

韧性设计： 重新连接人和环境

DESIGN FOR RESILIENCE: RE-CONNECTING COMMUNITIES AND ENVIRONMENTS

1 引言

当我们谈及具有韧性的景观设计时，我们通常会关注空间和生态原则，以及那些用于提升城市景观韧性的、基于自然的技术途径。本文通过探讨若干欧洲的项目与策略，指出韧性景观的实现不仅依靠韧性的生态要素，还需要人文因素的配合。在感知和利用城市景观时，人们的观念应该如何从以自我为中心，转变为以生态为中心？我们如何帮助市民树立这种韧性认知，使他们了解多变且多样的适应性城市景观相关的知识，并积极展开行动参与到韧性景观的构建过程中？

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卡特琳娜·巴克

德国汉堡港口城市大学建筑学院建筑与景观专业研究与教学助理

安琪·施托克曼

德国汉堡港口城市大学建筑系建筑与景观专业教授

Katarina BAJC

Research and Teaching Associate of Architecture and Landscape, Department of Architecture, HafenCity University Hamburg

Antje STOKMAN

Professor of Architecture and Landscape at Department of Architecture, HafenCity University Hamburg
Überseeallee 16 20457 Hamburg, Germany
antje.stokman@hcu-hamburg.de

摘要

本文强调了对动态变化的生态过程的积极形象和感知对于建立和维护具有生态系统服务功能的城市区域的重要性。这些生态过程反过来也确保了我们的城市环境的韧性。将生态变化、过程和周期强调并展现出来的审美体验可以提升公众对于城市可持续目标和项目的接受程度和兴趣。因此，一些欧洲城市目前不仅力求提高其绿色网络的生态服务能力和韧性，而且最重要的是，旨在加强公众对绿色网络覆盖地区的接受和积极利用程度。他们正在鼓励公众参与到关于在绿色网络中建设新的、拥有迷人外观的生态设施的公开讨论中，并激励景观设计师以具有视觉冲击力的设计来实现重要的生态过程和功能，从而使人们注意到自然的动态变化和周期，并将韧性所具有的艺术和文化特征呈现在世人面前。

关键词

韧性；生态美学；自然体验；动态过程；生物多样性

ABSTRACT

This article stresses the importance of positive image and perception of dynamic ecological processes for the implementation and care of areas which provide ecosystem services within the city. Those in turn secure the resilience of our urban environment. Aesthetic experience with emphasis on highlighting and revealing the presence of ecological dynamics, processes and cycles can increase the acceptance and interest for sustainable goals and projects within the city. Thus, several European cities are currently implementing strategies not only to enhance the capacity of their green networks for ecological services and resilience but most importantly to enhance the acceptance and active use of such areas. They are integrating the public in an open debate about implementing new attractive ecological amenities within a green network, and also stimulating landscape architects to find ways to design important ecological processes and functions in an eye-catching and spectacular way. The natural dynamics and cycles are thus brought to the attention of the people and present an important artistic and cultural component of resilience.

KEY WORDS

Resilience; Ecological Aesthetics; Nature Experience; Dynamic Process; Biodiversity

整理 田乐 译 田乐 王胤瑜 李欣

EDITED BY Tina TIAN TRANSLATED Tina TIAN WANG Yinyu LI Xin

2 韧性——设计和规划范式

在规划领域，“韧性”（Resilience）一词的热度已渐渐与“可持续性”（Sustainability）相当。相较“可持续性”而言，“韧性”一词更易定义，因为这一概念由自然科学的系统理论发展而来。而系统的概念也适用于城市和景观，因为它们都是由相互作用的各个部分组成的复杂网络所构成，且不断发生着动态变化，允许能量、物质及信息交换，并深受环境的影响——无论远近。这些系统会产生复杂而多导向性的动态变化，但这些变化无法完全预测，只能依据概率进行假设。城市中的交通网络、人口流动、贸易波动，以及不断更迭的建设思潮，便是这种复杂系统的最好例证。为动植物及人类生存及迁徙提供保障的水、土壤、气候条件、植物、栖息地等亦是具有如此复杂性的系统。

在全球气候变化的背景下，城市及景观规划师都肩负着对这些动态系统进行设计的重任。他们试图以控制或缓冲等方法来阻止这些环境变化，但都以失败告终。许许多多的人造城市景观最后都遭遇了瓶颈，例如，浸没区面积不足以容纳全部洪水，以致其后方的居住区依然面临着洪涝威胁；又例如，生态群落过于碎片化，不足以保护生物多样性。不同于这种防御的理念，我们可以通过“发挥系统的能力来适应和调节这种不断变化的内部或外部过程”，从而实现韧性设计。^{[1][2]}或者更准确地说，在城市及景观设计中，如果我们可以使城市景观进行自我调节、学习和适应而成为一个具有持久效益的系统，那么景观便可以保持其自身的特色、功能和结构。那么，我们应该如何运用韧性概念，通过规划和设计的方式来应对城市环境的变化呢？

1 Introduction

When we talk about resilient landscape design, we generally focus on spatial and ecological principles and technical nature-based solutions to support the resilience of urban landscapes. This article argues that it will take more than ecological parameters for designed landscapes to become resilient, and examines the role of people and the cultural component of the resilience agenda by discussing current projects and strategies in the European context. How can we change the human perception and use of urban landscapes from an egocentric to a more bio-centric perspective? How can we support a resilient citizenship, based on an imperative of acknowledgment, engagement, and activism in and for adaptive, dynamic and diverse urban landscapes?

2 Resilience as a Design and Planning Paradigm

“Resilience” is a new buzzword in planning disciplines slowly gaining popularity against the concept of sustainability. In comparison to sustainability, it is easier to define because it derives from systems theory based on natural sciences. The concept of a system also applies to cities and landscapes. They are composed of networks of interacting components in a constant state of becoming, open to the flows of energy, material, and information, and affected by adjacent as well as distant circumstances. Dynamic changes that occur as a result are complex and multidirectional, impossible to fully predict and can only be understood based on probabilistic assumptions. Cities with their traffic veins, migrations, trade fluctuations, and ever-changing construction speculations are prime examples of such erratic states. So are the waters, soils, climates, vegetation and habitats that support life and migration of flora and fauna as well as humans.

Urban and landscape planners are left with a task to plan and design this fluid state, in the wake of global climate change. Their attempts to prevent changes in the environment, to control them, to compensate them have been failing greatly. Many man-made urban landscapes eventually reach a threshold where the space for flood is not large enough to prevent the flooding of inhabited areas or where the biotopes become too fragmented to prevent the loss of biodiversity. The resilience approach as an alternative to resistance approach can be achieved if we manage to support the “ability of a system to adapt and adjust to changing internal or external processes.”^{[1][2]} Or more precisely, if we manage to integrate the persistence of systems by self-organization, learning, and adaptation into urban and landscape design, in such a way that landscapes retain their identity, function, and structure. How can the resilience concept be applied as a response to change and as a form of action in the planning and design of urban environments?

3 韧性景观的基本原则

韧性景观系统中的某些特定的空间属性可以为景观设计师、城市规划师等所构建和改善。为了增强景观对多变环境和灾难事件的适应力，设计师应考虑以下几项原则：

3.1 连通性与模式—过程关系

一个系统的生存及发展离不开与外界的资源、能量、物质及信息交换，城市生态系统亦如此。景观的物质和功能层面的联系及空间格局的构成，直接决定了整个景观系统的运作方式及功能。^[3]景观生态学的应用建立了一种植被斑块理想分布模型，其中包含支持种群的迁移、水分和营养流动的栖息地与廊道。^[4]“绿色基础设施”概念的提出进一步完善了这一模型，即通过强化城市蓝—绿网络，将上述至关重要的生态过程与高密度的城市区域相整合。

3.2 生态和社会多样性与波动性

纵使生物多样性无法轻易定义或测量，但是提升生物多样性已经成为全球和地区尺度可持续发展中的一种共识，并被写入诸如联合国《2030年可持续发展议程》《巴黎气候变化协定》等具有全球性影响力的可持续议程，以及世界各地的景观与城市战略文件当中。如今，生物多样性的内涵已由对物种、基因和生态系统的定量测度，拓展为对种群、群落、景观的功能结构及其中所包含信息的多样性的研究。在这样的背景下，人类文化、行为与自组织信息的多样性则至关重要。^[5]生物多样性对于韧性景观的重要性体现为生态系统及存在于其中的各类生物都能够通过调配社会资源来适应变化（图1）。

3.3 自组织、密切反馈循环、自下而上能动性、学习及创新能力

生态系统和城市系统的自组织能力也是构建韧性不可缺少的先决条件之一。基于密切反馈循环的快速自组织机制能使系统在第一时间对于干扰信号做出回应，并迅速而顺利地进行适应性变化。这一特性



3 General Principles of Resilient Landscapes

Resilient landscape systems display certain spatial attributes which can be constructed and influenced by landscape architects, urban designers, and other planners. To support the landscape's ability to adapt to changing environmental influences and disruptive events, designers can consider the following principles:

3.1 Connectivity and Pattern-Process Relationship

The survival and thriving of a system is dependent on the flow of resources, energy, material, and information through it. This is as well true of urban and ecological systems. Physical and functional connectivity and the spatial configuration of patterns in landscape directly determine its processes and functions.^[3] The applied science of Landscape Ecology has developed models for optimal dispersion of vegetation patches with different habitats and corridors for species movement, and nutrient and water flows across the landscape.^[4] The concept of green infrastructure is taking it further in an attempt to integrate these vital ecological processes in dense urban areas, by strengthening the green and blue networks within the city.

