与荒野共生：
城市绿地的发展前景
Working With Wilderness:
A Promising Direction for Urban Green Spaces

英戈·科瓦里克
Ingo KOWARIK*

德国柏林工业大学生态系统科学 / 植物生态学教授
Professor of Ecosystem Science / Plant Ecology, Technische Universität Berlin, Germany

*Corresponding Author
Address: Technische Universität Berlin, Institute of Ecology, Rothenburgstr. 12, D 12165 Berlin, Germany
Email: Kowarik@tu-berlin.de

摘要

“荒野”（wilderness）是一个根植于人类社会的文化概念。对于当代景观设计师或是景观设计先驱来说，荒野一直以来的重要性既在于其与人工景观元素的鲜明对比可以为自然主义植物设计提供灵感，也在于如今为协调城市、城市居民与自然做出的贡献。人们习惯上将城市和荒野视为对立面，因此有必要采取新方法以便更好地应对与城市语境下荒野相关的机遇和挑战。从生态学的角度来看，城市荒野是未受明显人类干扰的、具有生态系统过程高度自我调节特性的区域。由此可以区分出两种主要的荒野类型：以许多城市中的自然遗迹为代表的“古老荒野”，以及工业城市中诞生的“新生荒野”，在设计和管理绿地时需要对不同类型的场地区别对待。古老荒野一直以来都是保护和修复的对象，以及自然主义种植的灵感来源；相对地，新生荒野长期被视为疏于管理和社会经济衰退的产物。然而，自20世纪80年代起，德国的早期先锋项目开始将城市新生荒野融入绿色基础设施，产生了将荒野与设计相结合的、前所未有的绿色空间，既可以吸引游客，又可以保护生物多样性、支持许多生态系统服务。本文旨在说明将荒野元素、过程与城市绿色基础设施相融合——以便城市适时与自然恢复联系——的机遇和挑战。

关键词

生物多样性；设计干预；自然动力学；自生植被；城市荒野；野性城市

ABSTRACT

Wilderness is a cultural construct that is deeply rooted in many societies. For landscape architects and their predecessors, wilderness has long been important as a contrast to artificial garden elements, as an inspiration for naturalistic plant designs, or today as a timely contribution to reconciling cities and their inhabitants with the natural world. Since cities and wilderness have traditionally been seen as opposites, new approaches are necessary to better address the opportunities and challenges associated with wilderness in urban regions. From an ecological perspective, urban wilderness can be defined as an area characterized by a high degree of self-regulation in ecosystem processes where direct human impact is negligible. This allows two main types of wilderness to be distinguished: “ancient wilderness” represented by natural remnants in many cities, and “novel wilderness,” which arises in artificial urban-industrial sites. The two types require different approaches in designing and managing green spaces. Ancient wilderness is a traditional object of conservation and restoration, and offers inspiration for naturalistic plantings. In contrast, the emergence of novel wilderness has long been associated with neglect and socio-economic decline. Since the 1980s, however, early pioneer projects in Germany have started to integrate novel urban wilderness into the green infrastructure. The results are unprecedented green spaces that combine novel wilderness with design interventions. These places are attractive to visitors, contribute to biodiversity conservation, and support many ecosystem services. This article aims to illustrate the opportunities and challenges of integrating wilderness components and processes into the urban green infrastructure—a timely way to reconnect cities with nature.

KEYWORDS

Biodiversity; Design Interventions; Nature Dynamics; Spontaneous Vegetation; Urban Wilderness; Wild Cities

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翻译 | 崔婧沄、田乐
EDITED BY | CUI Jingyun, Tina TIAN
TRANSLATED BY | CUI Jingyun, Tina TIAN

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1 引言

“荒野”（wilderness）是一个根植于人类社会的文化概念，且具有不同的象征意义[1][2]。对于当代景观设计师或是景观设计先驱来说，荒野一直以来都是一个重要的议题。早在16世纪，自然林地就作为人工景观元素的对照出现在意大利文艺复兴时期的园林中[3]。18世纪初，随着规整的文艺复兴或巴洛克园林向英国如画式园林的转变，更加自然化的公园不断涌现，荒野自此成为一个明确的设计主题[4]。克里斯蒂安·凯·洛伦兹·赫希菲尔德在其颇具影响力的《景观设计理论》一书中强调了“完全交由自然过程和无序主导”的荒野对于英国如画式园林的重要意义在于文化上的“打破和对比”[5]。

其后，景观设计师从自然植物组合中汲取灵感，开启了自然主义种植设计：从荷兰的野生动植物公园到英国的绿色概念新城镇，再到美国近年的草原或沙漠花园。[6]~[8]这些项目从自然景观中获得荒野模板，运用乡土植物，并通常包含自然过程（如植物的生命周期）。其中，诸如纽约高线公园等高度人工设计、管理的项目创造了具有象征意义、能够唤起荒野联想的新式植物配植组合。

20世纪80年代，人们向城市荒野与设计概念的融合更进一步。这一时期的德国设计项目在很大程度上依赖于城市工业区中的自生植被，建立在后工业景观之上的开创性先锋项目包括由彼得·拉茨设计的鲁尔区北杜伊斯堡公园[9]，以及柏林的相关项目[10][11]。这些前所未有的城市绿地类型是对传统荒野和植物设计观念的挑战，同时也展示了城市生物多样性保护和人与自然互动的新机遇。

在前人工作的基础上[12]，本文旨在回答：如何定义城市环境中的荒野？为什么提升城市中的荒野是有前景的？与城市荒野共生存在哪些挑战和机遇？

2 什么是城市中的荒野？

长期以来，由于解读方式各异，荒野一直是一个微妙的概念[13]。有趣的是，“荒野”一词很早就被用于描述英国如画式园林中那些或多或少设计过的小节点[4]。然而，自然保护中所指的传统荒野主要依据的是美国1964年颁布的《荒野法》中的定义——“地球及地球上生命群落中不受人类干扰”的广阔景观；欧盟《自然保护区荒野指南》中也有类似

1 Introduction

Wilderness is a cultural construct that is deeply rooted in human societies, with different symbolic meanings[1][2]. For landscape architects and their predecessors, wilderness has long been an important topic. As early as in the 16th century, wild forest patches (selvatici) were included in Italian Renaissance gardens as a contrast to artificially constructed garden elements[3]. Since the early 18th century, the transformation of formal Renaissance or Baroque gardens in Europe into English landscape gardens led to more natural parks, with wilderness as an explicit design topic[4]. In his influential *Theory of Garden Design*, Christian Kay Lorenz Hirschfeld highlighted the importance of wilderness in English landscape gardens as areas “left entirely to natural wilderness processes and free disorder,” serving “as a means of interruption and contrast” to culture[5].

