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RESEARCH PROJECT
BY BRENNA CASTRO
& HAVEN KIERS

Keeping Up

Maintaining Biodiversity
in Public Landscapes



ATLAS
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UC DAVIS
LANDSCAPE ARCHITECTURE
& ENVIRONMENTAL DESIGN



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“A designated, managed wilderness is, in a very important sense, a contradiction in terms. It could even be said that any area that is proclaimed wilderness and managed as such is not wilderness by these very acts! The problem is that the traditional meaning of wilderness is an environment that man does not influence, a place he does not control.”

— Roderick Nash, *Wilderness and the American Mind*.

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“We can design a biodiverse landscape, but if it isn’t maintained accordingly, it will fail.”

— Anonymous Comment, 2024 Biodiversity Survey, ASLA

ABSTRACT

The biodiversity crisis is a top priority among landscape architects, whose work is uniquely positioned to increase biodiversity and habitat in human-dominated landscapes. Yet there is a critical knowledge gap between the design of high-biodiversity landscapes (through naturalistic planting and other innovative design approaches) and the successful management and maintenance of these landscapes for long-term performance.

This problem is especially acute in large-scale public landscapes such as education campuses, institutional campuses, and public parks, where maintenance budgets are limited and conventional mow-and-blow practices dominate. To be successful, a large-scale naturalistic landscape must be fiscally sustainable: a plan means nothing if it cannot be built and then managed in a realistic and cost-effective way. This project will comprehensively investigate the challenges preventing widespread adoption of high-biodiversity landscapes through interviews and surveys of landscape management professionals and landscape architects across the United States.

Based on our findings of the primary barriers to adoption, we catalog current and alternative landscape management approaches that can support long-term biodiversity. We aim to empower landscape architects as our primary audience, in addition to maintenance and management professionals, to advocate for, design, and sustain ecologically vibrant landscapes that will bring about lasting change.



Vegetation management (UC Davis Arboretum and Public Gardens)

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INTRODUCTION

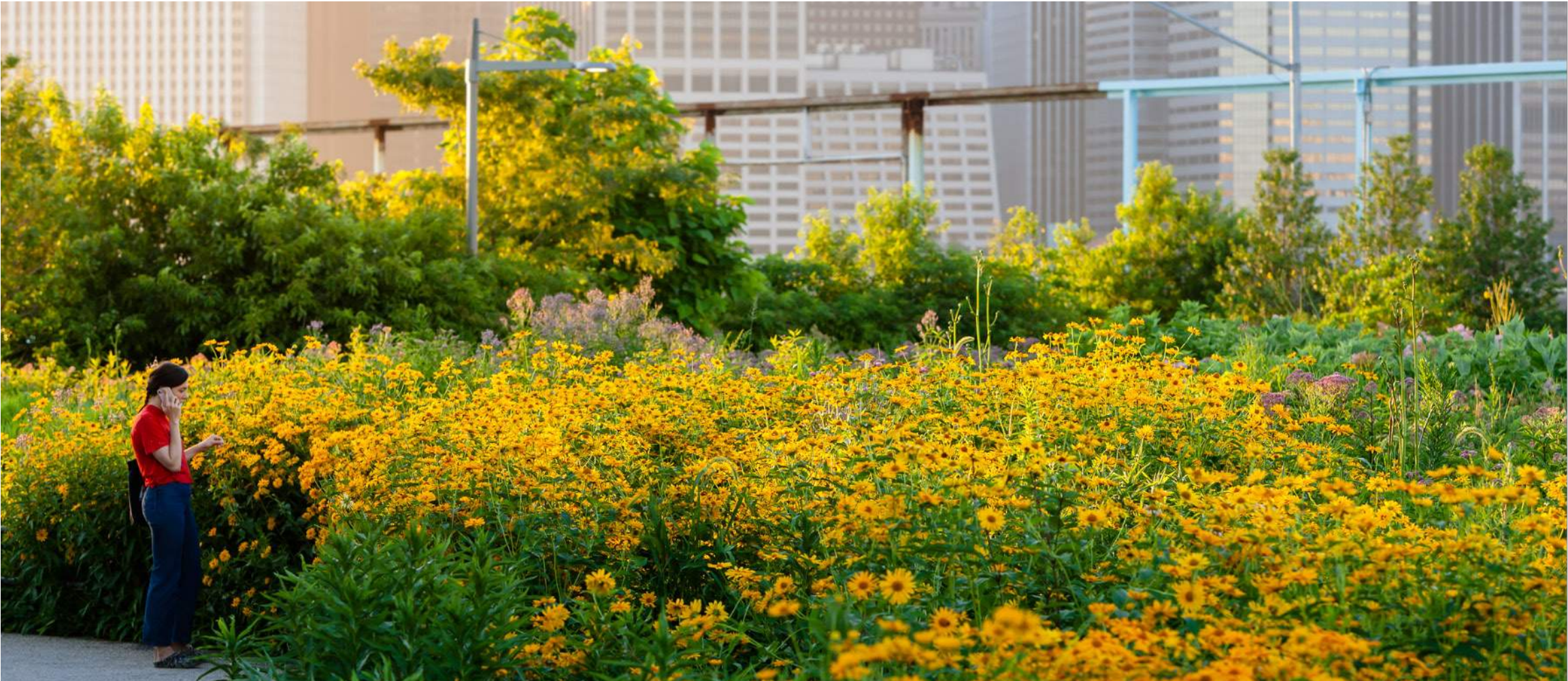
Weed removal by hand (North Brooklyn Parks Alliance)

PURPOSE & OBJECTIVES

The global landscape of biodiversity is facing an unprecedented crisis, driven primarily by habitat loss and fragmentation [Haddad et al., 2015; Hyseni et al., 2021; Brondízio et al., 2019; Millennium ecosystem assessment, 2005]. Despite biodiversity ranking as a priority among landscape architects [ASLA 2024; Hernandez–Santin et al., 2023; Kiers et al., 2022], a critical gap persists in both professional practice and academic research.

Notably, there is a striking lack of literature addressing landscape maintenance, especially in high-biodiversity landscapes—a blind spot that limits the widespread adoption of innovative, ecologically-rich design and management approaches [VanDerZanden & Cook, 2010]. With this critical disconnect the initial vision of a landscape design often fails to translate into long-term ecological success [Dunnett 2004].

Research and practice related to public and green spaces typically focuses more on design and placemaking than on long-term management and maintenance processes [Aly & Dimitrijevic, 2022]. While the role of the landscape architect may end after construction is complete, maintenance shapes the design through client and stakeholder expectations about planting density, aesthetics, and maintenance intensity. To sustain the value created through the design and construction process, long-term management must be supported with a similar level of consideration and resources [Collomb, 2015; Jansson & Lindgren, 2012].



No matter how well designed a park is, if it is poorly managed it will start to deteriorate [Dempsey & Burton, 2012; Tahir & Roe, 2006]. Furthermore, users’ perception of the overall quality of a park has been shown to be more closely tied to its management than its design intent [Carmona & De Magalhaes, 2006].

There is often a tension between the inherent wildness of a high-biodiversity landscape (inhabited by rambunctious perennials, complex planting schemes, and a corresponding abundance of insects, birds, and rodents) and public expectations for a highly-manicured or sanitized appearance. While some visitors may celebrate the presence of birdsong and fireflies, others may perceive the plantings as unkempt and shy away from the native bees. At the same time, ubiquitous lawns and neatly-hedged boxwoods are ecological deserts, but

are easily understood and perceived as well-maintained. This tension may stem in part from a perceived dichotomy between “natural” landscapes (such as urban forest fragments) and “non-natural” ornamental landscapes (including gardens and turf) and a corresponding expectation for differences in their level of care. A reading of “wildness” as a lack of maintenance or investment can result in a negative perception of naturalistic spaces in urban contexts.

To advance biodiversity and long-term resilience in large-scale public landscapes, it is essential to bridge the persistent gaps between design and maintenance practices, fostering stronger collaboration among ecologists, landscape architects, maintenance professionals, planners, and decision makers. Integrating biodiversity goals into both the design and ongoing

stewardship of landscapes allows for more adaptive, ecologically informed management strategies that balance habitat conservation, resource efficiency, public access, public perception, and the long-term health and functionality of open space systems. This project analyzes existing constraints of large-scale naturalistic landscapes and identifies the primary ideological, operational, and economic barriers to their widespread adoption. Our emphasis is focused on public parks, educational, and institutional campuses – large open spaces which often face limited maintenance budgets yet serve diverse and frequently disadvantaged communities. With this understanding of the primary barriers, we aim to identify the types of creative, ecologically healthy, and sustainable maintenance schemes that can support naturalistic landscapes in public and institutional settings.

ABOVE: Brooklyn Bridge Park (Ettien Frossard)

LARGE-SCALE PUBLIC LANDSCAPES

A growing body of interdisciplinary research highlights the health, social, environmental, and economic value of high-quality, well-funded parks and public spaces [Wolch et al., 2014, Rigolon et al., 2021, Browning et al., 2022, Lee et al., 2015]. Environmentally, public parks and institutional green space can reduce flooding, improve air quality, conserve biodiversity, and reduce urban heat island effects [Meerow 2020; Thompson et al., 2019; Wang, 2023].

ACCESSING THE BENEFITS OF GREEN SPACE

Access to large scale public landscapes, such as public parks and educational campuses, can also support public health and human well-being by reducing stress, anxiety, and depression while improving physical health, mood, sleep patterns, and memory recall [Russell et al., 2013; Frumkin et al., 2017; Rakow & Ibés, 2022]. Economically, public parks and green space can improve property values within communities and generate revenue for local jurisdictions from spending on recreational activities [Harnik & Welle, 2009].

The extent to which people experience these benefits is often shaped by how they perceive and interact with green spaces. Research has shown that perceptions of parks are strongly influenced by the characteristics and condition of the landscape itself [Kothencz & Blaschke, 2017]. Positive impressions can increase their use, as people are more likely to visit and spend time in spaces where they feel comfortable and emotionally positive [Ayala-Azcárraga et al., 2019; Sepe 2017].

Well-maintained green spaces can strengthen residents’ sense of place while encouraging social interaction and connections between neighbors [Yang et al., 2013]. In contrast, poorly managed urban green spaces may negatively affect human wellbeing due to concerns related to safety or maintenance, including damage to infrastructure from animals, discomfort associated with dense vegetation, and increases in pests [Sreetheran & Van Den Kamjou & Lennon, 2025; Drew-Smythe et al., 2023, Kuo, 1998; Jorgensen et al., 2007]. Underutilized, unsafe, and poorly maintained parks can additionally contribute to broader patterns of vacancy and neighborhood decline within surrounding communities [Raya and Rubin 2006].

For residents and communities to fully experience their positive outcomes, parks must be both accessible and high quality. Access to urban green spaces –and the environmental, social, and health benefits they provide– remains unevenly distributed among urban residents, particularly in historically underserved communities (e.g., Watkins & Gerrish 2018; Shiraishi 2022). As a result, large-scale public landscapes present an important opportunity to advance equity by providing broader access to ecologically resilient public space [Beck et al., 2024]. However, many of these environmental and sociocultural benefits depend on consistent and effective long-term maintenance, without which the intended functions and public value of these landscapes may be diminished [Carmona et al., 2008].

“Achieving high quality in maintenance and managing activities depends on the sufficiency of resources assigned for these processes.”