3.2 Ecological and Social Diversity and Variability

While it is not easy to define or measure biodiversity, there is a consensus that fostering biodiversity is an important goal for sustainability on the global and local level. It appears in all globally important sustainability agendas, such as the United Nations' 2030 Agenda for Sustainable Development, the Paris Agreement on Climate Change, as well as in local landscape and city strategy documents. The concept of biodiversity is being expanded from measuring the mere amount of species, genes, and ecosystems to a diversity of functions and structure of populations, communities, landscapes, and stored information. In this context, also the diversity of human cultures with their behavioral, and self-organizational information are vital.^[5] In such a way, biodiversity becomes an important aspect of resilient landscapes where not only ecological systems but also its inhabitants are capable of adapting to change by resorting to their social capital (Fig. 1).

3.3 Self-Organization, Tight Feedback Loops, Bottom-Up Initiatives, Learning, and Innovation

Self-organization applies to ecological as well as urban systems as one of the prerequisites of resilience. Fast self-organization with tight feedback loops enables a system to respond to first signs of disturbance and so grants a more rapid and smooth adaptation to change. Depending on how systems are built spatially,

1. 根据设计方案，德国柏林滕博尔霍夫机场会在鸟类繁殖期限制人类进入鸟类栖息地。
1. Bird nesting area with restricted access during breeding season is integrated into the design of Tempelhofer Feld in Berlin, Germany.

2. 在德国汉堡“经典格斯特”景观轴线上，孩子们被城市中出现的羊群所吸引。

2. A group of children amazed by the experience of grazing sheep in the middle of the city, Horner Geest, Hamburg, Germany.

取决于系统的空间构成，故可通过城市景观设计手段来改善。多中心性、多功能性和连通性可以保证密切反馈循环和信息交换。然而，那些不易在空间上体现的属性，如自下而上能动性、参与、学习及创新活动等，都有助于社会在变化环境中把握新机遇，提高自组织与适应能力。^{[6][7]}

3.4 模块化、网格、灵活的结构和多中心性

一座城市建立伊始，其空间建构便会对城市环境有所影响，并通过将城市分成不同的功能区域来使城市系统逐步适应这种改变。因而，不同的区域都可以从城市系统中暂时移除，或者另作他用。模块性则可保证当系统的一项功能或某一区域停止运转时，整体系统不受影响。在生态系统中，这种模式体现为一张由若干相互作用、进行能量交换的功能节点组成的网络。这些节点不一定具有空间边界，但会随着景观中活动的增加而形成可辨别的热点。不论个体单元存在与否，只要整个功能分布模式在更大的空间尺度上保持不变，整体韧性系统就可以维持景观系统的健康与活力^[8]。同样地，多中心性可以使城市内部节点在不超过空间界线和资源承载力的前提下，在空间上扩散和相互连结。

3.5 多功能性与生态系统服务

资源与功能的交叠可大大提升城市生态系统服务的潜力。水文循环、栖息地多样性、固碳，及对极端环境及其他扰动形成缓冲都是重要的生态系统功能，唯有将这些功能进行有效整合，才能保障城市良好运转、健康发展。^[3]这就需要城市中更多能在不同时段发挥不同功能的临时性空间，例如生态涵养河道和绿色廊道，平日里可供人们在其中活动，雨洪时也可以充当城市滞洪区。如果这些功能以一种美观的方式融入城市景观之中，便可使人们在日常生活中增进对于生态系统中的非生物及生物组成元素及动态变化的体验（图2），进而促进人们开展休闲活动、改善他们的身心健康，并培养尊重自然的观念。^[9]



this characteristic can be fostered within designed urban landscapes. Polycentricity, multi-functionality, and connectivity can support tight feedback loops and the flow of information. However, also characteristics which are not discernable spatially such as bottom-up initiatives, participation, and programs for learning and innovation play an important part to support the ability of a society to self-organize and adapt to change by recognizing new opportunities within the changed circumstances.^{[6][7]}

3.4 Modularity, Grid, Flexible Structure, and Polycentricity

These are some of the spatial strategies of designing urban environments since the first grounding of a city. They allow for gradual adaptation of an urban system by dividing it into separate functioning parts. Modularity enables a system to shut down one function or geographic area without collapsing as a whole system. In such a way, the different parts can be temporarily cut off from the system or invested with an alternative use. In ecological systems, such patterns can be observed as a network of functioning units or nodes of increased interaction, and exchanges of energy. The nodes spatially do not necessarily display boundaries but are rather readable as hotspots of increased activity in the landscape. Individual units can appear and disappear, but if functions and patterns of distribution on broader spatial scales remain, the resilient overall form supports the life and health of a landscape system^[8]. Polycentricity within the cities has a similar function that allows them to disperse and connect activity spatially without exceeding their spatial and resource capacity.

3.5 Multi-Functionality and Ecosystem Services

Overlapping of uses and functions has a big potential for increasing ecosystem services in urban areas. Hydrological regimes, habitat diversity, sequestration of carbon, or buffering of climate extremes and other disturbances are important ecosystem functions that need to be integrated into a functioning and thriving city.^[3] They can demand more space temporally, such as the flooding of urban retention areas, where water recedes after or can coexist with human activity at the same time, such as ecologically restored urban rivers and green corridors in the city. If these functions are integrated within the urban landscape in an attractive manner, they support the human interaction with and experience of abiotic and biotic components and dynamics of ecosystems in daily life (Fig. 2). In such a way, they contribute to recreation, the physical and mental health of inhabitants, and foster respect for nature.^[9]

3.6 多尺度方法与嵌套系统

城市景观等复杂系统通常会多尺度协同运作。较小尺度的系统按层级嵌入较大尺度的系统，随着时间推移，每个系统都会受到它所包含的及包含它的其他系统的影响。^[10]因此，设计师需要意识到，即使是小范围干预或试点工程，也需在较大的战略尺度上考虑并预估其影响，这一点至关重要。通过多尺度上对这类过程进行初步分析与比较，可以发现一些关键信息，包括物质联系、相互依存性及临界阈值等。

4 韧性视角下的景观美学与感知

对于复杂动态的系统，需要采取韧性理念来应对其变化。这一观点已得到越来越多景观实践者和理论学者的认可，因为其提供了一套适用于保障城市各种重要功能和价值的策略。无论是小规模城市绿地（如植被廊道、复育的自然河岸、滞洪区等），还是拥有未受干扰的栖息地的更大规模的城市绿地，都对提升生物多样性、增强水体下渗能力、固碳、减少热岛效应等韧性目标的实现至关重要。结合“生态系统服务”概念，韧性的内涵从缓解城市环境中的负面生态影响（如温度调节），扩展到提供文化服务（如休憩）和供给服务（如食物），以此来支持城市的整体韧性。然而，在人口稠密的城市或大都会区，如何排布不同规模的城市绿地依然是一项挑战，需要在绿地建设与经济、居住、交通、基础设施等其他必要城市功能之间做出权衡。虽然其中一些功能也与韧性目标相契合，并可以与生态系统服务相结合，但这样做的前提是公众认可且的确存在相关需求，其次还须考虑政治意愿。

这便是韧性概念相对于更广义的“可持续性”概念的欠缺之处：后者不仅关注生态发展，也同样重视社会、文化和经济繁荣。如果我们仅将城市视作一个可以输入和输出的功能性生态系统，就会很快落入纯粹的功能主义设计观中。但如果没有配套资金和广大公众的支持，那些维持城市和生态系统活力的功能性设计方案也将无法实施；反之，如果这些方案不能够提升开放空间的品质、促进环境公平和文

3.6 The Multi-Scale Approach and Nested Systems

Complex systems such as urban landscapes function simultaneously at several scales. Small-scale systems are hierarchically embedded into larger-scale systems so that each one over time is influenced by the impacts of the systems that they enclose or that they are enclosed by.^[10] It is therefore vital for designers to consider and plan the impacts of even small interventions and pilot projects in the context of bigger strategies. Preliminary analyses and comparison of such processes at multiple scales can indicate important key points, for physical linkages, interdependencies, and critical thresholds.