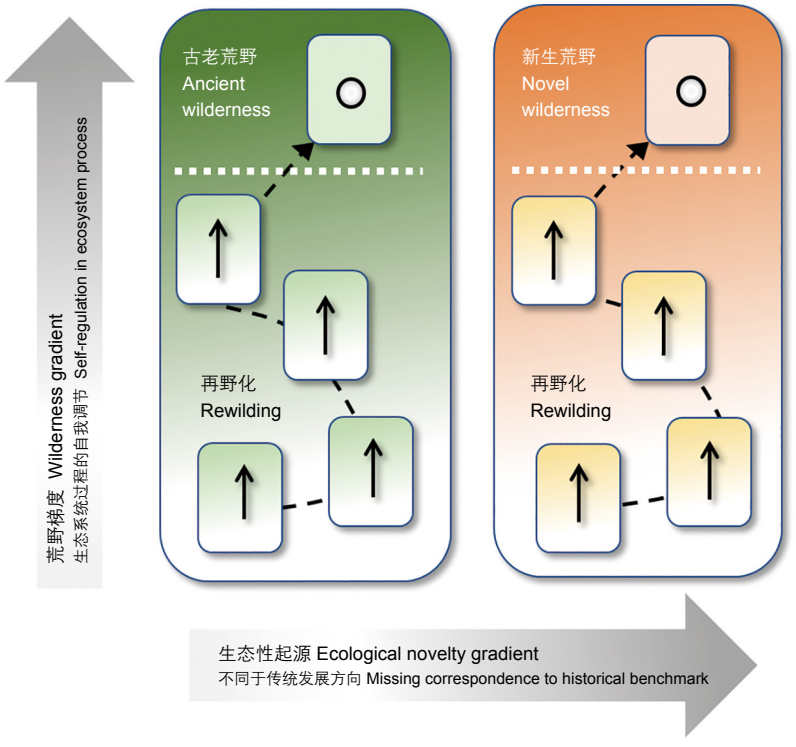
More recently, insights into natural plant assemblages have inspired landscape architects in the composition of naturalistic planting designs, from Heemparken in the Netherlands to green concepts for New Towns in England and to recent prairie-styled or desert gardens in the United States[6]~[8]. Inspired by wilderness templates from natural landscapes, these approaches work with native plants. They often also integrate natural processes (e.g. plants’ regeneration cycles) into their projects. Some of these projects, such as the High Line in New York, are powerful in the creation of new plant assemblages that evoke associations with wilderness at a symbolic level, despite their artificial origins and ongoing maintenance.

A further step toward integrating urban wilderness into design concepts emerged in the 1980s. This new generation of design projects in Germany largely relied on the existing spontaneous vegetation of urban industrial sites. Groundbreaking pioneer projects were established in post-industrial landscapes of the Ruhr, including Peter Latz’s Landscape Park Duisburg-Nord[9], and those in Berlin[10][11]. These unprecedented types of urban green spaces questioned the traditional views of wilderness and planting design. These projects also demonstrate new opportunities for urban biodiversity conservation and the interactions between people and nature.

Based on previous work[12], this article aims to provide answers to three questions: How can wilderness be defined in urban environment? Why is it promising to enhance wilderness in cities? What challenges and opportunities exist when working with urban wilderness?

2 Defining Wilderness in Cities

Wilderness has long been defined in very different ways and is therefore a subtle term[13]. Interestingly, the term “wilderness” was used early on in a green space context to describe small sections in English landscape gardens that were more or less designed[4]. Traditional wilderness concepts in nature conservation, however, largely rely on vast landscapes “where the earth and its community of life are untrammeled by man” as pronounced in the influential United States Wilderness



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1. 城市中的两种荒野类型：古老荒野和新生荒野（以虚线上方的方块表示）。以图中虚线为界，这两种荒野类型均包含高于一般自我调节能力的生态系统过程。虚线以下，每个方块代表一个城市空间，每个空间均处在一个荒野梯度上，沿梯度越向上生态系统过程的自我调节越强。方块中的箭头表示该城市空间中绿地再野化的可能性；方块间的曲线则代表城市空间逐步转变为对应类型（古老或新生）荒野的可能性。
2. 柏林古老荒野区域中的自然森林和湿地遗迹

1. Two types of wilderness in cities: ancient wilderness and novel wilderness (boxes above dot lines). Both wilderness types share a high-level self-regulation in ecosystem processing as indicated by a position above the threshold for prevailing self-regulation (dot lines). Each box below the dot lines represents urban spaces along a wilderness gradient, which reflects an increasing role of self-regulated ecosystem processes. The arrows within the boxes illustrate rewilding opportunities within a given green space type. The curves between the boxes indicate the possibility of a step-wise transformation of urban spaces toward ancient or novel wilderness.
2. Ancient wilderness area in Berlin with remnants of natural forests and wetlands

界定。今天，在人类影响波及全球生态系统的人类世，我们似乎需要拓展对于荒野的解读：不论其规模或起源如何，荒野均应建立在未受明显人类干扰的、具有高度自我调节的生态系统过程之上[12]。在城市语境下理解这一概念将有助于应对与人类世生态系统中荒野相关的机遇和挑战。

2.1 两种荒野类型

从类型学层面来讲，根据形成方式可将城市中的荒野区域划分为两种类型：古老荒野和新生荒野（图1）。古老荒野对应自然保护中的传统荒野概念，以城市边缘留存的自然遗迹为代表，例如传统景观意义

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Act of 1964, and similarly in the EU Guidelines on Wilderness in Natura 2000. Yet in the Anthropocene Epoch, with ecosystems globally being influenced by humans, a broader wilderness definition seems to be appropriate, which is based on a high-degree self-regulation of ecosystem processes, regardless of their size or origin, with direct human influences negligible[12]. Applying this concept to urban regions allows us to address both opportunities and challenges associated with wilderness in novel ecosystems.

2.1 Two Types of Wilderness

At a typological level, two types of wilderness can be defined by the origin of wilderness areas in cities: ancient wilderness and novel wilderness (Fig. 1). Ancient wilderness corresponds to the traditional wilderness concept in nature conservation and is represented in an urban context by natural remnants that exist within several city boundaries. Examples include wetlands or forests (Fig. 2) that still correspond to the historical benchmark of pristine landscapes, though they are often modulated by urban interventions[14]. In contrast, novel wilderness areas result from divergent development paths emerging in the wake of far-reaching human alterations to soils, hydrological conditions, or species communities. Thus novel ecosystems are often with unprecedented combinations of native and non-native plants[15][16]. Examples of such novel wilderness sites range from micro to landscape scale (Fig. 3) and include emerging forests in vacant lots, large derelict industrial areas, former military areas, and other types of vacant land of high biological richness[10][17]~[19].

3. 城市新生荒野具有多种尺度：从树池中（图3-1）和意大利罗马古迹附近（图3-2）的自生植被；到德国柏林墙遗址旁（图3-3）、西班牙马德里某个非正式社区花园里（图3-4）野生的臭椿（*Ailanthus altissima*）；再到德国鲁尔区盖尔森基兴的莱茵-易北雕塑公园中的后工业景观（图3-5，3-6）。

3. Novel urban wilderness ranging from the micro-site scale to the landscape scale. Spontaneous vegetation in a tree pit (Fig. 3-1) and close to antique ruins in Rome, Italy (Fig. 3-2); wild-grown *Ailanthus altissima* associated with fragments of the Berlin Wall, Germany (Fig. 3-3) and in an informal community garden in Madrid, Spain (Fig. 3-4); post-industrial landscape of the Ruhr with the "Sculpture Park Rhein-Elbe" in Gelsenkirchen, Germany (Fig. 3-5, 3-6).