— Aly & Dimitrijevic, 2022

FUNDING AND OPERATIONAL CHALLENGES

Despite the recognized importance of management, public parks and institutional landscapes often face challenges related to limited financial resources, shrinking budgets, and the loss of (or inability to hire) skilled maintenance staff [Dempsey & Burton, 2012; Collomb, 2015]. The perceived higher costs associated with the design, construction, and maintenance of sustainable landscaping strategies often discourage designers from recommending or implementing alternatives to conventional landscaping approaches [Kazemi & Mahdizadeh, 2022]. While funding for capital projects can be relatively easy to secure – most emerging, innovative funding opportunities are capital investments – funding for operations and maintenance is typically dependent on traditional sources such as appropriations and dedicated taxes [Eldridge et al., 2019].

If built projects do not receive sufficient funding, staff, and equipment to support their long-term operation, and if vegetation is not maintained during its establishment period, newly planted landscapes may not survive [Breger et al., 2019]. Similarly, when large-scale public landscape projects are promoted as environmentally beneficial but fail to achieve their stated ecological goals due to insufficient long-term planning, maintenance, or community support, they may represent a form of “greenwasting” – failed initiatives that ultimately waste resources but are otherwise regarded as green [Nature Based Solutions Institute 2022].

As city populations grow, demands on parks and green spaces increase, but maintenance resources often don’t grow in tandem. Frequent and intensive use means these spaces must effectively serve many different purposes and populations while meeting a broad range of expectations. [de Jong & Lu, 2022]. This combination of elevated demand and declining maintenance budgets often force agencies to neglect or defer routine, scheduled upkeep, resulting in substantial deterioration in the quality, safety, and overall condition of existing parks [Ahmad et al., 2022].



ABOVE: A popular overlook for views of the Golden Gate Bridge at Presidio Tunnel Tops (Caitlyn Atkinson)

BIODIVERSITY IN THE BUILT LANDSCAPE

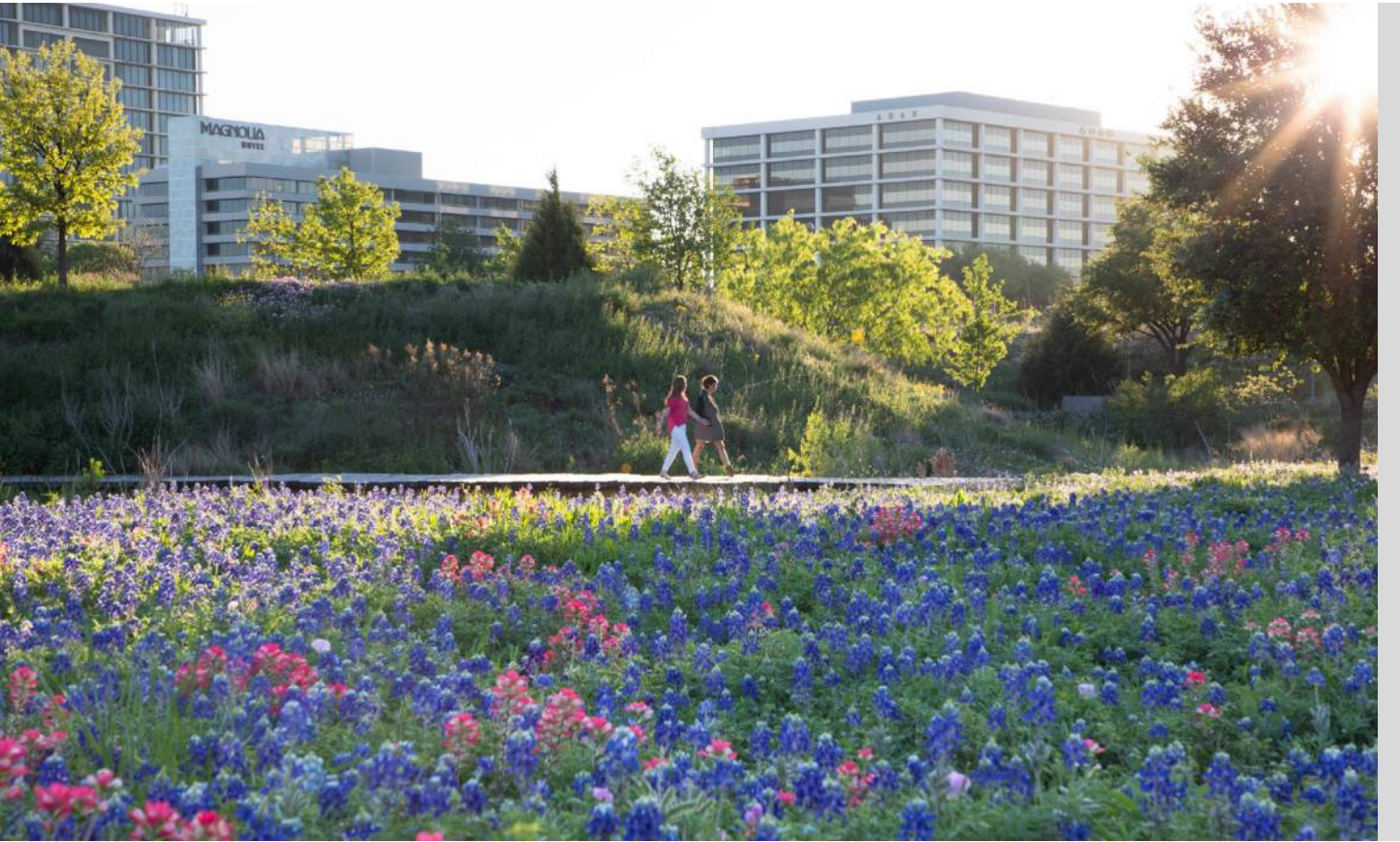
In geographic areas dominated by humans, landscape design can have significant ecological effects [Nassauer et al., 2001; Johnson & Hill, 2002; Lovell & Johnston, 2009]. The combined effect of urban and suburban public green space can influence ecological qualities including wildlife habitat and plant biodiversity [Helfand et al., 2005]. Lawns can contribute to environmental problems, such as an increased use of chemicals, fossil fuels, and potable water, with a concurrent reduction in biodiversity [Robbins & Birkenholtz, 2003]. Yet, even as we move away from resource-hungry lawn as a de facto default for green space, conventional replacements — frequently, massings of non-native plants surrounded by mulch — still require intensive maintenance and offer minimal habitat for wildlife.

TOP: Lupine meadow at the George Bush Presidential Center (Michael van Valkenburgh Associates)
BOTTOM LEFT: Monarch butterflies on goldenrod at Brooklyn Bridge Park (Rebecca McMackin)
BOTTOM RIGHT: A path through Chapel Woods, an on-campus forest fragment at Penn State (Penn State)

BUILT LANDSCAPES CAN CONTRIBUTE TO BIODIVERSITY IN POSITIVE OR NEGATIVE WAYS

The design of large publicly accessible urban landscapes plays a critical role in their success as nature-based solutions for biodiversity loss. Built landscapes can either contribute to ecological degradation through habitat simplification, environmental contamination, and biotic homogenization, or support biodiversity conservation if habitat structure, connectivity, and ecological networks are intentionally integrated into their design and management [Andersson et al., 2014; Aronson et al., 2014].

A landscape typology of open lawns dotted with formal tree plantings and garden beds dominates most large-scale public green spaces in the United States. The ornamental plantings are typically composed of widely available non-native species selected for their reliability and low maintenance requirements, despite the fact that many commonly used garden plants are also invasive; in fact, 61% of non-native species included on invasive plant lists continue to be sold in nurseries across the United States [Beaury et al., 2021]. These landscapes are typically maintained through intensive horticultural practices, including frequent mowing, pruning, weeding, irrigation, and the application of fertilizers, pesticides, herbicides, and insecticides [Aronson et al., 2017]. Although the approach is intended to create orderly and highly controlled landscapes, it can also contribute to broader ecological decline through habitat fragmentation, landscape homogenization, and soil degradation [Robbins and Sharp, 2003]. An over-reliance on gas-powered tools further contributes to carbon dioxide emissions and noise pollution [Cameron 2023]. Conventional maintenance regimes are also highly resource-intensive, requiring substantial long-term labor, material inputs, and financial investment.



Conversely, naturalistic and biodiverse landscape designs can provide habitat and food resources for migrating birds, pollinators, and other wildlife while increasing habitat heterogeneity and connectivity and improving species richness and abundance (Elmqvist et al., 2013; Goddard et al., 2010). Urban landscapes can serve as important corridors and habitat “stepping stones” for wildlife within otherwise fragmented and inhospitable urban environments [Prendergast et al., 2022]. When designed with structurally diverse vegetation, they can function as localized biodiversity hotspots [Baldock et al., 2019]. Research has also shown that greater plant and bird biodiversity in green spaces is associated with increased psychological benefits for users [Fuller et al., 2007], while urban pollinator gardens have been linked to stronger community resilience and ecological robustness [Baldock et al., 2015]. In addition, well-maintained biodiverse plantings can signal care, investment, and collective efficacy, reinforcing positive social perceptions of public landscapes [Troy et al., 2012].

The ecological and social performance of biodiverse landscapes, however, ultimately depends on long-term management and public perception. When poorly maintained, even highly biodiverse landscapes can generate negative environmental impacts including chemical runoff, water pollution, soil erosion, and invasive species proliferation [Khachatryan et al., 2016]. Neglected landscapes, regardless of their biodiversity, may convey disorder, uncertainty, or lack of stewardship, producing more ambiguous or negative social cues for users [Troy et al., 2012].

INNOVATION IN PLANTING DESIGN TO SUPPORT BIODIVERSITY

Landscape architects and academics have brought forth significant innovation in naturalistic planting practices in recent years [Cadenasso & Pickett 2008; Hitchmough 2011]. Naturalistic landscapes demonstrate remarkable potential for supporting rich ecosystems, with higher plant species diversity creating complex habitats for multiple species [Tabassum et al., 2020; Croci et al., 2008; Ossola et al., 2016; Nilon et al., 2024]. Landscape architects such as Claudia West, Thomas Rainer, Larry Weiner, and Thomas Wolz have taken the naturalistic planting approach developed in Europe by pioneers such as Piet Oudolf and Nigel Dunnett and adopted it to urban areas in the United States with great success.

Naturalistic planting approaches center around the identification of an archetypal wild plant community type to serve as a model for plant selection and aesthetic qualities, the use of layered and diverse plant palettes, and consideration for change over time – both seasonally and through succession or disturbance.

Naturalistic landscapes do not fit neatly into the perceived dichotomy between “natural” urban landscapes (often, ecological restoration projects such as restored waterways, forest fragments, and open space corridors) and “non-natural” or ornamental urban landscapes (including lawns, formal ornamental gardens, or shrub beds). This false dichotomy, stemming from historic understandings of humans as separate from nature, is being broken down by the rise of naturalistic landscape approaches.

High profile naturalistic gardens such as the Lurie Garden in Chicago, the High Line in New York, and Tunnel Tops in San Francisco have been praised for their aesthetic and ecological qualities, as well as for their sustainability, health and well-being benefits, and ability to create meaning for local users. Case studies, including those in LAF’s Landscape Performance Series, are increasingly utilizing metrics to identify design projects prioritizing biodiversity and to quantify their environmental benefits [Nam & Dempsey, 2019; Uppala et al., 2025; Calkins 2012; Landscape Architecture Foundation, n.d.]. However, despite this professed outpouring of support for naturalistic landscapes, there is little guidance on how to support them, and the reality remains that once a naturalistic project has been designed and built, few resources exist for its ongoing maintenance [Davis & Oles, 2014].