4 The Role of Landscape Beauty and Perception in the Perspective of Resilience

A resilience-based attitude to managing change within a complex dynamic system has become popular by urban and landscape practitioners and theorists because it covers a variety of important functions and values we wish to provide for our cities under one umbrella. Small green areas within the urban environment such as vegetative corridors, restored natural river banks, rainwater retention zones, bigger green areas with inner undisturbed habitats, etc. are therefore vital for resilience goals such as biodiversity, water infiltration capacity, carbon dioxide sequestering, reducing the heat island effect and so on. With the notion of “ecosystem services” this expands from solutions to ameliorating negative ecological impacts of urban environments (e. g. temperature regulation), to cultural (e. g. leisure) and provisioning services (e. g. food), in order to support the overall resilience of a city. Allocation of space for bigger or smaller green areas in the densely populated city or metropolitan regions, however, is challenging as it competes with other amenities that city needs to provide, such as the economy, residence, transport, infrastructure and so on. Some of these uses can be combined well with the goals of resilience and integrated with ecosystem services, however only if there are public acceptance and demand for it, and subsequently the political will.

This is the point where the concept of resilience comes short to the more general term of sustainability that focuses on a social, cultural, and economic thriving as well as ecological. Imagining the city only as a functioning ecosystem of inputs and outputs quickly falls into a purely functionalist view on design. Yet functional solutions to retain the vitality of urban and ecological systems cannot be carried out without allocating the funds and without appreciation and support of the general

3. 艾尔河的生态恢复远不止将河道重新自然化。方案以一种独特的场地设计重塑了自然与人工之间动态的相互作用过程，使河流的生态功能重新展现在人们眼前。

3. Ecological restoration of the River Aire goes far beyond mere re-naturalization. Its ecological functions are revealed to human eye by poignant design and dynamic interplay between the wild and the cultivated.



化多样性，也很难得到民众支持。因此，韧性设计策略需要跳出功能或景观生态学的单一视角，将美学概念也纳入考量（图3）。

在环境系统自我运作的全部空间和时间尺度中，人们能够对景观环境进行体验的“可感知的范围”^[11]只是其中很小的一部分。但从上文中可发现，在人类与生态现象之间建立联系是非常必要的。尽管“对于人类而言，理解或关注超出其直接感知范围的现象并做出回应是十分困难的”^[12]，但设计师们仍然必须对生态动态过程影响人类视觉、身体及多重感知体验的机制进行更深入的了解。保罗·H·格博斯特等学者^[12]曾明确指出“人类不能直接感知生态质量”，也无法在没有相关知识储备的情况下洞悉环境系统中的所有变化；然而，人们仅凭直觉即

public. They can hardly be supported by the people if they do not contribute to the quality of open spaces, environmental equity, and cultural diversity. Resilient design strategies thus need to surpass functional considerations and Landscape Ecology alone — and include the notion of beauty (Fig. 3).

Our “perceptible realm”^[11] where we are able to experience our landscape surroundings, is small in comparison to the inner workings of the environment on all spatial and temporal scales, but as we see on the mentioned examples, it is crucial for connecting humans with ecological phenomena. While it is “difficult for people to understand, care about, and act purposefully upon phenomenon that occurs beyond our own direct experience”^[12], it is vital for designers to understand more precisely in what ways visual, body, and multi-sensory experiences of ecological dynamics do have impact on people. As Paul H. Gobster, et al. ^[12] clearly point out that “humans cannot directly sense the ecological quality” or grasp all dynamic correlations in environmental systems without previous knowledge. They can, however, intuitively respond to aesthetic experience without necessarily understanding what triggered

可获得审美体验，无需究其原因。因此，一些当代景观理论学者^{[13][14]}认为审美体验对“可持续性”的意义尤其重要，因为其能激发人们对于环境的共情、敬畏和关注，并推动文化价值观的传播。

因此，创造积极的形象、感知和人们直接参与生态过程对于城市生态功能区的建立至关重要。这其中包括通过激发人们情感和氛围营造的方式来提升人们对环境复杂性的敏感程度。不同于自然保护活动以教育的方式向人们传播生态知识和价值观，景观设计试图激发人们对场地的独特探索和解读，并对他们的感知进行引导。因此，设计韧性的重点需要从“传播模式”转变为“探索模式”，使人的角色从被动的接受者转变为主动接触周围环境的探索者。根据生态心理学研究^{[15][16]}，正是通过这种个人探索，人类才能从被动地远距离观看世界，转变为积极地参与和环境的互动，并树立新的价值观和行动准则。

因此，揭示、展现并艺术性地重新评估自然动态过程——包括生长、衰败、季节性洪水或维护机制（如修剪植被、调节地下水位和水流量）——可以成为传播和展示生态价值观的一种方式。人类需要在日常生活中、在更长的时间跨度和可感知的尺度下感受自然动态过程，这样才能产生显著的生态经验积累并在认知水平上有所显现。例如，人们每天都可以观察他们通勤沿途的野生草甸或潮汐公园，在其中感知季节更替、颜色变化、材质肌理、水位涨落，或是雨洪过后沉积物对原有地形的改变。如果将自然保护与城市绿地设计有机结合（例如在鸟类筑巢季节封闭部分通道），人们就会更为直观地了解、感悟自然的时间节律，并以此为启发来调节自己的生产生活节奏。临时性事件（如收获或修剪）甚或破坏性事件（如洪水或为维护植被而采取的火烧措施），都可以作为城市绿色空间中的一个事件或场景（图4）。

用超然、纯理性的态度去欣赏城市开放空间中的自然之美及其动态变化所展现的力量是不可取的；而这种欣赏也不仅仅是为了获取愉悦感。为了将人类与他们所处的生态和环境脉络联系起来，设计必须



it. Therefore, several contemporary landscape theorists^{[13][14]} claim that aesthetic experience is particularly important for sustainability since it has the power to trigger empathy, respect, and care for the environment and communicate cultural values.

Creating a positive image, perception, and direct involvement of people with ecological processes is therefore vital for the implementation of areas with ecological functions within the city. This includes engaging people emotionally and creating settings that help them to become sensitive to the complexity of the environment. Rather than educating people about ecological knowledge and values in an instructive way as nature conservation usually does, landscape architecture can stimulate people's individual exploration and interpretation of a site and reeducate their senses. Thus, the focus of designing for resilience needs to shift from a communication mode that assigns people a passive role, to enabling people's exploration of the surroundings by granting them an active role. According to Ecological Psychology^{[15][16]}, it is exactly through such individual Exploration that humans shift from passive, distanced views of the world to an active, participatory way of engaging with the environment and developing new values and actions.

Revealing, staging, and artistically re-evaluating natural dynamic processes such as growth, decay, seasonal floods, or maintenance regimes (e.g. trimming of vegetation, regulating water tables and water flow) can so become a way of communicating and displaying ecological values. Humans need to experience these in their everyday lives, over longer time spans, and in their perceptible realm, so that the ecological experience becomes palpable and reflected on a cognitive level. A wild meadow or a tidal park which is situated on a commuting route to work can be observed by people on a daily basis. One experiences the seasons, changing colors, textures, different water tables, and new sediment patterns after a flood. If the nature conservation aspect is proactively integrated into the design of urban green areas, such as partially closed access during bird nesting season, people learn about and reflect the schedules of nature as well as their own. Temporal events, such as harvesting or pruning, or even destructive incidents, such as floods or burning of vegetation as a maintenance measure, can be staged into an event, a spectacle within an urban green area (Fig. 4).

The experience of natural beauty and the power of its dynamic forces in an urban open space cannot be appreciated in a detached, rational manner. Neither is it only an act of pleasure. In order to unite humans with their ecological and environmental context, the design has to offer the opportunity for a transformative experience or an emotional breakthrough, where people start to feel and understand themselves as a part of

4. 人们在德国汉堡的艾尔北河岸边体验涨潮的乐趣。
4. Experience of an event of a high tide along the beach shore of the Elbe River in Hamburg, Germany.

在体验模式和情感氛围营造上有所突破，使人们渐渐感受到自己是一个更庞大的整体自然循环系统中的一个鲜活组成部分，而非置身其外的旁观者。这种体验可以使人类与某些更宏大、存在时间更久远的事物重新建立起联系，并为我们提供了一种审视过去与未来联系的特殊视角。

诚然，通过参加生物课程，或者教育性远足活动和解说性游览也能了解自然周期、增进对生态的理解，但是，直接参与到自然周期之中是一种令人激动的、美好的、发人内省的体验，对人的影响力也更强。这种在景观中的沉浸有两重含义：一是通过观察和深入思考其内部运作而获得审美体验；二是可以令人直接参与景观的营造和管理^[13]。这种对景观的形成、设计与养护过程的亲身参与对人们欣赏生态过程的意义愈发重要。那么，设计师应当如何运用这些知识和设计策略将人类与生态联系起来，从而提高景观韧性？

5 将生态和社会领域联系起来的韧性设计文化原则：欧洲城市案例研究

目前，许多欧洲城市正纷纷制定策略，试图通过空间设计手段（如改善绿色廊道和绿地的连通性、增加生物多样性、修复被破坏的城市水循环等）来提升场地韧性并实现相关的目标。居民对城市生态动态过程的参与、认同、关注和支持正在成为这些策略中越来越重要的部分。一方面，城市会组织各类公开辩论和参与性活动，将公众召集起来共同商讨美观的生态设施的建设事宜；另一方面，也鼓励景观设计师和城市规划师寻找具有美学价值、可展现生态动态变化的新方法。自然动态过程及其生态价值观因此被视为重要的艺术和文化遗产，受到了公众的广泛关注。

下文将在韧性视角下对一系列体现了上述观念的重新构建人与环境联系的案例进行逐一讨论。

5.1 城乡生活方式：通过公众的主动性参与提升开放空间的文化价值，以保障并建立起城市景观框架

近年来，柏林^[17]、汉堡^[18]以及慕尼黑^[19]这三个德国最大、发展最快的城市均已制定了全市域尺度的综合性城市景观策略，以构建一个

a greater whole, as an active part of natural cycles, and not merely outside observers. This experience can connect us, humans, back to something greater before us, and therefore present us with a perspective that connects our roots with a meaningful future.