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上的湿地或森林（图2），尽管它们经常受到城市干预的影响[14]。相对地，新生荒野区域则是在人类对土壤、水文条件或物种群落的深远影响下，以不同形态或模式发展出的人类世生态系统，因此其中的乡土与非乡土植物组合通常是前所未见的[15][16]。新生荒野区域具有多种尺度（图3），也涉及多种用地类型，包括空地上的新生林地、大型废弃工业区、后军事用地和生物多样性高的其他空地类型[10][17]-[19]。

2.2 荒野的梯度

作为生态过程的产物，荒野可以反映自组织的生态系统过程的水平，不同的城市用地处于荒野梯度上的不同位置[12]，这即是罗德里克·纳什早先为非城市景观建立的荒野程度谱系[20]。如图1所示，荒野程度会随着人类影响的增加而降低，这正是城市中许多残余林地不同于亚洲寺庙林[21]或城郊游憩林[22]等纯粹荒野的原因。同样，人工设计场地的荒野程度可通过减少维护、区分空间休闲用途、利用自生植被等方式来提高。这种城市“再野化”策略类似于将衰落乡村景观发展为新生荒野区域的设计策略[23]。

人类影响（如刈草）停止后，生态系统过程便会自发开始。随着演替的推进，过往管理对群落组成和结构的影响逐渐减弱。经此形成的成熟森林相比之前的生态系统阶段更具“野性”。重要的是，荒野的类型无法转变，但同一类型的荒野元素或过程可以进行提升（如图1方框中

2.2 Wilderness as a Gradient

Since wilderness results from ecological processes, urban sites can also be assigned to a position along a wilderness gradient that reflects different levels of self-organized ecosystem processing[12]. This is the wilderness continuum which has been early established for non-urban landscapes by Roderick Nash[20]. Along this gradient, as shown in Figure 1, the level of wilderness may decrease in response to increasing cultural influences. This is why many remnant forests in cities differ from pure wilderness sites as in Asian temple forests[21] or in peri-urban recreational forests[22]. Conversely, the level of wilderness in designed areas can be increased, e.g., through less maintenance, spatially differentiated recreational use, and the acceptance of spontaneous vegetation. This is the urban analog to “rewilding” strategies that have been proposed for abandoned rural landscapes to allow for the development of novel wilderness areas[23].

Self-organized ecosystem processes start directly after the cessation of human impacts (e.g. when mowing is stopped), and, as succession proceeds, effects from previous management on community composition and structure diminish. In this way, mature forests are “wilder” than previous ecosystem stages. Importantly, there is often an option to enhance wilderness elements or processes within one type instead of shifting it to the other type as indicated by the arrows in the boxes in Figure 1. Examples are the inclusion of spontaneous vegetation in parks by reduced weeding or the allowance of decay in old trees or fallen wood in maintained green spaces. As with wilderness, ecological novelty can also be classified typologically according to the novel ecosystem concept[16], i.e. a place is novel or not.

的箭头所示）。相关举措包括降低公园内清除自生植被的频率，或在人工维护的绿地中保留枯木。与荒野一样，这些景观的生态特性也可依据人类世生态系统的概念进行分类[16]，即场所新生与否。另外，场地的生态系统也可按照从原始到高度新生的梯度来划分[24]。

2.3 不同尺度下的荒野

最后，尺度对新生荒野很重要。奥尔多·利奥波德曾表示“再小的地块也会存在荒野”[25]。事实也正如此，城市与自然景观相连时，城市荒野可以在区域尺度上存在、发展，例如巴西里约热内卢城市内部就包含部分大西洋雨林[26]；在城市尺度上，大型新生荒野区域网络也会伴随工业区转型而出现，如德国鲁尔区[27]或美国的收缩城市[28]。在斑块尺度上，以自生植被为代表的荒野可能在空地中或沿线性结构出现（如交通廊道沿线）[18][29]。在微观尺度上，一棵古树便是城市空间中古老荒野的遗存[30]；墙面、裂隙或树池中的自生植被则是新生荒野开启的标志[31]。因此，被保护或提升的城市荒野对象并不完全为大面积的区域，也包括中小型场地。

3 城市荒野支持论

全球各地的城市正逐渐将荒野提上议程[32]。许多旨在使城市变得更加野性的倡议（如“野性城市”①和“国家公园城市”②等）指出，人们对城市社会重新拥抱自然的兴趣渐增。除了人类对更自然的环境愈发青睐外，还存在如下一些关于城市荒野——特别是新生城市荒野——的重要观点：

1）保护或提升城市中古老和新生荒野有助于应对全球生物多样性危机。城市的加速发展使得许多城市内部及周边的残余古老荒野面临的压力日增，因此亟需保护或恢复当地生物多样性，尤其是乡土物种。城市中的新生荒野区域可以庇护乡土物种和濒危物种[33]。此外，在人工设计绿地内促进荒野过程可提升其动植物生境功能[34]。

2）为城市居民提供更多与自然接触的机会，有利于人类健康和福祉[35]。随着城市建成环境的增加，大部分城市居民与自然的接触愈发

① “野性城市”是由荒野基金会（美国）发起的全球性活动，旨在“为所有生灵复兴城市中的野性自然”。有关该倡议的详细信息，请访问野性城市的官方网站。

② “国家公园城市”是由国家公园城市基金会（协同其他国际组织）发起，旨在“创造人、地、自然紧密相连的城市”的倡议活动。有关该倡议的详细信息，请访问国家公园城市基金会的官方网站。

Alternatively, sites can be assigned along a novelty gradient spanning from pristine to highly novel ecosystems[24].

2.3 Wilderness at Different Scales

Finally, scale matters to novel wilderness. Aldo Leopold stated that “no tract of land is too small for the wilderness idea”[25]. Indeed, urban wilderness can exist, or develop, at a regional scale, when cities are in contact with natural landscapes. Parts of the Atlantic rainforest of Brazil, for example, are located within Rio de Janeiro[26]; At the same spatial scale, large networks of novel wilderness areas can emerge in the wake of industrial transformation as in the Ruhr of Germany[27] or in shrinking cities of the United States[28]. At the patch scale, wilderness represented by spontaneous vegetation may emerge in vacant lots or within linear structures, e.g., along transportation corridors[18][29]. At the micro scale, a single heritage tree can represent remnants of ancient wilderness in urban spaces[30]; the spontaneous revegetation on walls, and in cracks or tree pits indicates the onset of novel wilderness development[31]. Thus, approaches to protect or enhance wilderness in cities do not exclusively rely on large areas and can also include small and medium-sized sites.

3 Arguments for Urban Wilderness

Wilderness is increasingly on urban agendas around the globe[32]. The many initiatives toward making cities wilder indicate a growing interest in reconnecting urban societies to the natural world. Examples include the “WILD Cities”① and the “National Park Cities”② initiatives. Beyond a general human preference for more natural surroundings, there are some major arguments for urban wilderness in general and novel urban wilderness in particular:

1) Approaches toward conserving or enhancing ancient and novel wilderness in cities help counteract the global biodiversity crisis. Remnants of ancient wilderness within or in the vicinity of many cities are increasingly under pressure due to accelerating urban growth. This requires efforts to conserve or restore their unique biodiversity, represented by native species assemblages. Novel wilderness areas in cities can also harbor a high biodiversity, including a range of native and endangered species[33]. Moreover, allowing for or stimulating wilderness processes within the frame of designed green spaces can increase the habitat functions for plants and animals[34].