	ORNAMENTAL PLANTING	NATURALISTIC PLANTING	ECOLOGICAL RESTORATION
 FORMS & SPATIAL STRUCTURE	› Formal, symmetrical or geometric block layout with well-defined edges › Low diversity, massings of plants › Tidy orderly appearance	› References archetypal plant community, using essential characteristics rather than trying to replicate › Moderate to high diversity, layered plantings › Asymmetrical forms, soft edges, planting in drifts or using a matrix approach with strategic placement of structural plants	› Mimics native ecosystems › High diversity and low order › Little focus on form – placement based on habitat function or site conditions
 ECOLOGICAL CHARACTERISTICS	› Small planting areas bounded by paths › Species selected for aesthetic qualities like flower or foliage color rather than habitat value › Turf lawns, ornamental non-native species, cultivars, and nursery hybrids › Little habitat value	› Medium to large planting areas to provide habitat value › May prioritize habitat for key species › Mixes of native species, cultivars, and climate-adapted plants › Emphasis on building soil health	› Large planting areas to maximize habitat value and minimize edges › May prioritize habitat for key species › Mixes of native species, may include local ecotypes, no cultivars
 CULTURAL PERCEPTION	› Tidy and manicured appearance › Perceived as non-natural, gardened › Few species of animals and insects perceived as acceptable	› Less manicured appearance › Perceived as natural or somewhat natural, fostering connection to urban landscapes › Some acceptance for pollinators and desirable bird or animal species, little acceptance for species perceived as pests	› Wild or unmanicured appearance › Perceived as natural, even in urban areas or restored landscapes, fostering connection to natural landscapes › High acceptance for presence of insects and animals
 MAINTENANCE/ MANAGEMENT NEEDS	› Requires intensive maintenance › Expectations for consistent appearance, little tolerance for structural change.	› Little regular maintenance, instead plantings area managed as a plant community › Removal of invasive species › Moderate tolerance for variability while still meeting design intent	› Minimal regular maintenance except as needed for safety (fire control, sightlines) › Removal of invasive species › High tolerance for variability, spatial or structural change in plantings

MAINTENANCE & MANAGEMENT IN THE LANDSCAPE

While increasing attention is being given to the creation of vibrant and biodiverse public spaces, far less emphasis is placed on their long-term maintenance and management [Aly & Dimitrijevic, 2022; Rupprecht et al., 2015]. Research and practice alike tend to prioritize design and implementation, despite the fact that these phases represent only a small portion of a landscape’s overall life cycle. Public space management often lacks a cohesive, long-term strategic framework, instead operating through fragmented responsibilities and institutional structures [Carmona and Magalhães, 2006; Collomb, 2015]. As urban spaces face increasingly complex social, ecological, and climatic challenges, there is a growing need to move beyond traditional maintenance models toward more adaptive and innovative management approaches that support the long-term performance and resilience of public landscapes.

ROLE AND IMPORTANCE OF MAINTENANCE

A major misconception surrounding biodiverse landscapes is not just the idea that they are “low maintenance,” but the broader lack of understanding of how they should be managed over time. Clients and property managers often view maintenance as a fixed cost or a set of routine tasks, rather than an ongoing, skilled, and adaptive practice that evolves with the landscape over time. In reality, biodiverse landscapes do not necessarily reduce maintenance demands; instead, they redistribute them—from repetitive labor such as mowing or shearing toward more nuanced work requiring observation, ecological knowledge, seasonal timing, and informed decision-making. This misunderstanding creates a recurring contradiction in perception: biodiverse landscapes are frequently assumed to be either effortless and self-sustaining or excessively difficult,

messy, and expensive to maintain. Far less commonly are they understood for what they truly are: landscapes that require a different kind of maintenance, grounded in ecological literacy, flexibility, and adjusted expectations of care and aesthetics. The lack of evidence-based literature on maintenance can limit landscape architects’ ability to advocate for innovative naturalistic planting approaches during the early phases of a project [Gould et al., 2014; Plieninger et al., 2015]. This challenge is particularly pronounced in large public landscape projects, where landscape architects and institutional managers are often reluctant to move away from familiar design and maintenance practices that prioritize predictability over ecological complexity [Kalauni et al., 2023; Chamberlain 2012].

BELOW: Maintenance stewards replanting at Oudolf Garden in Detroit (Ryan Southen Photography)



MAINTENANCE	MANAGEMENT
 Plants maintained as individuals	 Plants maintained as part of a plant community
 Focused on appearance, with expectations for consistent appearance over time	 Focused on meeting performance goals including biodiversity, ecosystem services, and aesthetic/experiential goals
 Prescribed weekly/monthly practices	 Maintenance actions based on observation of site conditions
 Emphasis on tidiness	 Allows for some wildness in appearance
 Regular pruning and mowing	 Pruning and mowing at strategic times of year
 All debris removed from site and regular application of fertilizer and mulch	 Some debris kept on site as mulch to support soil health
 Gaps in planting filled with same species, or based on availability	 Gaps in planting filled with species selected for performance and design goals (may be same or different)
 All spontaneous plants and weeds removed	 Plants allowed to self-organize by reseeding or self-propagation. Undesirable or invasive species removed.

FROM MAINTENANCE TO MANAGEMENT

For the purposes of this project, maintenance can be described as the systematic and ongoing management of outdoor spaces through routine practices intended to preserve safety, functionality, operational dependability, ecological health, and visual order over time. Traditionally, maintenance has prioritized efficiency, productivity, and manicured aesthetics through repeated tasks such as mowing, blowing, pruning, irrigation, trash removal, and chemical applications, often relying heavily on gas-powered equipment and performance-driven technologies. In contrast, management is a dynamic and adaptive process that coordinates human, technical, ecological, and financial resources to support the long-term social, environmental, and economic sustainability of parks and public spaces. A sustainable management

approach emphasizes “interactions, relationships, including both natural and artificial systems, and considering feedback, accumulation processes and delays [Aly & Dimitrijevic 2022]. It involves managing the complex interactions between natural and built systems, balancing multiple and sometimes competing functions, and responding to feedback, change, and evolving user needs [Manning et al., 2011, Carmona et al., 2008, Dempsey & Burton 2012].

Addressing contemporary urban challenges requires a shift away from traditional maintenance models toward more innovative and adaptive management strategies capable of supporting complex, biodiverse landscapes [Haq, 2011; Ly & Xiao, 2016].

A systems dynamics perspective may offer a valuable framework for the management of biodiverse landscapes. This approach recognizes landscapes as complex, dynamic systems that are constantly changing in response to ecological, social, and environmental factors [Brinsmead & Hooker, 2011; Sardi & Sorano, 2019]. In contrast to relying on rigid predictability and fixed maintenance routines, adaptive and interactive management strategies respond to ongoing feedback and changing conditions. Adopting this approach may be particularly important for sustaining biodiverse landscapes, where long-term success depends on flexibility, observation, and continual adjustment rather than static maintenance practices.

Within the realm of dynamic landscape management, several paradigms have emerged that occupy the space between conventional landscape maintenance and the adaptive management techniques of restoration ecology. These systems are especially relevant to naturalistic urban landscapes, where the demands of public use and ecological function must be carefully balanced. The following approaches share several common principles, including working with natural processes rather than attempting to control them, creating landscapes that are appropriate to their regional context, and employing responsive rather than strictly prescribed management strategies. They include:

- › **Adaptive Management:** an iterative approach to landscape management that relies on a cycles of observation, assessment, action or testing an intervention, and adjustment [Rist et al., 2013]. Landscapes are managed as plant communities that are expected to change in composition over time, rather than a static arrangement of individual plants that are expected to look consistent over time.
- › **Ecological Gardening/Landscaping:** “ A method of designing, building, and maintaining landscapes that considers the ecology of a site and creates gardens that enhance the surrounding environment for the benefit of humans and all other life in the ecosystem [Knowles et al., ND].”

Ecological Gardening emphasizes the use of native or climate-appropriate plants to support pollinators and other wildlife, with the belief that a beautiful garden should not come at the expense of a healthy environment.

› **Regenerative Landscaping:** “A process for finding pattern-based solutions, emphasizing cooperative, iterative, and facilitated engagement for the co-production of locally relevant knowledge for desirable landscape stewardship [Smithiwick et al., 2023].” This approach emphasizes that management should increase ecological performance over time, rather than maintaining an aesthetic appearance, or minimizing impacts. Core principles include building healthy soils, maximizing habitat, reducing water and material inputs, and considering human health.



TRAINING AND SKILL DEVELOPMENT

The successful establishment and long-term stewardship of biodiverse and sustainable landscapes requires maintenance personnel with training and expertise that extend beyond the skill sets associated with conventional landscape maintenance crews. Unlike traditional approaches focused primarily on standardized tasks, biodiverse landscapes demand workers who understand plant communities, seasonal growth cycles, soil and water processes, and the dynamic ecological interactions occurring within a site. Biodiversity-based land management is more knowledge-intensive than technology-intensive [Kremen & Merenlender, 2018]. The maintenance of large scale public landscapes should be understood not as a repetitive operational task, but as an ongoing and collaborative process that actively shapes the long-term ecological and aesthetic development of a site [Kent 2017].

Current U.S. policies, technologies, and economic pressures promote fossil fuel- and chemical-intensive management practices that, rather than cultivating the specialized ecological knowledge and skill development needed for biodiverse landscape management, instead contribute to the “de-skilling” of landscape labor [Carlisle et al., 2019]. Professionals must instead be trained to “read” landscapes over time, make informed adaptive management decisions, and guide desirable ecological change rather than simply maintain static appearances. This requires a higher level of skill, ecological knowledge, and adaptive decision-making than conventional maintenance practices, as it depends on responding thoughtfully to changing site conditions.

Sustainable landscape training programs are one way maintenance professionals are gaining the skills required to manage biodiverse landscapes. Nationwide, many land-grant university systems provide educational resources and training related to native plant species, invasive species management, wildlife-supportive landscape practices, and other ecologically based approaches to landscape management through their Extension programming (Feather, 2015; Stacey & Dale, 2020).

In addition, nonprofit professional training and certification programs —such as California Native Plant Landscaper Certification through the Theodore Payne Foundation in California and the Chesapeake Bay Landscape Professional certification program through the Chesapeake Conservation Landscaping Council—have emerged to help train landscape professionals in sustainable planting design, ecological maintenance practices, watershed stewardship, and native landscape management (Corson 2017, Theodore Payne Foundation 2024).

LEFT: Hands-on training on proper planting technique using hand tools (UC Davis Arboretum and Public Gardens)

WHERE BIODIVERSITY & MAINTENANCE CONFLICT

“Unlike grey infrastructure that is generally hidden underground, in pipes, or else made inaccessible in concentrated facilities, nature’s services infrastructure is in plain sight, it takes up real physical space, and if it is not regularly maintained, (gardened) it will look unattractive, may not work and/or it will die. This implies a different knowledge and maintenance regime from the networked modern city to one more akin to parks.”