Learning about natural cycles through biology classes or educational trails and guided tours can support an ecological understanding, but the direct experience of natural cycles as exciting, beautiful, and specular events has a much stronger transformative power. There are two aspects of such immersion in landscapes: one is the aesthetic experience of its inner workings through observing and contemplation, whereas another important part is the direct involvement in the making and taking care of landscapes^[13]. Contributing to the landscape's formation, design, and care with a hands-on approach or participation process are becoming increasingly important for people's appreciation of ecological processes. How can we make use of this knowledge and apply design strategies to connect people to their ecologies, thus fostering resilience?

5 Principles of a Resilient Design Culture for Linking Ecological and Social Realms: Case-Studies from European Cities

Many European cities are currently developing strategies to increase resilience and its goals with spatial interventions such as improving connectivity of the green corridors and spaces, increasing biodiversity, reconnecting the interrupted water cycles within the city, and so on. The involvement, acceptance, interest, and support for ecological dynamics within the city among its inhabitants are becoming an increasingly important part of these strategies. Cities are integrating the public in open debates and participation processes about implementing new attractive ecological amenities and also stimulating landscape architects and urban planners to find new ways to aesthetically enhance and stage ecological dynamics. The natural dynamics and their ecological values are thus brought to the attention of the general public as an important artistic and cultural heritage.

In the following, we will discuss several cases that display this trend, and position them in the light of resilience paradigm as working examples of re-connecting communities with their environments.

5.1 Urban-Rural Lifestyles: Securing and Developing an Urban Landscape Framework by Enabling the Cultural Appropriation of Open Spaces through Citizens' Initiative and Involvement

In recent year, the largest and fastest growing German cities Berlin^[17], Hamburg^[18], and Munich^[19] have developed

连续的城市绿地系统，并保障其能够抵御城市扩张和高密度建设的压力，实现长期发展。然而，这些城市已认识到，这些战略取得成功、获得认可、得以贯彻的关键在于市民发挥的积极作用。因此，这些城市的景观策略非常重视不同类型城市景观的特定文化内涵，以及整合那些对城市现状及未来发展产生影响的新兴生活形态趋势：哪些城市景观和开放空间有助于提升长远的空间竞争力？哪些空间类型应该进一步提升或重建？

5.1.1 德国柏林城市景观策略

柏林市“城市景观战略”将城市绿地分为三种类型：自然型（包括森林、湖泊、自然保护区、预留/保护用地，以及城市荒野区）、城市型（包括所有公园、休闲娱乐设施、城市广场、绿荫街道和林荫大道）和生产型（包括农田、自留地、社区花园、海滩种植带及宣教场所）。其中，通过生产型绿地，一股与DIY文化和城乡结合的生活方式相融合的建设潮流正在兴起：在很多欧洲城市中，出于对自我实现、自我表达、自我组织的需求，越来越多的市民参与到合作性空间营造中，包括城市园艺、养蜂、自建临时沙滩或运动场地，以及其他面向社区的项目。除此之外，还出现了另外一种显著趋势：人们既希望生活在城市中心以享受那里的多元文化和高效服务设施，同时也渴望与自然和乡村亲密接触——人们愈发意识到，这种渴望并非仅仅出于对本地生产的纯天然食品的需要。柏林市正在战略性地将这些后现代价值观和生活方式融入市民、媒介性使用者、空间开拓者和创业者的生活，整座城市也因这种融合而越发充满活力；参与者们也因此形成了环境责任感和对城市绿化的强烈认同感。最终，在公民的主动参与、决策、互动与培育下，形成了一系列新型空间。

5.1.2 德国柏林滕博尔霍夫机场改造项目

柏林城市景观策略的其中一项提议就是对前滕博尔霍夫机场进行改造设计。该机场于2008年停止运营，当时市政府决定建立一个管

comprehensive, citywide landscape strategies in order to frame and safeguard the long-term development of their green space systems as a continuous network despite the pressures of urban growth and densification. However, the cities are recognizing that it is vital to the success, recognition, and implementation of their strategies that citizens assume an active role in realizing them. Therefore, their landscape strategies put a great emphasis on considering the specific cultural meaning of different types of urban landscapes and integrating the emerging lifestyle-trends that define our present and future: Which urban landscape and open spaces will be needed in the long-term regarding space competitiveness? Which types should be further developed and newly established?

5.1.1 The Urban Landscape Strategy of Berlin, Germany

In its “Urban Landscape Strategy” (Strategie Stadtlandschaft) the city of Berlin distinguishes three different types of urban green spaces: natural (e. g. forests, lakes, nature reserves, conservation, and urban wildernesses areas), urban (e. g. new and historic parks and recreational facilities, city squares, leafy streets, and tree-lined avenues), and productive (e. g. farmland, allotments, community gardens, beach bars, and educational sites). With the latter category, they build on the actual trend of an increasing DIY culture and urban-rural lifestyles: In European cities in general, the need for self-realization, self-expression, and self-organization, engages more and more citizens into collaborative spatial practices like urban gardening, beekeeping, self-built temporary beaches or sports fields and other community-oriented projects. In addition to that yet another complementary trend is recognizable: As much as people tend to move into dense urban centers with a big selection of cultural and other urban amenities, they simultaneously long for direct contact and interaction with the natural and the rural as well. The increasing awareness of the importance of biologically and regionally produced food is only one aspect of it. The City of Berlin is strategically drawing on these post-modern values and lifestyles in order to support urban inhabitants, intermediated users, spatial pioneers, and start-ups, and is getting invigorated by their involvement. They, in turn, develop environmental responsibility and identify more strongly with the city’s greenery. The end results are new types of spaces in which citizens can be active, determine, interact, and grow.

5.1.2 Tempelhofer Feld, Berlin, Germany

One of the strategic projects of Berlin’s “Urban Landscape Strategy” is the transformation of the former airfield “Tempelhofer Feld.” When the airport was closed down in 2008, the municipality decided to create a management organization

5. 基于场地特有的开阔空间和多风气候特征，滕博尔霍夫机场现在已经被改造为一处可供市民进行骑行、跑步、滑冰和放风筝等新型休闲活动的场所。
5. The former airfield of the Tempelhofer Feld has become a place for new leisure activities such as cycling, running, skating, and kiting, responding to the unique vast, open and windy character of the site.

理组织，以积极寻找可以调动市民创造力与资源投入的合作性解决方案。2010年，工作组并没有为该区域制定固定的公园总体规划方案，而是将270hm²的大型机场向公众开放，仅对场地进行了一些细微设计，如引入标识系统、观测点/观赏台、信息箱、废弃物收集系统等。场地的自由性、不确定性和空旷感为多种活动（如在原跑道上骑车、滑冰、放风筝、漫步，在空旷场地上野餐、观鸟、瞭望等）的开展提供了可能（图5）。项目中的空间设计与审美体验极大地展现了公众的想象力与创造力，这在柏林的其他公园中非常少见。项目明确地将原有的大面积草地保护起来，以作为某些濒危动植物（如野生云雀，*Alauda arvensis*）的重要栖息地，公众也参与到这些物种的保护行动中。

此外，在2010年，市民们还受邀参加了公园“开拓性项目”建设活动，最终提出了19个成功的试验性方案，涉及艺术、园艺、教育、社会等领域，形式丰富多样。该活动共收到约270份申请，由来自政府、行政管理机构和民间团体的成员组成的评审团，对所有申请方案进行筛选。在整个机场改造过程中，与官方规划同步进行的还有市民们的积极参与，他们贡献了知识、想法与创意，以及资源投入。这一项目的成功要求每位参与者都拥有高度的社会责任感、敏锐性和变通能力。从这一市民和政府合力为城市打造的社会实验性项目中可以看到市民在公园建设过程中的角色转变——由“为他们设计”到“他们自己设计”，他们正以一种新的合作方式检验并实现其愿景。2014年，市民们在一次公投中反对在机场周边修建更多建筑的市政规划方案，以此捍卫了公园的开放空间。

5.1.3 德国汉堡绿色网络 and 高质量活动开放空间

“绿色网络”总体规划力图在汉堡市内建成一个公共绿地系统与主动性旅游线路相结合的、可达性强的城市网络，从而塑造汉堡的整体城市特色。该绿色网络包括三个组成部分：12条辐射状“景观轴”（这些绿色廊道基于当地独特的水文和地貌特征而建，连通了乡村地



actively looking for collaborative solutions based on citizen's creativity and input. Rather than developing a fixed master plan for the design of the park, in 2010 they opened the 270 hectares large airfield for the use to the general public only furnished with small-scale design interventions such as signage, observation points, infobox, waste collecting system, etc. The field's freedom, indeterminacy, and vastness offered a huge wealth of opportunities for fast and slow activities such as cycling, skating, kite-surfing, and strolling on the former runways, as well as picnicking, watching birds or gazing clouds in the seemingly boundless open field (Fig. 5). The emerging spatial practices and aesthetic experiences are completely different from any other urban parks in Berlin, capturing the imagination and creativity of the citizens. As an important habitat for several red-listed animals and plants (e. g. the field lark, *Alauda arvensis*), it was clear from the beginning that large part of the vast grassland should be preserved and that people have to be involved in respecting the needs of these species to survive.