2) The creation of additional opportunities for urban residents to come into contact with natural components and processes benefits people’s health and well-being[35]. As many people have limited access to nature as cities become increasingly built up, increasing urban nature in general and wilderness in particular become an important issue of environmental justice in cities[36].

3) Integrating novel wilderness into urban green infrastructure contributes to the city’s resilience, in particular in the face of climate change. Urban wilderness supports a wealth of regulating, provisioning, cultural, and supporting ecosystem

① WILD Cities is a global campaign to regenerate and celebrate wild nature in urban areas to improve quality of life for all, initiated by WILD Foundation. For more information about this initiative, please visit the official website of WILD Cities.

② National Park Cities is a movement initiated by National Park City Foundation with many other international organizations, aiming at “making cities where people, places and nature are better connected.” For more information about this initiative, please visit the official website of National Park City Foundation.

有限，城市中的环境公平需要通过增加城市自然——特别是荒野——来达成[36]。

3）新生荒野与城市绿色基础设施的融合有助于提升城市韧性，尤其是在气候变化的当下。城市荒野与一般城市绿地一样，都可以提供大量的生态系统的调节、供给、文化和支持服务[37][38]。此外，荒野中高度自我调节的生态系统还具有两个特点：第一，不同于人工建造、维护的绿地在植物生产、种植、场地整理和维护等环节中的巨大能源消耗，荒野的存在或发展没有碳足迹；第二，经特定城市条件的筛选，新生荒野中的群落组成由乡土和非乡土物种混合，依城市条件的不同可能有多种组合[15]。因此，以城市自生植被为代表的植物组合最适应特定场地条件，且无需额外的能源消耗就能适应未来环境变化。

4）新生城市荒野是自然与文化的共同产物，尤其当其与建筑遗迹交织在一起时，常能让人们理解、铭记城市用地的波澜变迁。新生荒野区域也象征着城市与自然的重新融合，因此城市居民往往会喜爱荒野[39]~[41]，并产生情感上的依赖，例如人们与柏林三角地公园中自然森林的情感联系[42]。

4 与荒野共生的机遇与挑战

对于景观设计学科来说，可共生的城市荒野包括三个类型：古老荒野场地、新生荒野场地（本文焦点），以及其他城市空间中的荒野元素和过程。在设计和管理绿地时需要对不同类型的场地区别对待。

4.1 古老荒野场地

即使是广阔的古老荒野区域（如国家公园），通常也需要必要的景观设计干预以保证自然景观内的可达性[43]。在城市地区，古老荒野一直以来都是保护和修复的对象，由于城市化进程的加快，现有的一系列成熟方法面临的挑战渐增：例如巴西的大西洋雨林，这里是全球生物多样性热点地区，虽然大部分地区已遭破坏，但一片面积约为3 300hm^{2}的区域作为国家公园受到里约热内卢的保护。这里面临的挑战是如何防止未来林地的损失、减少来自周边城市的负面影响，及修复受损区域[26]。在城市内部，可通过修复手段（如种植乡土植物）来改善一些包含小面积残余雨林生态系统的流域[44]。

4.2 新生荒野场地

可共生的城市新生荒野场地面临的挑战众多，通常需要设计干预将之与城市绿色基础设施相融合。由于存在垃圾、涂鸦、衰败等疏于管理的迹象，人们通常对荒野存在负面认知——在象征意义上，场地的“野”亦宣告着场地的“荒”，会使人们联想到与之相关的伤痛记忆。

services as urban green spaces do in general[37][38]. Two additional benefits from the high-level self-regulation in ecosystem processing inhere in wilderness: first, wilderness sites exist or develop without a carbon footprint—in contrast to constructed and intensively maintained green spaces, which require energy inputs for plant production, plantings, site preparation, and maintenance; Second, the species composition of novel wilderness sites is filtered by the specific urban conditions, leading to novel mixtures of native and non-native species with open-ended community assembly[15]. Such plant assemblages represented by urban spontaneous vegetation are thus best adapted to the given site conditions and will adapt to future environmental dynamics without additional energy inputs.

And 4) novel urban wilderness is a co-product of nature and culture, often allowing people to understand and remember the checkered history of urban land uses that gave rise to it, especially when interwoven with built relics. Novel wilderness sites also demonstrate, at a symbolic level, the reconnection of cities to the natural world. Therefore, urban dwellers often appreciate wilderness sites[39]~[41] and may feel emotionally attached to such places—as people are to the wild forest in Berlin's Gleisdreieck Park[42].

4 Challenges and Opportunities for Working With Urban Wilderness

For the discipline of Landscape Architecture, three facets of working with wilderness in cities are particularly relevant: ancient wilderness sites, novel wilderness sites (which are the focus in this article), and wilderness elements and processes in other urban spaces. It requires different approaches in design and management.

4.1 Ancient Wilderness Sites

Even in vast ancient wilderness areas, landscape architectural interventions are usually necessary to provide access to natural wonders, e.g. in national parks[43]. In urban regions, ancient wilderness is a traditional object of conservation and restoration, with a range of well-developed approaches but also with increasing challenges due to the accelerating urbanization. An example is the Atlantic rainforest of Brazil, a biodiversity hotspot. Most parts have been destroyed, but a large area of 3,300 hectares is being protected as a national park in Rio de Janeiro. Here, the challenge is to prevent future losses of forest areas, reduce negative impacts from adjacent urban areas, and restore damaged parts[26]. Within the city, some watersheds contain smaller remnants of Atlantic rainforest ecosystems, which can be enhanced through restoration efforts, e.g. plantings of native species[44].

4.2 Novel Wilderness Sites

Diverse challenges exist when working with novel wilderness in cities. Design interventions are often needed to integrate such areas into the urban green infrastructure. Many times, wilderness places are laden with negative connotations due to signs of neglect, such as littering, graffiti, and general decay. On a symbolic

4-1

4-2

4-3

4-4

4. 柏林南部自然公园中未经干扰的森林动态（图4-1），不定期放牧的空地（图4-2），以及设计干预后的废弃铁轨（图4-3，4-4）。

4. Natur-Park Südgelände in Berlin. Undisturbed forest dynamics (Fig. 4-1), occasionally grazed clearings (Fig. 4-2), and design interventions on a former freight yard (Fig. 4-3, 4-4).