— Stephanie Pincetla, From the sanitary city to the sustainable city: challenges to institutionalising biogenic (nature’s services) infrastructure



HOW MAINTENANCE CAN CAUSE A PROBLEM FOR BIODIVERSITY OR DEGRADES PERFORMANCE

Many common landscape management practices continue to act as barriers to biodiversity conservation [Aronson et al., 2017]. Even as naturalistic gardens and biodiversity-focused landscape approaches become more widely adopted, substantial gaps often remain between ecological goals and day-to-day management, with many sites still characterized by intensive mowing, routine use of chemicals, and frequent disturbance that reduces opportunities for nesting, habitat formation, and other ecological functions [Varga-Szilay et al., 2024].

One of the clearest examples of this disconnect can be seen in the conventional maintenance of lawns within public parks and institutional landscapes. Conventional maintenance of lawn in public parks and institutional

landscapes is a principal barrier to biodiversity provision in urban landscapes worldwide [Aronson et al., 2017]. Research has shown that the traditional landscape practice of frequent mowing can be detrimental to wildlife, resulting in low abundance and richness of bees [Phillips et al., 2019;Wastian et al., 2016], reduced plant species richness, and decreased flower- pollinator interactions [Yang et al., 2019]. Intensive mowing can also favor the dominance of disturbance-tolerant exotic species, including invasive plants, by suppressing the establishment and reproduction of native vegetation [Norton et al., 2019]. Alternative mowing practices (e.g., frequency, height) can help reduce the deleterious effects and improve biodiversity efforts [Smith et al. 2015].

ABOVE: Conventional maintenance practices in the urban landscape (Haven Kiers)

Under conventional maintenance regimes, massings of native deergrass are cut back to the ground and all trimmings removed. This results in bare soil, disruption of nutrient cycling, and removal of habitat for overwintering insects.

Beyond mowing practices, other forms of intensive conventional maintenance can also significantly reduce urban ecological diversity. Chemical applications of pesticides, herbicides, and insecticides remain widespread in large public landscapes despite research documenting their negative impacts on plant species diversity [Bertoncini et al., 2012], as well as declines in bee and butterfly populations [Muratet & Fontaine, 2015] and birds [Shwartz et al., 2013]. Similarly, extensive pruning and the removal of trees, shrubs, and leaf litter decrease habitat structural complexity and can eliminate critical habitat resources altogether, creating less hospitable environments for wildlife [Kane 2015]. In one study, researchers found that when a spontaneously revegetated urban site with exceptionally high plant biodiversity was later managed as a conventional neighborhood park, plant species richness declined by nearly 50% [Filibeck et al., 2016].

HOW BIODIVERSITY GOALS CAN CHALLENGE ESTABLISHED MAINTENANCE PRACTICES

Biodiverse landscapes often challenge long-established maintenance norms and public expectations surrounding what urban green spaces should look like and how they should function [Filibeck at al., 2016]. While conventional maintenance practices in parks and institutional landscapes have historically prioritized visual order, predictability, cleanliness, and the use of power tools, biodiverse landscapes frequently include vegetation of varying heights, visible plant succession, leaf litter, standing seed heads, and habitat features that can appear “messy” or unmanaged to the public. A documented preference for “formal landscapes” [Özgüner et al., 2007; Qiu et al., 2013] means that management decisions and processes concerning biodiversity in urban areas are often more influenced by the perceptions of the general public than by either ecological or applied approaches [Breuste, 2004].

In contrast, “informal” greenspaces are consistently perceived as low value and unsafe [Hofmann et al., 2012, Jansson et al., 2013]. As a result, maintenance staff and managers are often pressured to revert to conventional practices such as frequent mowing, pruning, pesticide application, or removal of habitat features in order to maintain socially accepted standards of tidiness and control. This tension can create conflicts between biodiversity goals and day-to-day management decisions, particularly when maintenance regimes, public expectations, and institutional policies have not adapted to support more ecologically oriented landscape practices.

BELOW: UC Davis Grounds crew planting grass plugs by hand for a native meadow (UC Davis Arboretum and Public Garden)



“It can be tempting to prescribe a specific list of maintenance tasks and a fixed schedule to perform them, but in reality most maintenance tasks are performed on demand based on what the maintainer actually sees. The maintenance regime for an individual practice depends on the level of service or amenity, visibility, development intensity and owner preferences. Other factors, such as extreme rainfall events, hard winters and extended droughts, can strongly influence maintenance needs from year to year.”

02

IDENTIFYING BARRIERS

Maintenance worker deadheading perennials (Andrea Gaffney)

GOALS

The biodiversity crisis presents an urgent challenge for landscape architects, planners, and land managers, whose work plays a vital role in restoring ecological health and resilience in human-dominated landscapes. A recent survey of ASLA members identified several potential barriers to addressing this crisis, including client expectations and market demand, lack of awareness and understanding, financial and resource constraints, and limitations related to ongoing maintenance [ASLA 2024]. Building on these insights, this project expands the scope of inquiry to include not only landscape architects and planners but also landscape managers and maintenance professionals, whose direct, day-to-day work determines whether biodiversity-supportive designs thrive or fail over time.

SURVEY AND METHODOLOGY

In Phase 1, we sought to develop a comprehensive understanding of the systemic obstacles preventing the widespread adoption of high-biodiversity landscapes in large-scale public and institutional settings such as educational campuses and public park systems. To achieve this, we designed and disseminated two coordinated national surveys: one for designers and one for maintenance professionals. The surveys were distributed nationally through professional organizations and partner networks, reaching practitioners across a wide range of regions and organizational contexts. In addition to the surveys, we conducted more than twenty in-depth interviews with a smaller group of practitioners to capture more nuanced perspectives on challenges and opportunities. Together, these methods provided a robust dataset for examining how biodiversity is perceived and prioritized, how naturalistic planting approaches are implemented, and how maintenance practices, funding, and staff training influence outcomes.

SURVEY DESIGN

To examine how biodiversity is understood and operationalized across large-scale public landscapes, we developed and distributed two Qualtrics surveys targeting distinct professional groups: (1) designers, including landscape architects and planners, and (2) maintenance professionals, including gardeners, horticulturalists, and landscape managers. Separate surveys allowed us to capture differences in perspectives, priorities, and perceived challenges related to the design and long-term care of biodiverse landscapes. Both surveys collected information on participant demographics, organizational context, attitudes toward biodiversity, perceived barriers and opportunities, and experiences with specific management practices.

The survey instruments included a mix of fixed response and open-ended questions to support both quantitative and qualitative analysis (Appendix A & B). Fixed-response questions employed multiple-choice formats, Likert scales, and rank-order questions to assess perceptions of barriers and priorities, while open-ended responses allowed participants to elaborate on contextual factors and share specific examples or strategies. Questions were developed iteratively with input from an advisory panel of landscape architects, park managers, and other experts to ensure relevance and clarity.

SURVEY DISSEMINATION

The surveys were disseminated nationally using a multi-pronged outreach strategy to maximize reach across professional roles and geographic regions. Distribution channels included the Landscape Architecture Foundation (LAF), the American Society of Landscape Architects (ASLA) Climate and Biodiversity Committee, the Professional Grounds Management Society (PGMS), the Sustainable SITES Initiative (SITES), the Landscape Expo, and the City Parks Alliance. Surveys were also promoted through direct outreach, professional networks, and social media targeting relevant audiences.

The surveys were launched on August 20, 2025 and remained open until May 1, 2026.

DATA ANALYSIS

Quantitative data were analyzed to identify patterns and differences between the two respondent groups, focusing on how biodiversity is prioritized by individuals, organizations, and clients, as well as how barriers and challenges were ranked. Responses to open-ended questions and interviews were analyzed using a thematic coding approach to identify themes related to barriers, strategies, and professional experiences. These qualitative insights provided additional depth and context to the survey’s quantitative findings.



TOP: Maintenance staff (Presidio Trust)
BOTTOM: Site review by the design and client teams at George W. Bush Presidential Center (Michael Van Valkenburgh Associates)

RESULTS

The surveys received strong national representation, with 158 designers and 110 maintenance professionals responding. The vast majority of design respondents identified as landscape architects or designers (83%), with smaller representation from planners (5%), ecologists (3%), and related design roles. Maintenance respondents were most often gardeners or horticulturists (44%), followed by managers overseeing maintenance (39%). Smaller numbers represented contractors, field staff, and other related roles.

Respondents from both surveys were primarily employed in the private sector, with a **74/26%** private/public sector split among the designers and a **60/40%** split among maintenance professionals. The sample represented a broad geographic distribution, with participation from all major regions of the United States, reflecting a range of ecological and organizational contexts.

KEY FINDINGS

The findings from Phase 1 indicate substantial alignment between designers and maintenance professionals regarding both the importance of biodiversity and the challenges associated with implementing it at scale. While respondents in both groups identified biodiversity as a high personal priority, they consistently perceived it to be of lower priority among key decision-makers, including clients and organizational leadership.

Designers were more likely to express concern that biodiversity was not a top priority for clients, with only **16%** of designers perceiving biodiversity as a high priority for their clients, compared to **25%** of maintenance professionals who felt it was prioritized by theirs.

Respondents reported widespread adoption of sustainable maintenance practices, including the use of regionally native plant species, removal of invasive species, and efforts to protect or restore habitat and soil systems. Maintenance professionals, however, more frequently reported implementing a broader range of non-conventional or ecologically oriented practices beyond these baseline approaches. These included integrated pest management (IPM), delayed seasonal cutbacks to support habitat provision, retention of woody debris (e.g., fallen logs), and the application of leaf mulch.

Across both groups, responses indicated comparatively limited engagement with more formalized processes such as goal setting, monitoring, and the development of long-term management plans for biodiverse landscapes. This gap in structured management capacity is further reflected in respondents’ perceptions of industry readiness: a majority in both groups (**62%** of designers and **69%** of maintenance professionals) indicated that traditional landscape maintenance companies are currently not equipped to manage biodiverse landscapes.

When asked about barriers, designers frequently identified maintenance and management as a significant obstacle to creating biodiverse landscapes. **Fifty-five percent** reported that maintenance was the most pressing barrier, highlighting a lack of technical training for maintenance staff, insufficient funding and resources, deeply entrenched norms favoring manicured landscapes, poor communication among stakeholders, and client resistance to naturalistic aesthetics. Maintenance professionals identified similar issues but were less likely to view maintenance itself as the primary barrier, with only **28%** naming it as one of the most significant challenges. For them, public perception, lack of client understanding, and financial constraints emerged as equally pressing concerns.

Weed pressure, invasive species, and plant mortality were reported as ongoing operational challenges by both groups. In an open-ended follow-up question, both groups identified cost, public perception, lack of knowledge/technical skills, and lack of client understanding as other significant barriers to the adoption of biodiverse landscapes.

LIMITATIONS

Several limitations should be considered when interpreting these findings. The surveys are unlikely to represent a fully random or comprehensive sample of landscape architects and maintenance professionals. Rather, the respondents are likely biased toward individuals and organizations already engaged with or interested in biodiversity. This is evident in the relatively high percentage of participants reporting that their organizations prioritize biodiversity: **50%** among designers and **48%** among maintenance professionals, compared to **45%** in the recent ASLA biodiversity survey.

Additionally, conventional landscape maintenance workers and managers were likely underrepresented, as this audience can be difficult to reach and may have been less inclined to participate in a survey specifically focused on biodiversity. The composition of the maintenance sample further reflects this challenge, with a large proportion of respondents identifying as gardeners or horticulturalists (**44%**) and a significant subset (**23%**) indicating that they do not regularly work on large-scale public landscapes. While this was not unexpected given the diversity of maintenance roles nationwide, it is an important consideration for interpreting the results. These factors limit the generalizability of the findings to the broader professional population, particularly within more conventional maintenance contexts.