Additionally, in 2010, citizens were invited to apply for space within the park to establish “pioneering projects,” resulting in 19 initiatives successfully experimenting with artistic, gardening, educational, and social ideas, creating a broad range of activities and programs. From around 270 applications, the selected projects were chosen by a jury made up of members from the fields of politics, administration, and civil society. Learning, inspiration, and input by the citizens' activities became part of the transformation of the former airfield, with the official planning running in parallel with the active. This demands a high degree of responsibility, sensitivity, and flexibility from everyone involved. It shows that it is possible to develop a park not only for but by the people, based on the social experiment of citizens and the municipality jointly shaping their city, testing and implementing ideas in a new form of coexistence. As a result of their empowerment, it was a citizens' initiative that managed to defend the open space of the park against municipal plans to cover the outskirt area of the airfield with buildings in a 2014 referendum.

5.1.3 Green Network and Quality Campaign Open Spaces, Hamburg, Germany

The “Green Network” (Grünes Netz) is a master plan to develop a network of interconnected and easily accessible public green spaces and active travel routes in Hamburg, shaping the city's identity. The Green Network consists of three elements: 12 radiating “landscape axes” — green corridors that are determined by distinctive hydrological and morphologic features and reaching from the countryside right into the city center; two

区与城市中心)；两个“绿环”(围绕市中心形成的内外两层连续绿带)；以及众多大小不一的、分散的城市休闲绿地(如城镇公园、区域性公园和城市休闲区)。

这个综合系统对于城市的绿色基础设施十分宝贵：既为市民提供了休闲娱乐空间，也有助于提升生态多样性、雨洪管理和城市微气候调节。虽然绿色网络是汉堡在当代景观领域做出的一种政策引导，但汉堡的公共开放空间仍然面临来自住宅、商业以及交通建设项目的巨大压力，绿色网络建设也深受影响，其在部分地区被迫中断或缩减，且在许多地方丧失了地域特色。针对这一问题，汉堡发起了一项富有成效的“捍卫运动”，来推动绿色网络中的特色风貌建设，修补城市特色景观，加强与邻近社区及非机动车方式游览路线的结合，并提升公众对汉堡开放空间系统的认可度。

5.1.4 德国汉堡“你的格斯特”全民参与项目

汉堡开展了一系列提升开放空间质量的实践活动，“经典格斯特”景观轴线改造项目是其中的一个试点项目，旨在提高该区域景观品质及市民的认可度。^①这一景观绿色廊道始于汉堡中央车站，从市中心沿城市主干道向东延伸。当地将一种在冰河时代形成的独特地貌称为“格斯特”，该景观廊道沿着格斯特地貌边界，在致密的城市肌理中形成了一条从西向东的线状斜坡。轴线长达9km，沿线连接着不同公园、私有花园、墓园和生物栖息地，以大型景观节点奥真多佛湖区为终点。

从城市发展和社会文化的层面看，这条景观轴线穿越的建成区肌理是高度异质性的。因此，除了城市生态功能之外，它还需为周围高密度居住区的居民提供社交空间。作为“经典格斯特”景观轴线新总体规划项目的一部分，汉堡市启动了一个全面、多层次的、信息公开



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“green rings” formed by the connected green spaces in an inner and outer loop around the core city; and a series of scattered recreational green spaces within the urban areas on different scales, such as borough parks, district parks, and urban leisure areas.

This comprehensive system is highly valuable for the city's green infrastructure, providing recreation and leisure opportunities as well as supporting ecological diversity, flood mitigation, and the urban microclimate. Although the Green Network is an integral part of the contemporary landscape policy for Hamburg, its public open spaces are under immense pressure from increasing residential and commercial as well as traffic development projects. Therefore Hamburg's unique Green Network has been diminished, partially interrupted and, in many places, lacks distinctive identity. Therefore, a quality campaign was launched in order to support the development of the Green Network's distinctive features, to close gaps and missing links, to improve the connection with the adjacent neighborhoods and non-motorized travel routes, and to promote public acknowledgment of Hamburg's open space system.

5.1.4 Citizen's Project "Your Geest," Hamburg, Germany

One of the strategic pilot projects of Hamburg's open space quality campaign is the transformation of the "Horner Geest" landscape axis, aiming to increase both its quality and recognition by the citizens of Hamburg.^① Its landscape green corridor starts right at the central station of Hamburg running eastwards from the city center, mostly alongside main roads. It follows the edge of the "Geest," a distinctive topographical feature that developed in the ice age, forming a linear slope from the west to the east within the dense urban fabric of the city. The landscape axis connects different parks, allotment gardens, cemeteries, and biotopes along its 9 km length, ending in a large landscape area around the Ojendorfer Lake at the city's periphery.

It passes through a built fabric which is extremely heterogeneous from an urban development and socio-cultural perspective. Therefore, in addition to its urban-ecological functions, the landscape axis plays an important role as an area of social interaction for those living in the adjacent densely populated neighborhoods. As an integral part of the development of a new master plan for the "Horner Geest" landscape axis, the municipality launched a comprehensive, multi-level citizen information and participation project with the title "Your Geest." For the first time, citizens were able to actively propose and directly decide how 1 million Euro of funding should be used. As a part of the public campaign

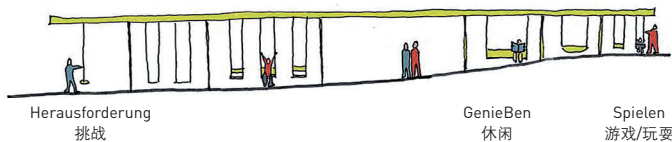
① 更多信息请访问：<http://www.hamburg.de/deinegeest/>。

① For more information, please visit <http://www.hamburg.de/deinegeest/> (in German).

6. “你的格斯特”宣传单：当地民众可从此类宣传品中获取有关汉堡“经典格斯特”景观轴线的协同设计与营造的信息，并参与其中。

6. "Your Geest" newspaper as a way of informing and activating citizens to participate in the process of co-design and co-production of the Horner Geest Landscape Axis, Hamburg.

7. 由市民提议的“格斯特秋千”项目利用当地特有的格斯特地貌中的14m等高线作为秋千的定位参考线。
8. 通过市民与景观专家的积极协作，汉堡市“经典格斯特”景观轴上的秋千项目建成并投入使用。
7. Proposed citizens' project "Geest Swing," using the height of the exiting Geest contour line 14 m as a reference for positioning the swings in the landscape.
8. Testing and developing the idea of the swings in the Horner Geest landscape axis, Hamburg, in cooperation between citizens and professional landscape experts.



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的全民参与项目，命名为“你的格斯特”。这是有史以来市民第一次获得主动参与权，并决定100万欧元的项目经费该如何使用。通过公开征集公众意见并举办设计创意竞赛，市民们可以为这座“汉堡最长的公园”的具体功能和项目安排提出他们的设想。为了让人们更好地了解这一项目，政府开展了全面的宣传活动，包括设立门户网站、分发传单及项目宣传册、提供导览，并组织了现场活动和其他临时性活动（图6）。

最终，共有1 600名公民和一支专业评审团参与了提案投票，并选出了12个项目投入建设，包括一个公共厨房、一个城市园艺工程、一处蝙蝠观赏草地和一座大型秋千。所有项目都将按照精心策划的参与式流程进行建造。目前，所有实施中的市民项目正逐渐被纳入城市总体规划之中；除市民项目外，总体规划还包括一条新的步行和骑行路线、标识系统，以及为了给当地鸟类和昆虫创建栖息地而补植的树木和特别设计的野生草甸。通过这种共同设计创作的全过程参与模式，市民们积极融入到“经典格斯特”景观轴未来愿景的描绘和实施过程中。政府也希望以此促进公众更多地参与城市绿色廊道的维护和使用，并认可其空间与生态特质（图7，8）。

5.2 少即是多：整合天然荒野地区，增进人们对动植物多样性、自然过程的动态特征，以及自然节律的体验

提升城市景观的生物多样性与栖息地连续性这一生态目标需要我们做出切实的行动。欧洲城市已经逐渐认识到并开始重视荒野地区的文化价值和社会意义。这不仅需要将那些天然形成的、未受干扰的荒

and open ideas competition, citizens could submit their ideas for specific features and projects for “Hamburg’s longest park.” In order to inform the citizens about this opportunity, a comprehensive information campaign was launched, including setting up a web-portal, distributing leaflets and project-newspapers, offering guided tours, organizing on-site events, and temporary actions (Fig. 6).