例如，美国底特律地区和德国鲁尔区，新生荒野因工业的衰落得以在前工业用地上发展，使人在情感上回忆起场地曾经的社会经济繁荣一去不再[45]；在柏林，许多新生荒野是伴随着二战造成的破坏及其后柏林墙对城市的割裂（1961~1989）发展起来的[46]。

人们对于新生荒野的负面认知可通过景观设计干预来改善（图4），其中景观感知的关键点在于通过提供正面感知元素来体现“管护的迹象”[47]。这些干预产生了荒野和人工绿地的混合体，而挑战在于如何保留场地过去“非正式”的独特性[48]，并将自生植被的组成、结构和功能在演替中的自然变化纳入考量。

通过增设正式入口、园路和其他绿地要素，可提升荒野对公众的吸引力[49]。信息系统是一种有效手段，包括谛听漫步等创新性形式[50]。通过结合艺术作品，可实现与充满野性的自然的对比，例如柏林南部的自然公园[51]或鲁尔工业森林中的许多地区[27]。建在曾经将城市一分为二的柏林墙遗址上的柏林绿带，通过将现代设计方法引入新生城市荒野，将饱含历史伤痛的遗迹融入新的绿地之中[46]。

这些项目的一大挑战是如何应对自然界的无序动态变化。在大多数没有人类的干预情况下，经过几年的自然演替，场地会被茂密的木本植被覆盖。一方面，演替过程中物种的更迭很好地反映了自然对新兴城市

level, people’s perceptions of novel wilderness may reflect the painful events that led to ruptures with the former land-use history, thereby enabling the natural dynamics in the first place. For example, in the Detroit region of the United States or in the Ruhr area of Germany, industry decline has allowed the development of novel wilderness on previously industrial land, and the wilderness is now linked, emotionally, with preceding traumatic socio-economic effects[45]. In Berlin, many novel wilderness sites developed in the wake of destructions due to World War II and the subsequent division of the city by the Berlin Wall from 1961 to 1989[46].

Negative connotations of novel wilderness can be ameliorated by landscape architectural interventions (Fig. 4) by offering positively perceived signs as “cues to care”—a key issue in landscape perception[47]. Such interventions result in hybrids between wilderness and designed green spaces. The challenge here is to preserve the distinctiveness of the site, to leave room for informal uses that existed before[48], and to take the nature dynamics into account since the composition, structure, and function of spontaneous vegetation usually change during successional processes.

Formalizing access by establishing official entrances, paths, and other elements of green spaces usually increases the attractiveness of wilderness areas for a broader public[49]. Information systems are useful, including innovative approaches such as sound walks[50]. With the integration of artworks, contrasts to wild nature can be achieved, as in Berlin’s Natur-Park Südgelände[51] or in many areas of the Industriewald Ruhr[27]. The Berlin Green Belt, being created where the Berlin Wall once divided the city into two, is an example of integrating remnants of the painful past into new green spaces by combining modern design approaches with novel urban wilderness[46].

环境的适应。新生林地体现了在城市中几乎不可见的、未加控制的生态系统过程，可作为新生荒野保育区加以保护。另一方面，林木茂盛的荒野也存在两个缺陷：首先，环境心理学研究表明，相比茂密的林地，人们更喜欢开放或半开放空间[52]——阿普尔顿的“视界—遮蔽”理论[53]将其解释为人们一般希望“看的同时不被看”，如用一棵树或树丛遮蔽自己，并瞭望开阔区域。其次，尽管以乡土或引进树种建群的城市新生森林可供多样的动植物栖息[54]，但这些林地并不适宜那些习惯生活于阳光充足、开敞环境的濒危动植物栖息。柏林的新生草原比新生林地庇护了更多的濒危植物物种[55]。因此，荒野中不同结构的生境镶嵌也有利于生物多样性保护。

应对这些挑战的方法是调节部分地区的植被动态，以在更大区域内实现不同演替阶段的持续共存。为此，柏林会在部分已经作为公园或自然保育区保护起来的新生荒野中仅进行不定期的刈草或放牧，其余则不加管控。由此形成的林地和开敞栖息地镶嵌不仅可以吸引游客，也吸引了多种动植物来此安家。这其中的一些区域可用于游憩活动，而其他区域为了保护物种丰富的草原群落或保证野生植被的萌发免受干扰，只能沿路而游。对许多动植物来说不可或缺的先锋地块，可以像柏林北站公园那样，通过整合现有的不透水地面或不定期移除表土来维持（图5–3）。在德国法兰克福波那梅斯前军用机场的项目中，部分混凝土跑道被破开，不仅在结构上产生了生动有趣的效果，也十分利于林地重建（图5–1，5–4）。当地下水重新渗出或后工业场地构筑物中的雨水得以收集时，新生湿地便可建立——这取决于场地的原用地性质（图6）。

In these projects, a particular challenge is how to deal with the wild dynamics of nature. In most cases without human intervention, dense woody vegetation will result from natural succession after a few years. On the one hand, the alteration of species during succession perfectly reflects nature's adaptation to novel urban conditions. Emerging novel forests well manifest the uncontrolled ecosystem processes, which are rarely experienced in cities. Such areas can be protected as novel wilderness reserves. On the other hand, densely forested wilderness areas see two disadvantages. First, studies from environmental psychology have shown that dense forest stands are less appreciated than open or semi-open spaces[52]. This preference is often explained in terms of Appleton's prospect-refuge theory[53], according to which people generally have a need for “seeing without being seen,” e.g., with a tree or group of trees as the refuge and the open area for prospect. Second, although emerging urban forests dominated by either native or introduced trees can host diverse plant and animal assemblages[54], they are less important in providing habitat for endangered plant and animal species that are often specialists of sunny, open sites. Novel grassland in Berlin thus harbors more endangered plant species than novel forests[55]. Maintaining differently structured habitat mosaics in wilderness areas is thus also beneficial for biodiversity conservation.

The solution to these challenges is to modulate vegetation dynamics in some places so that different succession stages continuously coexist in a larger area. To this end, parts of novel wilderness areas in Berlin, which have been conserved as parks or nature reserves, are mown or grazed occasionally, while in other parts

5. 与荒野共生。同一块场地中起始阶段（上行）与充分生长的自生植被（下行）的对比。法兰克福波那梅斯的废弃飞机跑道被破碎成块（左列）；柏林三角地公园中自然森林生长在铁路道渣上和设计过的道渣床两侧（中列）；柏林北站公园里部分移除表土的场地和部分修剪的草地（右列）。

5. Working with urban wilderness. Pioneer stages (row above) are contrasted with more mature spontaneous vegetation in the same sites (row below). Former airstrip partly broken into clods in Bonames, Frankfurt (left); wild forest on rail ballast and designed rail ballast bed in “Gleisdreieck-Park,” Berlin (middle); partially removed topsoil and partially mown grassland in “Park auf dem Nordbahnhof,” Berlin (right).