WHAT WE HEARD

FROM MAINTENANCE PROFESSIONALS:

“Designers and clients think the landscape does not need to be maintained. They often think they can be planted and left alone.”

“Diversity relies on ongoing stewardship to manage plants and soils, not just the initial plant list at the time of installation.”

“Impress the idea of landscapers as partners with nature instead of having to fight or tame it.”

“We need to reach the property management companies who often dictate maintenance expectations – and who often undermine all regenerative, sustainable and biodiversity goals through their lack of education and colonial aesthetics.”

FROM DESIGN PROFESSIONALS:

“Some folks think there is no stewardship needed... other folks think those landscapes require too much stewardship...”

“Design and construction are just the initial phases of a project. The maintenance and life cycle are the soul of the long-term success of a project.”

“I think it is a mistake to promote native plant gardens as lower maintenance than conventional gardens. They have a million advantages over conventional landscapes, but the amount of work to take care of them is not necessarily less... It’s a different type of maintenance.”

“People think they can choose what flavor of biodiversity they want for social or aesthetic reasons, ie. no caterpillars please but we want butterflies. We like birds but don’t want bugs, etc.”

DISCUSSION

Survey responses reveal substantial agreement between designers and maintenance professionals on the importance of biodiversity and the challenges of implementing it at scale. Qualitative responses and interviews consistently identified sustained collaboration between designers and maintenance professionals as a key factor in successful outcomes. **Seventy-eight percent** of designers and **72%** of maintenance professionals agreed that the success of biodiverse landscapes depends equally on design and maintenance. However, only **21%** of designers reported frequent involvement in long-term, post-construction landscape management, suggesting that this level of engagement remains uncommon in practice due to limited funding, fragmented project delivery, and insufficient long-term coordination.

Designers tended to frame these issues as systemic failures involving inadequate planning, poor communication, limited institutional support, and insufficient integration of maintenance into the design process. Maintenance professionals, by contrast, focused on the realities of implementation, including inadequate staffing, time constraints, limited training, and unclear or impractical design intent. Across both groups, a central issue emerged: the difficulty of translating ecological design intent into actionable long-term maintenance practices. This disconnect is reinforced by knowledge gaps, ineffective communication formats, and the persistence of conventional maintenance approaches that often override ecological goals due to their familiarity and efficiency.

Differences between the two groups were also evident in how they conceptualized maintenance itself. Designers frequently approached maintenance as a system-level challenge requiring improved policies, frameworks, and educational programs to support ecological outcomes over time. Maintenance professionals framed maintenance more directly in terms of labor conditions,

resource limitations, and operational feasibility. Their responses highlighted the physically demanding nature of the work, chronic understaffing, and the need for practical training in plant identification, pruning, and weed management. Together, these perspectives reveal a critical gap between ecological ambition and maintenance capacity, underscoring the need for more integrated approaches that align design goals with long-term stewardship realities.

BARRIERS TO ADOPTION

Survey responses and interviews point to five systemic barriers constraining the adoption of biodiverse and naturalistic landscapes. The **first barrier** is limited funding and resources. While capital investments for installation are often attainable, respondents noted that operating budgets rarely support the labor-intensive establishment period or ongoing ecological monitoring. Many also highlighted underfunded park operations and low wages for maintenance workers, which contribute to deferred maintenance, reactive management, and high staff turnover.

“If it’s not a mowed lawn with crepe myrtles, boxwoods, and annuals, it’s [seen as] too ‘messy.’”

— Anonymous quote, Maintenance Survey

This funding gap reinforces the **second barrier**: cultural expectations for manicured landscapes. Both surveys and interviews described strong pressures from clients, owners, and the public to maintain uniform appearances, undermining support for wilder and more ecologically complex plantings. These tensions reflect broader conflicts between conventional landscape norms emphasizing turfgrass and tidiness and alternative models centered on biodiversity and ecological function.



ABOVE: Brooklyn Bridge Park Park horticultural staff (Rebecca McMackin)
RIGHT: Tunnel Tops Steward maintaining native plants (Presidio Trust)

“PAY PEOPLE MORE. That’s literally it. The problem is low, criminally low wages in the industry. No benefits. No sick leave. No health insurance. Why would a well educated horticulturalist, forester, landscape architect, etc work in landscape maintenance?”

— Anonymous quote, Design Survey

A **third barrier** is a persistent lack of training and technical expertise among maintenance personnel. Respondents emphasized that complex plant communities require horticultural knowledge and establishment-phase care not typically provided by conventional crews. Limited staffing, inadequate training, and reliance on conventional maintenance practices frequently lead to the mismanagement of ecological plantings, with several interviewees emphasizing the need for structured training programs and clear “cookbook style” maintenance manuals.





“We need to empower and educate maintenance staff - they got to get off their mowers and learn about the plants and habitats they maintain, give them a connection to it, make them want to care for it.”
— Anonymous quote, Maintenance Survey

The **fourth barrier** concerns weak communication and coordination across roles. Collaboration is often inconsistent, with maintenance staff excluded from design and construction phases. Practitioners reported that this disconnect leads to mismatched expectations, inappropriate installations, and erosion of long-term goals. This fragmentation also limits opportunities for adaptive management and knowledge exchange, making it more difficult to respond to changing site conditions, refine maintenance practices over time, or sustain the ecological and aesthetic intentions of the original design.

failing to account for differences in plant community types, site conditions, design intent, and changes in maintenance needs due to growth and succession, yearly variation, extreme events, and the unpredictability of dynamic plant communities. Survey responses further demonstrate that misconceptions about biodiverse landscapes often center on maintenance requirements and visual appearance. Clients and decision-makers frequently assume that these landscapes are either maintenance-free or inherently more difficult and expensive to manage.

“I’d love it if we could discuss our long-term relationships and how we use them rather than discussing all design, implementation, and maintenance as transactional events where we extract use and maintenance is just something we are forced to do.”
— Anonymous quote, Design Survey

Closely tied to this is the expectation that landscapes should remain static, tidy, and visually predictable, creating resistance to ecological processes such as succession, seasonal change, and structural variability. Additional misconceptions include the belief that conventional maintenance crews can manage biodiverse systems without additional training, or that ecological landscapes will become self-sustaining immediately after installation.



“The biggest misconception about biodiverse landscapes is that they can be maintained by crews with the same level of training, and to the same standard, in the same amount of time as conventional institutional landscapes.”
— Anonymous quote, Design Survey

Finally, the fifth barrier is the traditional maintenance industry itself presents a structural constraint. Firms organized around standardized, low-cost maintenance models often lack the staffing, equipment, and adaptive management experience required for biodiverse landscapes. As a result, entrenched maintenance practices frequently prioritize efficiency and visual uniformity over ecological function, plant establishment, and long-term resilience. These approaches are applied broadly across sites and projects and uniformly over time,

TOP: Perennial plantings at Oudolf Garden, Detroit (Ryan Southen Photography)
BOTTOM: Volunteer training at the UC Davis Arboretum (UC Davis Arbretum and Public Gardens)

BARRIERS & INTERVENTIONS

 01 LIMITED FUNDING & RESOURCES Biodiverse landscapes frequently lack stable, long-term funding and operational resources to support ongoing maintenance, stewardship, and adaptive management. › Funding for capital improvements maybe available, but long-term maintenance funding is not supported › Low wages and limited benefits for maintenance professionals › No investment in ongoing training to build skilled workforce › Need more operating budget for establishment period › Need funding for ongoing ecological monitoring › Lack of budget for plant replacement SEE PAGE 60 Intervention Focus FINANCIAL & RESOURCE SYSTEMS	 02 CONVENTIONAL AESTHETIC NORMS Public and institutional expectations for tidy, manicured landscapes can conflict with the dynamic and seasonal appearance of ecologically diverse plantings. › Expectation for tidy and uniform appearance with little variation over time › Preference for highly-manicured lawns and ornamental plantings over wild-appearing landscapes › Low acceptance for presence of animals and insects › Little public knowledge about biodiversity crisis or benefits of habitat landscapes SEE PAGE 64 Intervention Focus CULTURAL PERCEPTION & PUBLIC NARRATIVE	 03 LACK OF TRAINING & TECHNICAL EXPERTISE Maintenance staff and organizations often lack the ecological knowledge, training resources, and technical skills needed to successfully manage biodiverse landscapes over time. › Conventional landscape maintenance prioritizes routine procedures over responsive or adaptive management › Not enough establishment-phase care leads to plant failure › Power tools, chemical herbicides/pesticides, and routine irrigation used as a default › Need more horticultural training for landscape maintenance staff › Traditional or conventional maintenance techniques are not suited to ecological plantings, leading to mismanagement SEE PAGE 69 Intervention Focus WORKFORCE CAPACITY & SKILL BUILDING	 04 WEAK COMMUNICATION BETWEEN TEAMS Poor coordination and knowledge transfer between project stakeholders can result in maintenance practices that undermine long-term ecological and design goals. › Little coordination or collaboration between design and maintenance teams › Mismatch between biodiversity or other ecological goals, and applied maintenance practices › Design approaches that do not consider long-term maintenance › Need more opportunities for knowledge exchange to build capacity for adaptive management SEE PAGE 54 Communications Framework THE DIALOGUE SEE PAGE 73 Intervention Focus DESIGN & SPATIAL FRAMEWORKS	 05 LACK OF CAPACITY IN MAINTENANCE CREWS Conventional maintenance systems and contractors are often structured around standardized, efficiency-driven practices that are not well suited to the adaptive care required by biodiverse landscapes. › One-size-fits-all approach to landscape maintenance prioritizes efficiency over other goals › Standardization does not build resilience or allow for variation over time › Low-cost maintenance (publicly-funded or for-profit) does not leverage volunteers or non-profit partners › Need monitoring and decision-making frameworks to guide adaptive management SEE PAGE 78 Intervention Focus GOVERNANCE, COORDINATION & STEWARDSHIP SYSTEMS
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CONCLUSION

Taken together, the survey findings point to a fundamental structural mismatch at the heart of biodiverse landscape management: landscapes designed to support ecological diversity require adaptive, knowledge-intensive stewardship, yet they are too often maintained through systems optimized for standardized, low-cost, and visually predictable practices. Designers emphasized the need for improved systems, communication, and long-term planning structures, while maintenance professionals emphasized the realities of labor, time, and operational constraints that limit implementation. Respondents consistently identified challenges extending beyond individual projects, including broader issues related to perception, funding, training, communication, and labor conditions.

Our survey results point to a fundamental structural mismatch at the heart of biodiverse landscape management: landscapes designed to support ecological diversity require adaptive, knowledge-intensive stewardship, yet they are too often maintained through systems built around standardized, low-cost practices. Respondents consistently identified challenges that extend beyond individual sites or projects, reflecting broader issues in perception, funding, training, communication, and labor conditions. Taken together, these findings suggest that meaningful long-term improvement will depend not only on better project design, but on aligning maintenance systems, institutional expectations, and workforce support with the ecological complexity these landscapes demand.

Addressing these challenges will require change across multiple interconnected areas. Workforce capacity must be strengthened through expanded training opportunities and stronger management structures that support long-term stewardship. More sustainable funding models are also needed to support biodiverse landscapes over time. Cultural (mis)perceptions must be reshaped through education, public engagement, and storytelling that communicate the value of ecological landscapes. Finally, improving design frameworks and adaptive management strategies can strengthen collaboration across disciplines and project phases, while stronger governance and coordination systems can better align designers, owners, and maintenance teams around shared ecological goals. Together, these changes can help create a more integrated and resilient foundation for long-term success.