Finally, 1,600 citizens and a professional jury were part of the final voting on the winning proposals and 12 projects were selected to be implemented. They include a public kitchen, an urban gardening project, a bat watching meadow, and a huge swing, all developed by a curated participatory process. The citizens’ projects that are currently in the process of implementation, are integrated into the development of the general master plan that includes a new route for pedestrians and cyclists, signage system, and newly planted trees and wild meadows as a biotope designated to support the bird and insect populations in the area. By engaging the citizens in a comprehensive process of co-design and co-production, they became actively involved in determining the future existence and meaning of the Horner Geest landscape axis. With that the city hopes to engage people more strongly in the care and use of the green corridor, as well as acknowledge its spatial and ecological qualities (Fig. 7, 8).

5.2 Less Is More: Integrating Spontaneously Developed Wilderness Areas to Support People’s Experience of the Diversity of Flora and Fauna, Dynamic Characters of Natural Processes, Growth, and Decay

To support biodiversity and connectivity of habitats in urban landscapes is not just an ecological goal. European cities are



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野区域融入城市绿色网络中，还需开展一系列旨在唤起人们对荒野区域及野生动植物的好奇心和热情的社会活动——为了缓解城市生活的压力，人们对无人工建造痕迹的自然的体验需求越来越迫切；这些项目还需要将这一趋势与提升生物多样性的目标相结合。

5.2.1 德国“城市中的野趣自然”国家计划

德国联邦自然保护局向全国的城市地区生物多样性提升计划提供了资金支持。其中，在日常生活中增加人们与天然荒野的接触是自然保护目标的一个重要部分。作为一个全国示范项目，法兰克福、德绍-罗斯劳和汉诺威这三座德国城市建立了一个联盟，在2016~2021年期间联合开展“城市中的野趣自然”计划。^②这些城市目前正处于策略制定和试点项目开发阶段，通过这样的方式来维持和增加城市绿色网络中荒野区域的数量及生物多样性，这其中包括再次发生自然演替的后工业遗址，以及郊野花园、森林和城市内未受干扰的小型植被斑块。这种新的城市自然景观由不同的游径相衔接，可供人们在此冥想和开展各类休闲活动。

每周的文化活动不仅针对环保主义者和自然爱好者，还面向更广大的公众，向他们提供从野外探索游览到露天音乐会等一系列活动（图9）。这些活动促进了市民们重新体验和发现荒野之美。公众起初担心这些区域存在安全隐患、疏于照管，但这种与众不同的城市景观展现出的令人兴奋和富有美感的魅力抵消了上述顾虑。项目的长期目标是使城市荒野区域受到更多市民的认可、欣赏与喜爱。差异化的维护策略同样发挥着重要作用：通过强化和构建景观形象并提高荒野区域的可达性来消除人们对安全和杂乱问题的担忧。这三座城市已经建立了线下网络和在线门户网站，用于促进与试点项目开发及实施相关的想法和知识交流，并通过教育性活动和景观维护措施，着重传达对自然的尊重和欣赏。



increasingly recognizing and developing the cultural significance and social meaning of wilderness within the cities. Not only by allowing for and adding new areas of spontaneously developed undisturbed areas to their green space networks, but also by developing social programs aiming at waking enthusiasm and curiosity about untamed wilderness and wildlife among the population. These projects draw on an increasing trend of the human need to alleviate stressful urban lifestyle with undisturbed nature experience and link it to biodiversity goals.

5.2.1 National Program “Cities Take a Chance at Wilderness,” Germany

The German Federal Nature Protection Agency offers funds to individual cities which are motivated to increase the biodiversity in urban areas. A vital part of this, otherwise nature conservation-oriented goal is to also increase human interaction with spontaneous wilderness on a daily basis, through leisure activities. As a pioneer project on a national level, the three German cities Frankfurt am Main, Dessau-Roßlau, and Hannover built an alliance to jointly carry out the program “Cities take a chance at Wilderness” (Städte wagen Wildnis) from 2016 to 2021.^② They are developing strategies and pilot projects to protect and increase the amount as well as the biological diversity of their urban wilderness areas within their green networks. These include postindustrial sites again conquered by natural succession, wild gardens, forests, and smaller islands of undisturbed vegetation within the city. This new urban nature is being connected by trails and made accessible to people for contemplation and leisure activities.

Weekly cultural happenings are targeting not only conservationists and nature-loving enthusiasts but above all the broader public and offer diverse events from discovery excursions to open-air concerts in the wild (Fig. 9). These are inspiring citizens to experience and discover the beauty of the wilderness anew. The general public concerns that such areas are dangerous and neglected are challenged by promoting and uncovering the exciting and aesthetic aspects of this unusual landscape image in the city. The long-term goal is to develop bigger acceptance, appreciation, and love for the wild among the city’s population as a whole. Differentiated maintenance regimes are playing an important role, as they help ameliorate concerns about security and tidiness by accentuating and structuring the landscape image and offering access to such wilderness areas. The three cities have created networks and online portals to exchange ideas and knowledge on developing and implementing pilot projects that emphasize the respect and admiration for nature through educational events as well as by maintenance measures.

② 更多信息请访问：
<https://www.staedte-wagen-wildnis.de/>。

② For more information, please visit <https://www.staedte-wagen-wildnis.de/> (in German).

9. 德国法兰克福市策划发起的短途旅行项目——“野外之旅”

9. The excursion “Into the Wild” in Frankfurt, Germany, curated by the city.

10. 通过开辟林间空地，人们可以在此欣赏艺术化处理的草甸景致，这为人们欣赏身边熟悉的景观提供了一种新的视角。
 11. 赫罗纳市及其周边景观的绿色网络中某节点的维护计划。这种差异化的维护策略使景观的生态性与体验性均得到了增强。
10. A clearing with a view to the landmark and patterns in the meadow activates a fresh perspective on a known landscape.
 11. Action and maintenance plan at one of the points of the green network, encompassing the City of Girona and its landscape surroundings. Both ecological and experiential aspects of the landscape are enhanced.

5.2.2 西班牙赫罗纳海岸

由景观设计师马蒂·弗兰奇发起的一个位于西班牙赫罗纳市的都市设计项目也运用了自下而上的设计措施，并体现了上述目标。弗兰奇是EMF景观设计事务所的创始人，他希望家乡能拥有一个绿色基础设施网络，将城内及周边丰富、优质的绿地资源连接起来，包括当地的4条河流。他认为，让人们认识到当地景色的魅力会促使他们更加珍视周围的环境^[20]。他发现，尽管当地以造型化的松树、橡树、柏树等为元素的地中海庭院景观极具特色，但对于市民而言，这些位于城市边缘地带的景观却只是遥远的背景，以致这些区域常被误用作处理生活和建筑垃圾的场所，其在休闲活动和自然体验方面的潜力并未得到重视。

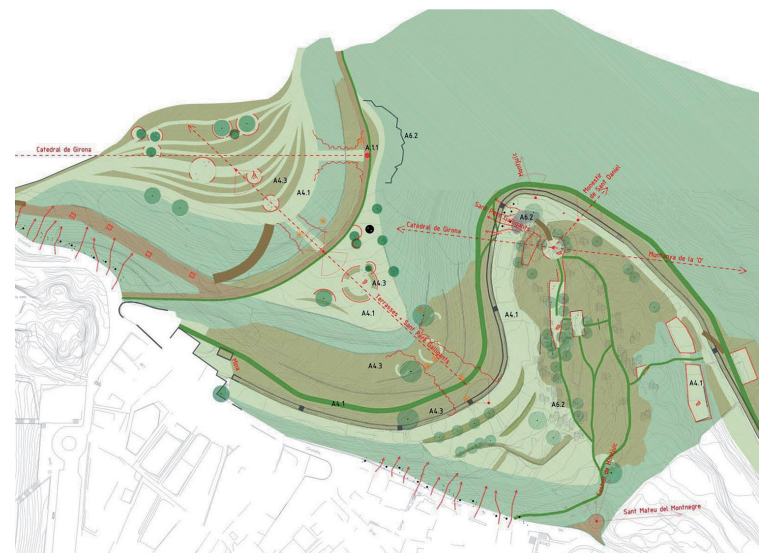
弗兰奇试图通过对原有场地进行简单的设计来激发场地活力，这些设计都旨在切实地解决上述问题，且成本低廉，例如清扫重要景点、开辟河岸沙滩以形成良好的河流沿岸景观、策略性地创建城市步行网络、在重要节点设置小型艺术装置，以及在同质地块中引入人类大地艺术的处理手法等（图10）。在项目中，他将景观维护措施作为主要手段，其中绝大部分是减法式的，如清理、割草和修剪；并建议赫罗纳市政府将这些措施纳入市容管理团队的定期维护工作。他没有制定总体规划图，而是根据对不同地点的反馈性与敏感性分析，分别制定出因地制宜的行动计划（图11）。



5.2.2 Girona Shores, Girona, Spain

In the Spanish city of Girona, a design-generated and bottom-up approach with the same aim as described above arose from the initiative of a landscape architect. Martí Franch, the founder of EMF landscape architecture office, had a vision for a green infrastructure network in his hometown, which would connect abundant and stunning green spaces in and around the city, including its four rivers. He was convinced that revealing the beauty of the local landscape to its inhabitants would encourage people to value their surroundings more^[20]. He could observe that in spite of the iconic beauty and charm of the local Mediterranean marquis landscape with its sculptural pines, oaks, and cypresses, the landscape in the city's periphery was perceived by the citizens as a mere background, which leads to it being mistreated by disposing of household and building waste. It also was not in focus for recreation, leisure or nature experience, in spite of its potential.