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6. 世界文化遗产德国弗尔克林根钢铁厂中共存的工业遗迹和处于演替中段的新生荒野（包括新生湿地）。
7. 意大利罗马前斯尼亚湖的工业遗迹中偶然出现的一片湖（图7-1），自然林地斑块（图7-2），非定期修剪的社交草坪（图7-3），以及提供遮荫的野生臭椿（图7-4）。

6. World Cultural Heritage Site Völklingen Ironworks, Germany. Coexistence of industrial remnants and novel wilderness with intermediate succession stages and novel wetlands.
7. Lago Ex-SNIA in Rome, Italy. Industrial remains, an unintentionally emerging lake (Fig. 7-1), wild forest patches (Fig. 7-2), and occasionally mown areas (Fig. 7-3) for social activities. Wild trees of *Ailanthus altissima* provide shades (Fig. 7-4).

nature dynamics are allowed to proceed. The resulting mosaics of forested and open habitats are attractive to visitors as well as to many animal and plant species. Some of these areas are accessible for recreational activities, others can only be experienced following paths to conserve species-rich grassland communities or to allow for the emergence of less disturbed ruderal vegetation. Pioneer sites, which are indispensable for many plants and animals, can be maintained by integrating existing impervious surfaces or by occasionally removing topsoil, as what has been done in the Park auf dem Nordbahnhof (Fig. 5-3). In the project for the former Bonames airfield in Frankfurt, Germany, some of the concrete of a former airstrip was broken up into clods, which achieved an interesting structural effect, but also strongly favored reforestation (Fig. 5-1, 5-4). Novel types of wetlands can develop, for example, when groundwater begins to infiltrate or rainwater to collect in built structures of post-industrial sites, this often in association with artifacts from the previous land use (Fig. 6). A prominent example is the post-industrial site “Lago Ex-SNIA” in Rome, Italy, where the ruins of a former textile factory seem to emerge from a lake (Fig. 7). As a result of construction work, groundwater was no longer pumped out when the industrial use ceased here. This small area harbors a considerable biodiversity[56] and demonstrates that different components can be well combined when working with novel urban wilderness. In this case as in many others[11][19], the engagement of local initiatives or grassroot movements is key in preventing the destruction of novel wilderness areas that are often located in the neighborhoods with limited access to green areas.

4.3 Wilderness Elements Within Traditional Green Spaces

In addition to working with novel wilderness areas at a larger scale, wilderness components can be fostered within a range of urban spaces as part of urban rewilding. Working with spontaneous vegetation has been a topic in planting design for a while, with multi-faceted approaches to integrating wild-grown plant communities in green spaces or to modulating such plant assemblages by adding aesthetically attractive species[57]. Non-native species can be accepted as typical components of urban spontaneous vegetation unless they spread into adjacent endangered ecosystems.

Converting frequently mown lawns to less intensively maintained meadows increases opportunities for natural processes and is often accepted when the ecological benefits are explained[58]. Other approaches to enhancing wilderness processes in green spaces include the retention of decaying or fallen trees. These are not only important habitat elements for many animals and fungi but also can inspire feelings to an unpredictable environment and evoke a sense of mystery[59]. Such structures obviously contrast with the traditional appearance of green spaces but are usually accepted by the public when information about their ecological value is provided.

Finally, unusual wilderness concepts for green spaces are also conceivable. An outstanding example comes from the French landscape architect Gilles

其中的典型案例是意大利罗马的后工业遗址“前斯尼亚湖”，纺织厂的废墟犹如自湖中诞生（图7）。工业活动停止后，先前构筑工程中不再抽取地下水，这一小块区域内蕴藏着可观的生物多样性[56]，并证明了在新生城市荒野中不同的部分可以得到有机结合。与其他许多案例一样[11][19]，地方倡议和基层运动的参与是防止那些绿地有限的社区中新生荒野遭破坏的关键。

4.3 传统绿地中的荒野元素

除研究更大尺度的新生荒野外，提升城市空间中的荒野元素以助城市再野化也是可行之道。利用自生植物的种植设计已经成为业内话题之一，包括运用多种方法整合野生植物群落野和绿地、在植物组团中增加景观效果良好的物种[57]。在不会扩散至周边濒危生态系统的情况下，非乡土物种也可用作城市自生植被。

将定期修剪的草坪转变为低维护的草甸，以促进场地的自然过程，而在向公众说明其生态效益后也常能得到大众认可[58]。促进绿地中荒野过程的其他方法包括保留朽木和倒木，因为它们不仅可以作为许多动物和真菌的重要栖息地元素，也可激发人们对不可预料的环境的神秘感[59]。这种群落结构显然与传统绿地的外观不同，但当公众了解了其生态价值后，通常便会认可。

最后，绿地中也可以营建不同寻常的荒野。一个很好的例子是由吉尔·克雷蒙设计的法国里尔的新亨利—马蒂斯公园，其设计概念包括在传统绿地中央建设一个高约7m、只进行了基本种植工作的高地，游客不可进入，自然就不会受到干扰。[60]

5 结语

城市环境中的荒野设计是景观设计行业的时下热点，也具有发展前景。荒野在其起源或生态性（古老或新生）、规模（从小地块到大区域），以及自然过程决定生态系统状态的程度（从初始阶段到成熟森林）等方面存在很大差异。因此，认识到场地的具体特征和机遇是其未来发展的关键。除保留完全未受干扰的荒野外，适当的设计干预也是可行的。当地社区参与保护、开发或调节城市荒野区域也是行之有效的方法。最终，在城市绿色基础设施中提升荒野有望将人们与自然世界重新联系在一起，并保护城市生物多样性。**LAF**

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Clément. His concept for the new Parc Henri Matisse in Lille, France included a plateau about 7 meters high, inaccessible to visitors, in the middle of a traditionally designed green space, where nature stay undisturbed after only a few initial plantings.[60]

5 Conclusion

Working with wilderness in urban regions is a timely and promising field for landscape architecture. Wilderness varies greatly in terms of its origin or ecological novelty (ancient or novel), its scale (from small patches to large areas), and the extent to which natural processes determine the state of the ecosystem (from initial stages to mature forests). Recognizing the specific characteristics and opportunities of a site is therefore key to its future development. Design interventions are often appropriate, as is the inclusion of completely undisturbed areas. Involving the local neighborhood has often proven successful for preserving, developing, or mediating urban wilderness areas. Ultimately, enhancing wilderness within urban green infrastructure is a promising to reconnecting people with the natural world and for urban biodiversity conservation. **LAF**

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REFERENCES

[1] Nash, R. F. (2014). *Wilderness and the American mind*. New Haven, CT: Yale University Press.

[2] Kirchhoff, T.,& Vicenzotti, V. (2014). A Historical and Systematic Survey of European Perceptions of Wilderness. *Environmental Values*, 23(4), 443–464. https://doi.org/10.3197/096327114X13947900181590

[3] Gothein, M. L. (1926). *Geschichte der Gartenkunst* [History of Garden Art]. Jena, Germany: Eugen Diederichs.

[4] Hunt, J. D., & Willis, P. (Eds.). (1988). *The Genius of the Place: The English Landscape Garden, 1620-1820*. Cambridge, MA: MIT Press.

[5] Hirschfeld, C. C. L. (1780). *Theorie der Gartenkunst (Vol. 2)* [Theory of Garden Art (Vol.2)]. Leipzig, Germany: G. Weidmanns Erben und Reich.

[6] Kühn, N. (2011). *Neue Staudenverwendung*. Stuttgart, Germany: Ulmer.

[7] Dunnett, N., & Hitchmough, J. (Eds.). (2008). *The Dynamic Landscape: Design, Ecology and Management of Naturalistic Urban Planting*. London, England: Taylor & Francis.