LEFT: Oudolf Garden (Ryan Southen Photography)

03

CASE STUDIES

Maintenance gardener tends to Republic Square (Patrick Y Wong)

SUCCESS STORIES: 14 CASE STUDIES OF PROJECTS & PLACES MAINTAINING BIODIVERSE LANDSCAPES

Bridging the disconnect between ecological research and practical landscape implementation requires clear, transferable examples of success. The following case studies highlight large-scale public and institutional landscapes that have successfully integrated biodiversity goals into long-term management and stewardship. Rather than focusing on highly publicized projects supported by exceptional funding and maintenance resources, such as the High Line, Lurie Garden, or corporate campus landscapes associated with companies like Meta and Google, these examples emphasize projects operating within more typical public and institutional constraints. Each case study demonstrates how collaboration between design and maintenance teams can support the long-term success of biodiverse landscapes at scale. Together, they offer practical, cost-conscious strategies and management approaches that can be adapted to a wider range of landscape contexts.

Staff and volunteers weed a biodiverse median at UC Davis (UC Davis Arboretum and Public Garden)



CASE STUDIES: CRITERIA & ASSESSMENT

The case studies were developed through a combination of semi-structured interviews with design and maintenance professionals and supplemental online research. Each project was evaluated using a consistent set of criteria to enable comparison across diverse contexts, including acreage, climate zone, biodiversity approach, design team composition, funding model, and maintenance practices. Additional areas of focus included maintenance team structure, planting typologies, and key narratives or lessons learned that illustrate how ecological intent is translated into long-term stewardship.

This framework is intended to support landscape architects as the primary audience, while also serving maintenance and management professionals, by highlighting practical, replicable strategies for advocating, designing, and sustaining ecologically vibrant landscapes capable of delivering lasting change. The selected examples emphasize approaches that are well-positioned for application in broader public and institutional landscape contexts, particularly those operating under realistic constraints of funding, maintenance capacity, and governance structures.

CASE STUDY PROJECT TYPES



Public Park



University Campus

KÖPPEN CLIMATE ZONES ACRONYMS



Humid Subtropical



Humid Continental



Warm-Summer Mediterranean



Hot Summer Mediterranean



Hot Semi Arid

ASSESSMENT PROPERTIES

› Acreage

Total land area encompassed by a project or managed landscape site. Project scale significantly influences ecological performance, maintenance demands, staffing needs, circulation patterns, and long-term management strategies.

› Construction or Project Budget

Total financial investment allocated toward the planning, design, construction, and implementation of the project. Budget provides important context for assessing which strategies are achievable within different funding conditions and operational realities.

› Climate Zone

Regional climatic classification of a project site using the **Köppen Climate Classification** system. The climate zones indicated in these case studies are estimates; readers are encouraged to find their own climate zones for replicable practices. Climate strongly influences plant selection, ecological performance, irrigation needs, maintenance intensity, and resilience.

› Maintenance Team

The organizations, groups, and coalitions involved in the long-term maintenance and management of the project or site including public agencies, private contractors, contracted or seasonal staff, non-profits, volunteer groups, and conservancies.

› Design Team

Consultants, organizations, and collaborators involved in the planning, design, engineering, ecological restoration, and implementation of a project.

› Planting Typologies

The plant community types and designed planting schemes included within the project. Planting typologies are categorized by dominant plant growth forms (trees, shrubs, grasses, perennials) and community compositions, as well as common schemes generalized from naturalistic planting approaches included block planting, matrix planting, and designed meadow.

› Biodiversity Approaches

The **ecological strategies, planting methodologies, habitat systems, and management techniques** used to support species richness, ecological resilience, and ecosystem function within a landscape. This category highlights practical and replicable strategies that can inform future efforts.

› Maintenance Practices

Routine, seasonal, and adaptive management techniques used to sustain plant communities, ecological systems, infrastructure, and public use over time. Maintenance practices are central to the long-term success of biodiverse landscapes and directly influence ecological health, resilience, aesthetics, and public perception.

› Maintenance Role

The **sharing of responsibility for various aspects of maintenance** between the different members of the maintenance team. This category illustrates different models for collaboration between multiple groups engaged in complex landscape care.

› Funding Model

The **financial structure** used to support the construction, operations, maintenance, and long-term stewardship of a project. This may include public funding, private philanthropy, conservancy partnerships, endowments, grants, earned revenue, or hybrid governance structures.

› Lessons Learned

Key insights, challenges, observations, and operational discoveries identified through the design, implementation, and long-term management of each project. This category captures the practical knowledge generated through real-world experience, including both successes and challenges encountered over time. Lessons learned help translate ecological goals into actionable guidance by revealing how maintenance practices, public perception, funding limitations, climate conditions, staffing structures, and adaptive management strategies affect project performance.

CASE STUDIES: PUBLIC PARKS

The selected case studies represent a diverse set of public parks across the United States, chosen to highlight how ecological ambition can be translated into long-term, real-world stewardship under a range of geographic, institutional, and funding conditions. Together, they span coastal, riverine, prairie, and urban post-industrial contexts—from Presidio Tunnel Tops in California and Brooklyn Bridge Park in New York City, to The Gathering Place in Oklahoma, Story Mill Community Park in Montana, Republic Square Park in Texas, Under the K Bridge Park in Brooklyn, and Oudolf Garden Detroit in Michigan.

Across these sites, funding and governance models vary considerably, ranging from municipal management and conservancy partnerships to philanthropic foundation leadership and hybrid public-private stewardship structures. Several projects, such as Brooklyn Bridge Park and The Gathering Place, demonstrate the role of dedicated long-term revenue strategies or philanthropic investment in sustaining high levels of ecological care, while others operate through more typical municipal or alliance-based frameworks, as seen in Republic Square Park and Story Mill Community Park. Across the set, maintenance approaches emphasize adaptive management, ecological horticulture, and collaborative stewardship models that integrate designers, operators, and in some cases volunteer or community-based labor.

Taken together, these parks illustrate a range of viable strategies for achieving biodiverse, publicly accessible landscapes at scale—demonstrating that ecological success is not limited to highly resourced flagship projects, but can also emerge through varied combinations of design intent, institutional support, and evolving maintenance practices.



REPUBLIC SQUARE

Texas



OUDOLF GARDEN DETROIT

Michigan



UNDER THE K BRIDGE PARK

New York



THE RAMBLE

Arkansas



PRESIDIO TUNNEL TOPS

California



GOWANUS CANAL

New York



STORY MILL PARK

Montana



THE GATHERING PLACE

Oklahoma



BROOKLYN BRIDGE PARK

New York

REPUBLIC SQUARE

422 GUADALUPE ST.
AUSTIN, TX 78107
COMPLETED — 2017

ACRES

2.4

BUDGET

5.8m

PROJECT TYPE



Public Park

CLIMATE ZONE



Humid Subtropical

PROJECT TEAM

Maintenance Team:
Collaboration between Nudge Design and City of Austin maintenance staff.

Design Team:
Design Workshop
DWG
Axiom Engineering
Carter Design Associates
Apex Cost Consultants
ETM Associates

PLANTING TYPOGRAPHY

- Open-Canopy Woodland
- Shrub-Dominated Block Planting
- Mixed Perennial Matrix Planting



REPUBLIC SQUARE PARK serves as a vibrant cultural hub and green oasis. After its renovation in 2017, Nudge Design and the Downtown Austin Alliance have collaboratively managed garden operations, focusing on soil health, plant diversification, ecological function, and optimized irrigation. The park integrates sustainability through drought-tolerant native plantings, prairie restoration for pollinators and wildlife, and permeable surfaces for stormwater management. Historic features, including the Auction Oaks, are preserved while providing flexible spaces for community events, art, and recreation. This multi-step management approach balances ecological health, civic use, and resilience, offering a replicable model for urban public gardens.

BIODIVERSITY APPROACH

- › **Prairie restoration** establishes diverse native plant communities, including grasses, wildflowers, and forbs, to support pollinators and wildlife.
- › **Native plant mixes** provide consistent food and habitat for insects, birds, and other urban wildlife.
- › **Historic trees**, including the Auction Oaks, are preserved, while additional canopy diversity is introduced to enhance resilience.
- › **Groundplane diversity** is increased through adaptive replanting and gap-filling with native species.
- › Plants are selected for **rapid coverage** to suppress weeds without herbicides.
- › **Soil biology** is actively supported to promote vigorous, sustainable plant growth.
- › **Drought-tolerant plantings** and efficient irrigation practices minimize water use.

MAINTENANCE PRACTICES

- › **Hand weeding** and pruning
- › **Seasonal plantings**, including native sunflowers
- › Soil inoculation with **mycorrhizae**
- › **Mulching** at planting with single-grind mulch, topped with 2–3” wood chips
- › **Irrigation monitoring** and adjustment, with designated non-irrigated areas
- › **Adaptive replanting**
- › Wildlife and **pollinator monitoring**
- › Staff training in sustainable care

MAINTENANCE ROLE

Nudge Design performs horticultural and gardening tasks including pruning, design and installation of new plantings, hand weeding, and irrigation management. A crew of two works approximately 40 hours per month from January–April, 20–30 hours per month from May–June and October–December. July–September reduced to eight hours per month. A private maintenance contractor performs mowing, trash removal, park custodial and facilities maintenance, and assist with major seasonal cutbacks and offhaul of biomass with a crew of four, working two hours weekly.

FUNDING MODEL

All funding for Republic Square is issued through the Downtown Austin Alliance.

LESSONS LEARNED

- +

Edge protection has made a major difference in the long-term health of plants by protecting plants from trampling by humans and dogs and minimizing soil compaction.
- +

Soil health is critical for planting success, vigor, and resilience, all of which support weed control. For this project, successful soil health approaches include minimal screening or no screening, keeping moderate clay content for fertility and moisture retention, use of biochar in the soil mix, and application of organic matter at the surface rather than incorporating into the soil mix.
- +

Shade, especially **building shade**, has been a major horticultural challenge and reduced plant resilience to stress. Construction of new buildings can suddenly alter sun exposure and require changes to plant community composition.
- +

The **gradual increase in plant diversity** through plant replacement has resulted in significant biodiversity gains, including increase presence of insects and birds. There has been an increased presence of rats, requiring monitoring and management.