Franch embarked on a mission to change that by defining simple interventions in this setting which were not costly but were to address all these issues. These should activate the already existing beauty and potentials of different sites by clearing up stunning views, cleaning sand beaches on the banks of lush rivers, strategically developing a pathway network, setting up small art installations on important nodes, and land-art like clearings accentuating extensive homogenous areas (Fig. 10). In his project, the main modus operandi was to change the maintenance regimes, mostly by the act of subtraction, such as clearing, mowing, and pruning. Franch proposed his idea to the municipality of Girona, to integrate it into the regular maintenance works by the city's maintenance teams. He did not impose a master plan but developed an action plan, which grew and got formed by the reflective and sensitive analysis on the site (Fig. 11).



和其他众多城市一样，赫罗纳市在建设与维护开放空间方面的预算有限，只会在十分必要时才进行相关作业，且所雇用的工人常常未经专业培训，采取的措施也都十分笼统，未考虑到场地差异性。然而，弗兰奇所采用的这种自下而上的设计模式证明，在极少的成本预算及缺乏大规模支持的条件下，也能造就具有重大意义的项目；唯一需要的是要有一位经验丰富的景观设计师或园丁来对项目进行指导和把控。

在项目中，弗兰奇的主要贡献在于制定了一个差异化的维护计划——加强对那些访问量大的景观节点的定期维护，而相对减少其他区域的维护措施。这种差异化维护策略不仅可以减少部分景观的维护费用，促进人们发掘景观魅力，还有助于提升当地的生物多样性。例如，那些草类和先锋植物长得较高的区域，可以成为野生动物的栖身之所；相反，在另一些区域则通过定期修剪来营造低矮、整齐的景观。这样可以创造出包含不同演替阶段的丰富景观格局，也进一步提升了生物多样性。

该项目最终决定将55%的土地设为非干预区（以便植被向树林和灌丛演替），保留25%的地区作为高地草原（待到花期结束后，在冬季对其进行修剪），仅在17%的土地上策略性地选择特定地点，每年修剪6~8次（以适应人们高强度的使用）^[21]。这些多样化的景观斑块和节点构成的马赛克式设计由一个新的临时性道路系统串联在一起，行走在这些从草地中开辟出的路径上本身也是一种体验，随着植被生长，沿途的景致每年也会呈现不同的面貌。项目中一些受欢迎的场所（如那些已经举办过文化活动的场所）则可能被永久保留下来（图12）。

5.3 任其流动：让河流动力学做功，提升生物净化能力，以强调并展示生态功能过程，构建新的人—水联系纽带

在未来，气候变化会导致严重的暴雨与热浪事件愈加频发；城市的持续扩张及高密度化发展致使硬质地表面积不断增加，地表径流也随之增多。此外，大规模的森林砍伐和农业用地集约化降低了景观蓄水能力，并加剧了河流泛滥；城市密度增大也加剧了热岛效应。为更好地防患于未然，欧洲城市基于“海绵城市”手段提出并推行了一系列新策略及试点项目，以促进场地的储水、下渗和蒸发。与此同时，

As in many other cities, also here the construction and maintenance of open spaces are acutely underfunded. Only the necessary is being done, often based on the work of non-trained personnel, on a large scale and with little differentiation. Franch's bottom-up initiative, however, shows that a landmark project can be implemented with very little or no extra cost on a very extensive scale. The only asset that needs to be present is a landscape architect or an experienced gardener as a curator and conductor.

His role is to develop a differentiated maintenance plan, based on a strategy of increasing the maintenance effort at punctual interventions in spots which are well visited and observed and reducing it in others parts of the landscape. It is vital to apply differentiated maintenance regimes, not only to reduce the costs and boost the beauty of landscapes but also to increase the biodiversity. In some areas, the grass and pioneer vegetation can grow higher to provide shelter for wildlife, while in contrast other parts can be mown regularly to look short and tidy. This creates rich landscape patterns of different successional stages and thus supports the biodiversity.

This resulted in the decision to leave 55% of the land without intervention (so that the vegetation can reach the succession stage of forest and bushland), to keep 25% as a high prairie (mow grasslands in wintertime after the blooming season is over) and to cut only 17% of the area at strategically selected sites 6 to 8 times a year (to allow for intensive use and appropriation by the citizens)^[21]. This mosaic of diverse landscape patches and attractions is connected by a new temporary path system, cut in the grass, putting emphasis on the ephemeral experience. The vegetation will grow and offer an opportunity for a different trail next year. The beloved sites, which are already being invested by organized cultural events, might stay (Fig. 12).

5.3 Let it Flow: Enabling Fluvial Dynamics and Improving Biological Purification to Emphasize and Stage Experiences of Performing Ecologies as a Basis for New Connections between People and Water

The impacts of climate change bring about more frequent occurrences of severe cloud-bursts and heat-waves in the future. The increasing growth and densification of cities is leading to an expanded surface sealing and consequently in the larger volume of run-off water. Additionally, large-scale deforestation and intensification of agricultural land-use reduce the amount of landscape water-holding capacity and cause flooding of rivers. At the same time, the increasing densification of cities increases the urban heat island effect even further. In order to be

12. 图中展示了赫罗纳海岸项目中最基本的维护措施，在差异化的维护计划中，这些措施可转化为不同的设计工具。

12. An image showing the most basic maintenance measures at Girona Shores Project and how they turn into design tools when applied in differentiated maintenance plans.

自2000年《欧盟水资源框架公约》提出“流域综合管理”概念以来，河流修复项目开始在欧洲不断涌现，项目大多涵盖了水质改善、生态价值提升、增强河流空间对公众的可达性和吸引力等目标，且不少项目场地条件非常有限。

5.3.1 德国柏林弗拉斯巴德河流修复项目

柏林弗拉斯巴德河流修复项目旨在对柏林老城区内的城市河流系统区段进行净化和改造，将其打造为新的城市生命线，使人们能够在沿岸居住、游泳，并与水重新建立联系。项目选择位于费希勒塞尔地区与博德博物馆之间、长约1.8km的施普雷运河作为设计对象，力图将这里打造为受市民欢迎的全新河流空间。水体在流入河道前，将首先经过一个大面积的自然植物过滤带进行过滤，之后汇入一个河池中，可供人们在下游河段中游泳。

当地的河浴传统因1925年施普雷河流重污染事件而被迫中止。这一项目不仅可以使这一古老的传统得以恢复，也可以提高柏林市民对河流的保护意识。该项目还是一项倡导重新关注城市河流的国际运动的一部分，呼吁人们认识到河流作为城市社会和生态资源的宝贵价值。基于上述观念，该项目已在一个由超过400人组成的协会推动下投入实施，不仅得到了德国联邦政府和柏林地方政府的资金支持，还获得了来自当地民众与国际社会的广泛支持和认可。

这个宏大计划的规划和实施过程并非一朝一夕能够完成。非营利机构“柏林弗拉斯巴德河”致力于整合多方力量，以广泛吸引各界关注，并证明项目的可行性，例如：通过举办一年一度的“柏林弗拉斯巴德杯”游泳比赛来测评河道的使用情况；在40m长的河流驳船内安装过滤器测试样机，为技术可行性研究提供实证数据；建立“弗拉斯巴德学院”，与众多本地和国际院校开展合作，建立研究和教学计划；

better prepared to counter potential flooding and overheating, European cities promote new strategies and pilot projects to retain, soak, and evaporate more water on site, based on the “sponge city” approach. At the same time, river restoration projects became widespread in Europe since the establishment of the European Union Water Framework Directive for integrated river basin management since 2000. The aims to improve water quality, enhance ecological value, and improve access and appeal of river spaces for the general public must often be reconciled within a very restricted space.