[8] Cai, T. Z. (2020). Ecological or Naturalistic: A Brief Review and Several Thoughts on Contemporary Planting Design. *Landscape Architecture Frontiers*, 8(3), 102-114. https://doi.org/10.15302/J-LAF-1-030017

[9] Latz, P. (2003). Landscape Park Duisburg-Nord: The Metamorphosis of an Industrial Site. In N. Kirkwood (Eds.), *Manufactured Sites* (pp. 163-17). London, England: Taylor & Francis.

[10] Kowarik, I., & Körner, S. (Eds.). (2005). *Wild Urban Woodlands: New Perspectives for Urban Forestry*. Berlin, Germany: Springer.

[11] Lachmund, J. (2013). *Greening Berlin: The Co-Production of Science, Politics, and Urban Nature*. Cambridge, MA: MIT Press.

[12] Kowarik, I. (2018). Urban Wilderness: Supply, Demand, and Access. *Urban Forestry and Urban Greening*, (29), 336-347. https://doi.org/10.1016/j.ufug.2017.05.017

[13] Cronon, W. (1996). The Trouble With Wilderness: Or, Getting Back to the Wrong Nature. *Environmental History*, 1(1), 7-28. https://doi.org/10.2307/3985059

[14] Jim, C.Y. (2017). Conservation and Creation of Urban Woodlands. In P. Y. Tan, & C. Y. Jim (Eds.), *Greening Cities* (pp. 307–330). Singapore: Springer.

[15] Kowarik, I. (2011). Novel Urban Ecosystems, Biodiversity, and Conservation. *Environmental Pollution*, 159(8-9), 1974-1983. https://doi.org/10.1016/j.envpol.2011.02.022

[16] Hobbs, R. J., Higgs, E. S., & Hall, C. (Eds.). (2013). *Novel Ecosystems: Intervening in the New Ecological World Order*. Hoboken, NJ: John Wiley & Sons.

[17] Bonthoux, S., Brun, M., Di Pietro, F., Greulich, S., & Bouché-Pillon, S. (2014). How Can Wastelands Promote Biodiversity in Cities? A Review. *Landscape and Urban Planning*, (132), 79-88. https://doi.org/10.1016/j.landurbplan.2014.08.010

[18] Anderson, E. C., & Minor, E. S. (2017). Vacant Lots: An Underexplored Resource for Ecological and Social Benefits in Cities. *Urban Forestry and Urban Greening*, (21), 146-152. https://doi.org/10.1016/j.ufug.2016.11.015

[19] Trentanovi, G., Campagnaro, T., Kowarik, I., Munafò, M., Semenzato, P., & Sitzia, T. (2021). Integrating Spontaneous Urban Woodlands Into the Green Infrastructure: Unexploited Opportunities for Urban Regeneration. *Land Use Policy*, (102), 105221. https://doi.org/10.1016/j.landusepol.2020.105221

[20] Lesslie, R. (2016). The Wilderness Continuum Concept and Its Application in Australia: Lessons for Modern Conservation. In S. J. Carver, & S. Fritz (Eds.), *Mapping Wilderness* (pp. 17-33). Dordrecht, the Netherlands: Springer.

[21] Gao, H., Ouyang, Z., Chen, S., & Van Koppen, C. S. A. (2013). Role of Culturally Protected Forests in Biodiversity Conservation in Southeast China. *Biodiversity and Conservation*, 22(2), 531-544. https://doi.org/10.1007/s10531-012-0427-7

[22] De Meulder, B., Shannon, K., & Nguyen, M. Q. (2019). Forest Urbanisms: Urban and Ecological Strategies and Tools for the Sonian Forest in Belgium. *Landscape Architecture Frontiers*, 7(1), 18-33. https://doi.org/10.15302/J-LAF-20190103

[23] Navarro, L. M., & Pereira, H. M. (2012). Rewilding Abandoned Landscapes in Europe. *Ecosystems*, 15 (6), 900–912. https://doi.org/10.1007/s10021-012-9558-7

[24] Heger, T., Bernard-Verdier, M., Gessler, A., Greenwood, A. D., Grossart, H. -P., Hilker, M., ... Jeschke, J. M. (2019). Towards an Integrative, Eco-Evolutionary Understanding of Ecological Novelty: Studying and Communicating Interlinked Effects of Global Change. *BioScience*, 69(11), 888-899. https://doi.org/10.1093/biosci/biz095

[25] Diemer, M., Held, M., & Hofmeister, S. (2003). Urban Wilderness in Central Europe: Rewilding at the Urban Fringe. *International Journal of Wilderness*, 9(3), 7-11.

[26] Matos, D. M. S., Santos, C. J. F., & Chevalier, D. D. R. (2002). Fire and Restoration of the Largest Urban Forest of the World in Rio De Janeiro City, Brazil. *Urban Ecosystems*, 6(3), 151-161. https://doi.org/10.1023/A:1026164427792

[27] Dettmar, J., (2005). Forest for Shrinking Cities? The Project "Industrial Forest of the Ruhr". In I. Kowarik, & S. Körner (Eds.), *Wild Urban Woodlands: New Perspectives for Urban Forestry* (pp. 263–277). Berlin, Germany: Springer.

[28] Riley, C. B., Perry, K. I., Ard, K., & Gardiner, M. M. (2018). Asset or Liability? Ecological and Sociological Tradeoffs of Urban Spontaneous Vegetation on Vacant Land in Shrinking Cities. *Sustainability*, 10(7), 2139. https://doi.org/10.3390/su10072139

[29] Bonthoux, S., Voisin, L., Bouché-Pillon, S., & Chollet, S. (2019). More Than Weeds: Spontaneous Vegetation in Streets as a Neglected Element of Urban Biodiversity. *Landscape and Urban Planning*, (185), 163-172. https://doi.org/10.1016/j.landurbplan.2019.02.009

[30] Jin, C., Zheng, M., Huang, L., Qian, S., Jim, C. Y., Lin, D., ... Yang, Y. (2020). Co-existence Between Humans and Nature: Heritage Trees in China's Yangtze River Region. *Urban Forestry and Urban Greening*, (54), 126748. https://doi.org/10.1016/j.ufug.2020.126748

[31] Huang, L., Qian, S., Li, T., Jim, C. Y., Jin, C., Zhao, L., ... Yang, Y. (2019). Masonry Walls as Sieve of Urban Plant Assemblages and Refugia of Native Species in Chongqing, China. *Landscape and Urban Planning*, (191), 103620. https://doi.org/10.1016/j.landurbplan.2019.103620

[32] McKinney, M. L., Kowarik, I., & Kendal, D. (2018). The Contribution of Wild Urban Ecosystems to Liveable Cities. *Urban Forestry and Urban Greening*, (29), 334-