RESOURCES & REFERENCES

- [Downtown Austin — Republic Park Square](#)
- [Republic Square Project](#)

ABOVE: Republic Square (Nudge Design)

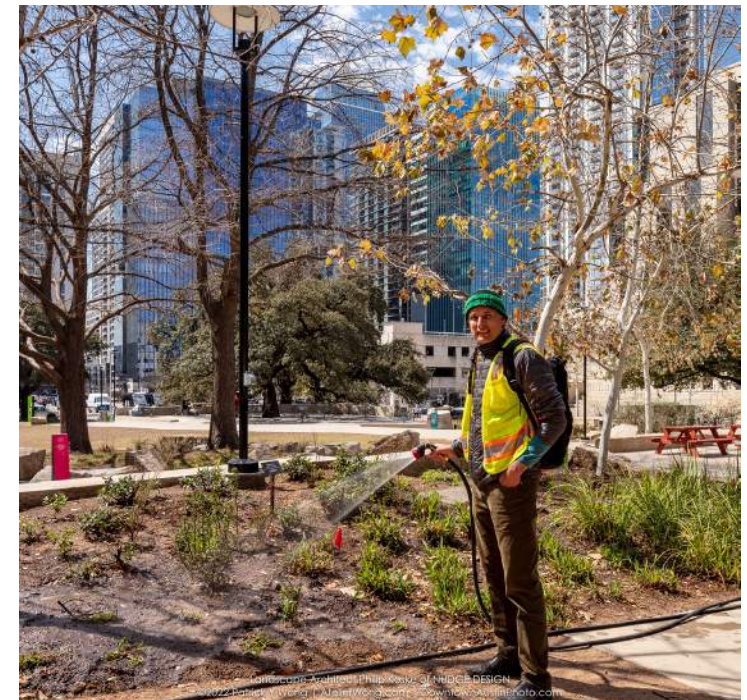
REPUBLIC SQUARE

422 GUADALUPE ST.
AUSTIN, TX 78107
COMPLETED — 2017

DYNAMIC AND SEASONAL

Since 2020, Nudge Design has partnered with the Downtown Austin Alliance to restore and manage Republic Square. The firm takes a hands-on approach to soils, plant diversity, irrigation, and ecological function, developing a multi-step maintenance model for civic gardens. This “design/maintain” approach leans into seasonality and change over time. As gaps appear in planting areas, their new planting selections prioritize ground coverage for weed control, layering, and species that have performed well in the particular microclimates of the site. The result is planting beds that feel both intentional and a little wild, and also celebratory seasonal moments like the annual sunflowers that tower over the groundcovers for a few months of each year.

“Be vocal about it and unafraid to dive in. With a shovel.”



QUOTE: Philip Koske, Nudge Design (2025)

LEFT: Maintenance gardener replanting to fill gaps in underperforming planting areas (Nudge Design)

TOP RIGHT: Site conditions before Nudge’s design/maintain gardening operations began (Nudge Design)

BOTTOM RIGHT: Replanting to fill understory gaps (Nudge Design)

-  The project inception, in particular the involvement of famed garden designer Piet Oudolf, was contingent on a **long-term maintenance funding strategy**. The endowment fund is held in partnership between Oudolf Garden Detroit and The Community Foundation for Southeast Michigan.

OUDOLF GARDEN DETROIT

BELLE ISLE, DETROIT, MI
COMPLETED — 2021

ADAPTIVE MANAGEMENT AND DESIGN

After extensive flooding during construction, the master plan was updated to ensure the garden can handle groundwater fluctuations and potential future flooding on Belle Isle. Piet reworked the master plan with support from InSite Design Studio, the project’s landscape architects based in Ann Arbor. The result features perennial beds raised up to street level and bordered by two retaining walls, and a grassy slope along the southern edge. The slope helps with garden drainage and is a fun spot for kids to run and play. The master plan also features expanded planted wetlands along the southern border, helping improve habitat along Lake Takoma.

“...this is a place that will teach you about plants, because you will see plants you have never seen before or have never seen combined this way.”



QUOTE: Piet Oudolf, The Garden Club of America (2021)
PHOTO: In bloom, the Oudolf Garden sits in front of the Nancy Brown Peace Carillon tower on Belle Isle on the Detroit River. (Ryan Southen, Gardens Illustrated 2021)

UNDER THE K BRIDGE PARK

19 BRIDGEWATER STREET
BROOKLYN, NY 11222
COMPLETED — 2021

ACRES

6.7

BUDGET

5.8m

PROJECT TYPE



Public Park

CLIMATE ZONE



Humid Subtropical

PROJECT TEAM

Maintenance Team:
North Brooklyn Parks. Alliance (NBK Parks)

Design Team: PUBLIC WORK, HR&A Advisors



UNDER THE K BRIDGE PARK is a public park under the Kosciuszko Bridge in Greenpoint, Brooklyn. It is operated by North Brooklyn Parks Alliance (NBK Parks), a parks conservancy that hosts events including major concerts, maintains the diverse park plantings, and operates a native nursery out of the park, in addition to its work maintaining other landscapes throughout North Brooklyn. Under the K serves a critical connective role for the neighborhood, providing pedestrian, bicycle, and habitat connectivity under the 9 lanes of Interstate 278 that cross the Kosciuszko Bridge (completed 2019), a previously underutilized space that was a barrier to people and wildlife. The event space is a major revenue generator for NBK Parks, and the native plantings and nursery reflect the conservancy’s ecological gardening approach and prioritization of habitat creation through thoughtful adaptive management.

BIODIVERSITY APPROACH

- › An **on-site native plant nursery** propagates and distributes regionally appropriate trees, grasses, and perennials to parks, community gardens, and neighborhoods across New York City.
- › More than **20,000 native trees** and plants establish habitat for local insects, birds, and urban wildlife.
- › Creekside restoration incorporates native riparian plantings to strengthen waterfront ecology and habitat connectivity.
- › **Organic landscape management** practices prioritize mulch, soil health, and the elimination of synthetic fertilizers and pesticides.
- › **Ecological planting** strategies respond to challenging site conditions, including limited sunlight and alkaline soils.
- › **Rewilding principles** guide landscape stewardship, emphasizing native species propagation and long-term ecological function.

MAINTENANCE PRACTICES

- › **Routine edge maintenance** to maintain clean transitions between asphalt, concrete, and planted areas
- › Mechanical **removal of invasive plant species**
- › Propagation and transplanting of native plants
- › **Soil amendment** to support plant health and establishment
- › **“Leave the leaves”** practice in planting areas
- › Ongoing **documentation** of horticultural practices, plant performance, and seasonal phenology
- › **Seed collection** for future propagation and adaptive planting

MAINTENANCE ROLE

The North Brooklyn Parks Alliance manages, programs, and maintains the park under an agreement with the NYS DOT. One dedicated full-time gardener, supported by staff and volunteers from Garden Club events, the Urban Forest Fellowship, and Horticultural Fellowship where interns participate in twelve-week spring and fall programs.

FUNDING MODEL

A hybrid conservancy model combines private philanthropy, earned revenue, and public partnerships. As a non-profit, NBK Parks reinvests proceeds from event rentals and ticketed programming—via a dedicated Park Restoration Fund—into ongoing maintenance and improvements across multiple parks. This district-wide approach allows revenue generated in higher-traffic or higher-income areas to support equitable maintenance, staffing, and ecological care throughout the neighborhood, including hands-on gardening, tree monitoring, and long-term stewardship.



PLANTING TYPOGRAPHY

- Shrub-Dominated Block Planting
- Perennial Block PlantingForest
- Mixed Perennial Matrix Planting
- Emergent Wetland/Stormwater Treatment

LESSONS LEARNED

- +

Public perception and preference for a highly-manicured appearance had been a challenge to the implementation of ecological gardening practices. NBK Parks engages the community through garden clubs, fellowships and internships, and plant giveaways from its Native Nursery.
- +

Despite the positively reception to biodiversity increasing, park visitors benefit from **interpretive signage and guidance** to see it and its relationship to the landscape.
- +

Skate-friendly design can expand park use without increasing conflict: Integrating skateable ledges, handrails, and steel coping into the overall park design broadened the park’s appeal and reinforced its role as an inclusive public space. Durable, utilitarian materials reduce damage concerns. support flexible use, and minimize maintenance responsibility.

RESOURCES & REFERENCES

- [Under the K Bridge — Organization](#)
- [PUBLIC WORK — Under the K Bridge Park Project](#)
- [North Brooklyn Parks Alliance](#)
- [CBS News \(2025\) — Featured Article](#)

LEFT: Under the K Bridge Park (Public Work)
ABOVE: Native plant nursery operated by North Brooklyn Parks Alliance (North Brooklyn Parks Alliance)

UNDER THE K BRIDGE PARK

19 BRIDGEWATER STREET
BROOKLYN, NY 11222
COMPLETED — 2021

A CIRCULAR NURSERY NETWORK

Much of the nursery’s infrastructure reflects the same ethos as its plantings: resourceful, collaborative, and deeply rooted in the city’s green network. Shelving is built from reclaimed wood donated by a private manufacturer, while seeds arrive from PECAN, the Parks Department–run nursery on Staten Island. Clean soil is sourced through the NYC Clean Soil Bank, the nation’s only municipal soil exchange program, turning surplus material into a vital growing medium. Even planting pots are gathered through informal reuse networks—“any source willing to give us pots.” Together, these partnerships create a circular system where urban resources are shared, reused, and reinvested in a greener city.

“Gardening for ecology is just one motivation. Gardening for social and cultural benefit—for people—is just as important.”



QUOTE: McGolrick Park Comprehensive Plan
PHOTO: Nursery Horticultural Fellows Theres Wegmann, Sara Hodaie and Snow Schwartz count seedlings at the Native Nursery to track germination rates (North Brooklyn Parks Alliance)

Keeping Up	Public Parks		Case Studies	30
THE RAMBLE FAYETTEVILLE, AK COMPLETED — 2024			BIODIVERSITY APPROACH › Conversion of a three-acre parking lot into a green civic plaza with trees and a water feature expands creek access, enhances habitat, and provides public cooling › Restoration of 1,200 feet of Tanglewood Branch creek corridor improves water quality and ecological function › Stream restoration includes micropools, riffles, and structures to increase dissolved oxygen and support habitat › The elevated path is an accessible walkway and bike path connector to regional trails. It reduces tree removal and protects creek stream ecology › 149 new trees and 400 native shrubs were added to replace invasive species and support biodiversity › In-depth survey of over 1,400 trees in Fay Jones Woods informed preservation, planting, and restoration decisions › Bioswales, restored wetlands, and naturalized stream channels manage urban runoff and improve stormwater processing › 36% of materials were sourced regionally, reducing transportation impacts and supporting the local economy › Recycled materials and waste diversion kept 100% of road and infrastructure waste out of landfills › Removed trees were mulched and repurposed to support soil health and plantings LEFT: Natural stone supplies seating along Tanglewood Branch Creek (Nick Hubbard, Architect’s Magazine)	MAINTENANCE PRACTICES › Multi-phase, city- and community-led removal of invasive species, including bush honeysuckle, restores native plant communities and enhances habitat diversity in the Lower Ramble › Community participation through Adopt-A-Park and Adopt-A-Trail programs support routine maintenance
ACRES 10+ BUDGET 31.7M PROJECT TYPE Public Park CLIMATE ZONE Humid Subtropical PROJECT TEAM Maintenance Team: City of Fayetteville’s Parks and Recreation Department Design Team: Nelson Byrd Woltz Landscape Architects, City of Fayetteville, Experience Fayetteville, Nabholtz, Entegrity, Flintlock, Nitsch Engineering, Olsson Associates, HSA Engineering, Tillett Lighting Design Associates, Hines, Rico Associates, Hydrodramatics, Threshold, Archetype PLANTING TYPOGRAPHY Open Canopy Woodland Forest		THE RAMBLE, completed in 2024, is a civic and ecological corridor in downtown Fayetteville that connects major arts institutions while restoring natural landscapes. Spanning the Upper Ramble between Dickson and Center streets and the Lower Ramble between Center and Prairie Street along 50 acres of public space, the park transforms overgrown, invasive-filled areas into accessible green space. Integrating arts, culture, and environmental restoration, it provides public access to the Fay Jones Woods and Tanglewood Branch creek, revitalizes the stream corridor, and links urban streetscapes with cultural assets, creating a dynamic space for community engagement, recreation, and ecological stewardship.	MAINTENANCE ROLE The Ramble is managed by the City of Fayetteville’s Parks and Recreation Department. Event-based volunteer opportunities offered through the City of Fayetteville (e.g., Invasive plant removal on MLK Day) FUNDING MODEL Public funding for the park, including the Parks Development Fund, the city’s General Fund, and a portion of the Sales Tax Capital Fund, comes from the City of Fayetteville. The Cultural Corridor, of which the Ramble is a part of, was funded through a Park Improvement Bond. Additional support came from the Walton Family Foundation’s Design Excellence Program grant, helping finance roads, trails, parks, public safety, and job creation associated with the project.	
LESSONS LEARNED + Repurposing underutilized space creates civic value: Converting former parking lots and neglected areas into the Upper and Lower Ramble demonstrates how landscape investment can generate vibrant public gathering spaces and activate downtown life. + Ecological restoration and urban development can be mutually reinforcing: Integrating stream restoration and green infrastructure within a dense urban context shows that environmental performance and civic use can coexist, contributing to SITES certification and long-term resilience. + The design team developed a maintenance manual for both lower and upper Ramble in collaboration with the City staff that guides maintenance efforts.		RESOURCES & REFERENCE SITES Cultural Arts Corridor – The Lower Ramble Nelson Bryd Woltz – The Lower Ramble Project Olsson – The Lower Ramble Project		

