sustainable environmental development.

Figure 5: Field Operations, The High Line, Pavement and Green Spaces, West Side of Manhattan, New York United States. https://www.fieldoperations.net/home.html

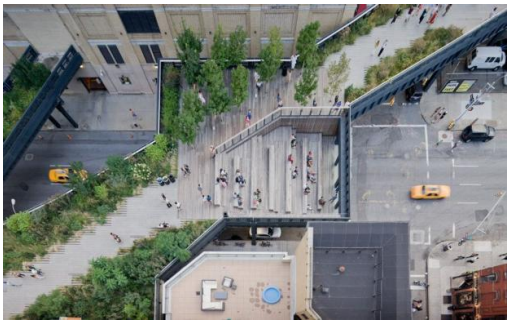

Figure 6: Field Operations, The High Line, Aerial View of the Resting Node Space, West Side of Manhattan, New York United States. https://www.fieldoperations.net/home.html

3. Conclusion

Urban gray spaces are often overlooked both in the field of design and by the public and administrators. However, their positive and negative impacts on the environment should receive sufficient attention. By redefining and effectively utilizing these spaces, the ecological and social vitality of the overall environment can be enhanced. This article discusses how to effectively empower gray spaces and the contributions of successful transformations of urban gray spaces to environmental sustainability through the practical cases of the Houston Green Loop and the New York High Line. In summary, this article answers how to activate urban gray spaces and create sustainable environmental development. Through interdisciplinary collaboration across multiple fields, spaces that have lost vitality are transformed into valuable assets. Strategic planning and innovative design are key collaborative models to achieve this goal.

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