335. https://doi.org/10.1016/j.ufug.2017.09.004
[33] Kowarik, I., & von der Lippe, M. (2018). Plant Population Success Across Urban Ecosystems: A Framework to Inform Biodiversity Conservation in Cities. *Journal of Applied Ecology*, 55(5), 2354-2361. https://doi.org/10.1111/1365-2664.13144
[34] Müller, A., Bøcher, P. K., Fischer, C., & Svenning, J. C. (2018). 'Wild' in the City Context: Do Relative Wild Areas Offer Opportunities for Urban Biodiversity? *Landscape and Urban Planning*, (170), 256-265. https://doi.org/10.1016/j.landurbplan.2017.09.027
[35] Myers, Z. (2020). *Wildness and Wellbeing: Nature, Neuroscience, and Urban Design*. Singapore: Springer Nature.
[36] Sikorska, D., Łaszkiewicz, E., Krauze, K., & Sikorski, P. (2020). The Role of Informal Green Spaces in Reducing Inequalities in Urban Green Space Availability to Children and Seniors. *Environmental Science and Policy*, (108), 144-154. https://doi.org/10.1016/j.envsci.2020.03.007
[37] Chen, W. Y. (2017). Urban Nature and Urban Ecosystem Services. In P. Y. Tan, & C. Y. Jim (Eds.), *Greening Cities* (pp. 181–199). Singapore: Springer.
[38] Pueffel, C., Haase, D., & Priess, J. A. (2018). Mapping Ecosystem Services on Brownfields in Leipzig, Germany. *Ecosystem Services*, (30), 73-85. https://doi.org/10.1016/j.ecoser.2018.01.011
[39] Hwang, Y. H., Yue, Z. E. J., Ling, S. K., & Tan, H. H. V. (2019). It's Ok to Be Wilder: Preference for Natural Growth in Urban Green Spaces in a Tropical City. *Urban Forestry and Urban Greening*, (38), 165-176. https://doi.org/10.1016/j.ufug.2018.12.005
[40] Mathey, J., Arndt, T., Banse, J., & Rink, D. (2018). Public Perception of Spontaneous Vegetation on Brownfields in Urban Areas—Results From Surveys in Dresden and Leipzig (Germany). *Urban Forestry and Urban Greening*, (29), 384-392. https://doi.org/10.1016/j.ufug.2016.10.007
[41] Li, X., Fan, S., Kühn, N., Dong, L., & Hao, P. (2019). Residents' Ecological and Aesthetical Perceptions Toward Spontaneous Vegetation in Urban Parks in China. *Urban Forestry and Urban Greening*, (44), 126397. https://doi.org/10.1016/j.ufug.2019.126397
[42] Lichtenstein, A., & Mameli, F. A. (Eds.). (2015). *Gleisdreieck / Parklife Berlin*. Berlin, Germany: Transcript Verlag.
[43] Carr, E. (1999). *Wilderness by Design: Landscape Architecture and the National Park Service*. Lincoln, NE: University of Nebraska Press.
[44] Herzog, C. P. (2016). A Multifunctional Green Infrastructure Design to Protect and Improve Native Biodiversity in Rio De Janeiro. *Landscape and Ecological Engineering*, 12(1), 141-150. https://doi.org/10.1007/s11355-013-0233-8
[45] Draus, P., Haase, D., Napieralski, J., Roddy, J., & Qureshi, S. (2019). Wounds, Ghosts and Gardens: Historical Trauma and Green Reparations in Berlin and Detroit. *Cities*, (93), 153-163. https://doi.org/10.1016/j.cities.2019.05.002
[46] Kowarik, I. (2019). The "Green Belt Berlin": Establishing a Greenway Where the Berlin Wall Once Stood by Integrating Ecological, Social and Cultural Approaches. *Landscape and Urban Planning*, (184), 12-22. https://doi.org/10.1016/j.landurbplan.2018.12.008
[47] Nassauer, J. I., (1995). Messy Ecosystems, Orderly Frames. *Landscape Journal*, 14(2), 161–170. doi:10.3368/lj.14.2.161
[48] Rupprecht, C. D. D., Byrne, J. A., Ueda, H., & Lo, A. Y. (2015). 'It's Real, Not Fake Like a Park': Residents' Perception and Use of Informal Urban Green-Space in Brisbane, Australia and Sapporo, Japan. *Landscape and Urban Planning*, (143), 205-218. https://doi.org/10.1016/j.landurbplan.2015.07.003
[49] Unt, A. -L., & Bell, S. (2014). The Impact of Small-Scale Design Interventions on the Behaviour Patterns of the Users of an Urban Wasteland. *Urban Forestry and Urban Greening*, 13(1), 121-135. https://doi.org/10.1016/j.ufug.2013.10.008
[50] Del Tredici, P., & Rueb, T. (2017). Other Order: Sound Walk for an Urban Wild. *Arnoldia*, 75(1), 14-25.
[51] Kowarik, I., & Langer, A. (2005). Natur-Park Südgelände: Linking Conservation and Recreation in an Abandoned Railyard in Berlin. In I. Kowarik, & S. Körner (Eds.), *Wild Urban Woodlands: New Perspectives for Urban Forestry* (pp. 287–299). Berlin, Germany: Springer.
[52] Brun, M., Di Pietro, F., & Bonthoux, S. (2018). Residents' Perceptions and Valuations of Urban Wastelands are Influenced by Vegetation Structure. *Urban forestry and Urban Greening*, (29), 393-403. https://doi.org/10.1016/j.ufug.2017.01.005
[53] Appleton, J. (1975). *The Experience of Landscape*. London, England: Wiley-Blackwell.
[54] Kowarik, I., Hiller, A., Planchuelo, G., Seitz, B., von der Lippe, M., & Buchholz, S. (2019). Emerging Urban Forests: Opportunities for Promoting the Wild Side of the Urban Green Infrastructure. *Sustainability*, 11(22), 6318. https://doi.org/10.3390/su11226318
[55] Planchuelo, G., von der Lippe, M., & Kowarik, I. (2019). Untangling the Role of Urban Ecosystems as Habitats for Endangered Plant Species. *Landscape and Urban Planning*, (189), 320-334. https://doi.org/10.1016/j.landurbplan.2019.05.007
[56] Battisti, C., Dodaro, G., & Fanelli, G. (2017). Paradoxical Environmental Conservation: Failure of an Unplanned Urban Development as a Driver of Passive Ecological Restoration. *Environmental Development*, (24), 179-186. https://doi.org/10.1016/j.envdev.2017.05.003
[57] Kühn, N. (2006). Intentions for the Unintentional: Spontaneous Vegetation as the Basis for Innovative Planting Design in Urban Areas. *Journal of Landscape Architecture*, 1(2), 46–53. https://doi.org/10.1080/18626033.2006.9723372
[58] Fischer, L. K., Neuenkamp, L., Lampinen, J., Tuomi, M., Alday, J. G., Bucharova, A., ... Klaus, V. H. (2020). Public Attitudes Toward Biodiversity-Friendly Green space Management in Europe. *Conservation Letters*, 13(4), e12718. https://doi.org/10.1111/conl.12718
[59] Gundersen, V., Stange, E. E., Kaltenborn, B. P., & Vistad, O. I. (2017). Public Visual Preferences for Dead Wood in Natural Boreal Forests: The Effects of Added Information. *Landscape and Urban Planning*, (158), 12–24. https://doi.org/10.1016/j.landurbplan.2016.09.020
[60] Gandy, M. (2013). Entropy by Design: Gilles Clément, Parc Henri Matisse and the Limits to Avant-Garde Urbanism. *International Journal of Urban and Regional Research*, 37(1), 259-278. https://doi.org/10.1111/j.1468-2427.2012.01164.x