5.3.1 Flussbad Berlin, Germany

The “Flussbad Berlin” project seeks to purify and transform a part of the urban river system in the historic centre of Berlin to become a new lifeline for the city, enabling people to inhabit its banks, to swim, and to re-connect with water. It aims to develop the Spree Canal, extending over a length of roughly 1.8 kilometres from the Fischerinsel to the Bode-Museum, into a new river space for people. The water entering the canal will be filtered by an extensive natural plant filter and then flow into a river pool within the canal which allows for swimming further downstream.

By taking up and re-interpreting the tradition of historic river baths, which disappeared in 1925 when the river baths had to be closed due to the Spree River’s heavy pollution, the project raises awareness among the local urban population of Berlin. It is part of an international movement that puts the spotlight back on urban rivers as valuable both social and ecological resources. In recognition of these values for the city, the project which is being developed through an association with more than 400 members, is financially supported by the German Federal Government and the State of Berlin and has gained a large public support and acknowledgement, not only locally but also internationally.

As the process of planning and implementing this ambitious project will take time, the non-profit association “Flussbad Berlin” pulls on different strands in order to draw attention to the project and to bring about its feasibility: They test the use of the channel by hosting a yearly swimming competition in the river (“Flussbad Berlin Cup”), they implemented a prototype test filter within a 40 m-long river barge in order to provide a practical proof to their technical feasibility study, they founded a “Flussbad Academy” cooperating with different local and international schools and universities to set up a research and teaching programme, and they built a “Flussbad Garden” on the shore of the river at the future project site, which serves as a public space for meeting,

TIPOLOGIA D'ESPÀIS I GESTIO ASSOCIADA
空间类型与相应维护措施



在未来项目场地的河岸上建立“弗拉斯巴德花园”，用作公共集会、交谈、思考和实验空间（图13）。

总体来说，柏林弗拉斯巴德河流修复项目提供了一个具有预见性、整体性和实操性的途径来处理大多数城市河流所面临的严重问题：污水系统溢流造成的水体污染——在柏林，这一现象在每年雨季大约会发生20~30次。通过营造一个具有展示功能的水环境来净化城市河流系统中被污染的或未被充分利用的水体，创建更多的亲水空间，并在城市中心创造出一个有吸引力的非商业公共空间，该项目展现了“生态公民权利”^[22]在创造属于人民自己的韧性城市空间过程中所发挥的力量。

6 结论和展望

“人类必须通过‘生物所形成的特有语言’来认识这个世界，从而发现组成世界的动态联系，而非仅将之看作离散事物的简单集合，并将管理这种复杂生命系统的实践当作一门艺术。”

——安妮·惠斯顿·斯本^[23]

当我们回顾上述欧洲城市的战略和项目时，可以看出它们都践行了前文所述的韧性原则，一以贯之地秉承了生态和社会文化策略。绿色廊道与斑块的空间连通性可以促进人与动物在由不同栖息地组成的互连网络中迁移，并为人类提供了浸入大自然体验生态的可能。差异化的景观维护策略有助于形成丰富的生态景观斑块，并支持生态和社会的多样性和差异性。通过将自然保护或森林管理的维护和设计方法与景观设计相结合，人类和其他物种栖息地的质量、多样性以及连通性均可得到提高。

在遵循自组织、密切反馈循环、自下而上能动性，以及相互学习原则的同时，公民的想法、创意和能动性皆可融入景观设计的过程中。通过这种方式，顺应社会趋势的创新解决方式成为了多阶段性项目的重要一环，由公民推动建设的、具有明确时间计划性的项目则标



talking, thinking and experimenting (Fig. 13).

Overall, the project provides a visionary, holistic and hands-on approach to deal with a severe problem that most urban rivers are suffering from: The pollution from overflows of the sewage system, which happens in Berlin roughly 20 to 30 times per year during periods of heavy rain. By purifying a dirty, unused part of the urban river system through provision of a performative water environment, facilitating access to the water, and creating an attractive, non-commercial public space in the middle of the city, the project demonstrates the power of “ecological citizenship”^[22] toward creating resilient urban spaces by and for people.

6 Conclusions and Outlook

Humans must learn to speak the language “in terms of which living things are organized,” in order to read the world not as discrete things, but as dynamic relations, and to practice the art of managing complex, living systems.

— Anne Whiston Spirn^[23]

When we reflect the above-mentioned strategies and projects of European cities, we can recognize consistent ecological and socio-cultural strategies to implement the resilience principles described in the article. Spatial connectivity of green corridors and islands supports the migration of people and animals through interlinked networks of different habitats. It also grants access to the hearth of the nature experience and ecology to humans. Differentiated maintenance regimes help diversify the landscape mosaic of biotopes and supports ecological and social diversity and variability. By connecting the maintenance and design methods of nature conservation or forest management with those of landscape architecture, we can increase the quality and diversity as well as connectivity of habitats for non-human species and humans.

Citizens’ ideas, creativity, and initiative can be integrated into the process of landscape design, applying the principles of self-organization, tight feedback loops, bottom-up initiatives, and mutual learning. In this way, innovative solutions building upon societal trends become part of multistage participatory processes, where punctual projects developed by citizens mark a new era of a democratic and hands-on approach in decision making and making of the landscapes. Such adaptive concepts can result in projects where humans adjust to ecological cycles, enjoy them, and learn from them, instead of opposing them. Ecosystem services embedded into the urban fabric require multi-functionality, which allow people to come in contact with natural dynamic processes in their everyday lives, enabling new experiences and social practices and increasing the awareness of the interdependencies and respect

13. 作为柏林弗拉斯巴德河流修复项目的一部分，通过在40m长的河流驳船内安装过滤器测试样机，为位于柏林老城区的施普雷运河自然净化系统的技术可行性提供实证数据。

13. The prototype test filter of the “Flussbad Berlin” within a 40 m-long river barge provides a practical proof to the technical feasibility of the nature-based purification system for the Spree Canal in the historic centre of Berlin.



志着景观决策制定和营造进入了一个强调民主与参与的新时代。基于这种理念改变的项目，可以使人们适应生态循环、向自然学习、享受自然，而不是站在自然的对立面。将生态系统服务嵌入城市结构中的做法体现了对于多功能性的追求，这样可以使人们在日常生活中感受到自然的动态变化，进一步激发新的体验与社会实践，提升人们对于所有生命形态之间的相互依存关系的认识，并激发敬畏感。

上述各个尺度的过程都被嵌入彼此相互关联的景观系统中，每个栖息地、蓄水区、休闲空间网络都是保障城市功能的不可或缺的一部分，它们都离不开当地居民的支持与参与。每个项目都通过在这种嵌套体系中重新建立身份认同感、营造景观要素及其生态循环过程中多样的美学特征与体验等手段来实现以上目标。对现有景观格局的细微调整、营造鲜明对比和惊喜感，以及兴趣的激发，都会驱使人们重新感知景观，从而满足好奇心，获得启迪。

综上所述，对景观内在之美的认识已经从传统的静态风景概念逐渐转变为一系列动态过程的集合。在欣赏景观的过程中，通过将规律性活动与突发性活动结合起来，并将之转化为统一的体验，人们不仅能够欣赏到景观的外在之美，也能深入地了解其内蕴与意义。偶遇野生动物、亲手种下一棵苹果树、在荒野上忽然看到壮观的景色或大地艺术作品、听到洪水涌入城市广场的声音，或在都市的荒野中探索出一条路……这些令人兴奋的景观体验都来源于景观韧性，也源自生态原则与基于自然的技术手段的结合。将这类美学体验融入我们不断提升的城市生活，将有利于人类的观念从以自我为中心向以生态为中心转变，这也是赋予社会生态韧性以文化内涵的先决条件。**LAF**

for all forms of life.

All this is nested into landscape systems interconnected at all scales. Every habitat, water retention area, or a network of leisure spaces needs to be part of a functioning system, which has to involve the local population and support their engagement. Each of the presented projects acknowledges this fact by fostering new identities, the different characters of beauty and experience of landscape elements and their ecological cycles within the nested scales. By slightly changing the patterns, creating contrasts, surprises, and transitory moments of interest in an already known landscape the user is motivated to perceive it anew, to get curious and inspired.

This moves the intrinsic beauty of a landscape as composition of dynamic processes to the center of our attention and slowly replaces its traditional notion as a static picture of a scenic view. By connecting punctual and sudden events with gradual changes over time into a unified experience, the user not only sees the surface of the landscape but embraces and uncovers its meaning. The excitement of encountering a wild animal, of planting your own apple tree, of a spectacular view or land art intervention suddenly opening up in the wild landscape, of listening to the sound of flood rushing into an urban square or discovering your own trail through an urban wilderness are all aspects of resilience as much as ecological principles and technical nature-based solutions. To enable these kinds of aesthetic experiences as a part of our increasingly urban lives help us humans to shift from an egocentric to a more bio-centric perspective as a precondition for a culturally embedded form of socio-ecological resilience. **LAF**

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