THE RAMBLE

FAYETTEVILLE, AK
COMPLETED — 2024

INVASIVE SPECIES REMOVAL IN FAYETTEVILLE

The City of Fayetteville uses a creative “bounty” program to curb invasive plants and restore native landscapes. Each spring, residents who remove designated invasive species from their property receive a free native tree or shrub in return. The program expands annually to spotlight priority invasives, initially focusing on Bradford pear and growing to include bush honeysuckle, Chinese privet, tree of heaven, golden bamboo, English ivy, and nandina. By pairing removal with replacement, the program reduces the spread of aggressive species that outcompete native plants while increasing public awareness and participation in long-term ecological stewardship across the city.



ABOVE: Volunteers work together to remove invasive species (City of Fayetteville)

LEFT: Elevated walkway provides landscape-safe bicycle and pedestrian access at the Ramble. (Nelson Byrd Woltz Landscape Architects)

Keeping Up	Public Parks		Case Studies	32	
PRESIDIO TUNNEL TOPS 210 LINCOLN BLVD, SAN FRANCISCO, CA 94129 COMPLETED — 2022		ACRES 14 BUDGET 118M PROJECT TYPE Public Park CLIMATE ZONE CSB Warm-Summer Mediterranean PROJECT TEAM Maintenance Team: The Presidio Trust, National Park Service, Golden Gate National Parks Conservancy Design Team: James Corner Field Operations; EHDD; Swinerton Builders	 PRESIDIO TUNNEL TOPS is a 14-acre park that transforms the space above Highway 101 tunnels into a vibrant landscape connecting the Presidio’s Main Post to Crissy Field and the San Francisco waterfront. Made possible by the replacement of a seismically unsafe highway section in the 1990s, the project spans cut-and-cover tunnels with a new public park shaped by extensive community engagement involving more than 10,000 participants. Designed by James Corner Field Operations through a partnership between the Presidio Trust, National Park Service, and Golden Gate National Parks Conservancy, the landscape recreates historic plant communities, incorporates 50% native species, supports wildlife habitat, and employs water-wise, sustainable practices.	BIODIVERSITY APPROACH › A diverse planting palette of more than 200 species and varieties supports ecological resilience, with over half of the plants locally native. › Native plants were propagated on-site from locally collected seed at the Presidio Nursery by the Golden Gate National Parks Conservancy. › Planting design prioritizes pollinator habitat for butterflies, insects, and birds. › Local plant communities, including Dune Scrub and Coastal Scrub, are represented to strengthen habitat connectivity with Crissy Marsh and adjacent uplands. › Planting strategies embrace succession and adaptation, allowing landscapes to evolve over time while building resilience to wind and coastal conditions. › Recycled-water “purple pipe” infrastructure is integrated to support future non-potable irrigation and long-term water stewardship. › Nature-based play landscapes extend ecological learning through immersive, sensory engagement within a living landscape. › Lightweight geof foam subgrades support over 50,000 cubic yards of horticultural soil, enabling robust plant communities above historic tunnel infrastructure. › Fallen and cleared Presidio trees were reused in building construction and site furnishings, reinforcing material reuse and site-based resource stewardship. › New landscape elements across the 14-acre site meet strict environmental standards, with over 50 sustainable practices supporting pursuit of ReScape (formerly Bay-Friendly) Rated Landscape certification. ABOVE: Bay Overlook (Presidio Trust)	MAINTENANCE PRACTICES › Maintenance protocols emphasizing reduced water inputs and soil care › Sensor-based, weather-responsive irrigation › Monthly water meter monitoring › Gradual replacement of low-use lawns with drought-tolerant plantings › Use of high-performance, tested soil mixes › Compost incorporation during soil preparation › Ongoing soil testing and monitoring › Certification of all soils and plant materials as Phytophthora-free prior to installation › Routine water audits to monitor irrigation performance and identify leaks › Regular mulching of planting beds to maintain soil cover, including consistent three-inch mulch layer across all planter beds › Integrated Pest Management using cultural, biological, and targeted controls. MAINTENANCE ROLE Public team includes the Presidio Trust, National Park Service, and Golden Gate National Parks Conservancy maintain the Tunnel Tops. Presidio Tunnel Tops Stewards volunteer through a seasonal program that runs from April–September twice a week. Activities include pruning, weeding, spreading mulch, and other general landscaping and gardening activities. FUNDING MODEL Presidio Trust is funded by earned revenue and private funding donations.
PLANTING TYPOGRAPHY Shrubland Matrix Planting Emergent Wetland/Stormwater Treatment Mixed Perennial Matrix Planting		LESSONS LEARNED + Framed view corridors to the Golden Gate Bridge and bay reinforce a strong sense of place, while community feedback emphasize the value of additional welcoming cues like shade, seating, and enclosure. + Habitat monitoring of Tunnel Tops, part of a long-term monitoring effort (see next page) showed that habitat value at the project site was in the “good” range with 77% of surrogate species present within 3 years of construction. + Dense plantings along the freeway edge demonstrate how landscape elements can also buffer noise and improve comfort in challenging urban conditions. + Designing for diverse experiences strengthens public use and comfort: Organizing the landscape into distinct yet connected zones—such as open lawns for views, overlook paths, and immersive play areas—allows the park to support a wide range of users and activities.	RESOURCES & REFERENCES Golden Gate National Park Conservancy — Presidio San Francisco ASLA Northern California Chapter — Award Field Operations — Presidio Tunnel Top Project Presidio Tunnel Tops Planting Fact Sheet		

PRESIDIO TUNNEL TOPS

210 LINCOLN BLVD,
SAN FRANCISCO, CA 94129
COMPLETED — 2022

CULTURE AND CREATURES

The Presidio is both a National Historic Landmark, known for its views of the Golden Gate Bridge and historic use as a military base, and a biodiversity hotspot that includes historic forest fragments, bayfront shoreline habitat including Crissy Marsh, and a range of upland habitats.

Thirty-five monitoring sites within the Presidio are regularly evaluated using the [Urban Biodiversity Index Framework \(UBIF\)](#) including Tunnel Tops and four other sites categorized as Cultural Landscape. UBIF uses the presence or absence of defined surrogate species to assess biodiversity. Cultural Landscape habitat areas in the Presidio were ranked as *good* in 2023–2025 with 78% of surrogate species observed, up from 58% in 2018–2019 and 66% 2020–2023, and comparable to 81% in the Presidio overall.

“Moments like this can create positive memories and life-long connections to the outdoors”



QUOTE: Richard Kennedy (Field Operations), featured in ASLA’s *The Dirt* (2022)
ABOVE: Presidio Trust maintenance staff are supported by volunteer stewards (Presidio Trust)
LEFT: Shrub matrix habitat stabilizes a slope, abutting a popular overlook site at Tunnel Tops (Presidio Trust)

GOWANUS CANAL

BROOKLYN, NY 11222
Multiple Projects*

ACRES

20

BUDGET

3.3B

PROJECT TYPE



Public Park

CLIMATE ZONE



Humid Subtropical

PROJECT TEAM

Maintenance Team:
Gowanus Canal Conservancy Gowanus Green Team

Design Team Gowanus Lowlands Plan. (See capital project links for more):

SCAPE Studio; Arup; Ben Margolis Biohabitats; Langan; Natural Systems Utilities; OptiRTC; Sherwood; Thread Collective; The New York Community Trust

PLANTING TYPOGRAPHY

Emergent Wetland/Stormwater Treatment
Forest
Mixed Perennial Matrix Planting



GOWANUS CANAL is being transformed from a Superfund industrial corridor into a resilient, biodiverse waterfront through innovative landscape design, green infrastructure, and habitat restoration. The Gowanus Canal Conservancy has led several major community-driven initiatives, including the Gowanus Lowlands park network, SpongePark, and ongoing stewardship programs. By integrating remediation, public access, and ecological enhancement, the project balances environmental justice, urban development, and climate resilience, creating a “park without borders” that reconnects communities to the canal while serving as a model for sustainable urban waterfront revitalization.

*Capital Projects: [Sponge Park \(2015\)](#); [363 Bond Street](#); [EPA Superfund Clean-Up \(2018-ongoing\)](#); [Gowanus Lowlands Master Plan \(2019\)](#); [Powerhouse Arts \(2023\)](#); [300 Huntington Street Esplanade \(2024\)](#); [420 Carroll Street \(2025\)](#); [Sackett Place \(2025\)](#); [Gowanus Bond Street \(Ongoing\)](#); [Gowanus Green \(Ongoing\)](#); [175 Third Street \(Ongoing\)](#); [Head End CSO Tank \(ongoing\)](#); [Salt Lot CSO Tank \(ongoing\)](#)

LESSONS LEARNED

- +

Collaboration between designers and landscape managers ensures design intent and biodiversity goals are realized throughout design and construction.
- +

Baseline biodiversity monitoring informs advocacy and decision-making and establishes ecosystem benchmarks before interventions.
- +

Contaminated waterfront maintenance **requires adapted protocols to protect staff** while sustaining habitat.
- +

Regenerative practices like green mulching and “leave the leaves” require **careful balance with pest and disease management**.
- +

Tracking plant survival can guide adaptive management, informing species selection, replacement strategies, and planning for future projects.

BIODIVERSITY APPROACH

- › Plant communities, including subcategories of Tidal, Coastal, Plateau, Lawn, Rain Gardens, and Streetscapes, are illustrated and described along with lists of suitable species.
- › Design and conservation teams **co-develop stewardship plans** for long-term ecological health.
- › Native tidal and salt marsh plantings **restore historic habitats**.
- › Multi-species embankments and “working landscapes” support birds, insects, and aquatic wildlife.
- › **Green infrastructure**—including bioswales, detention tanks, and daylighted creeks—manages stormwater and reduces CSOs.
- › **Annual bioblitzes and surveys** track over 300 plant species, 40+ bird species, and 40+ marine species.
- › Insect surveys document abundance and diversity pre- and post-construction.
- › **Early, visible prototypes** of bioswales, raingardens, and other green infrastructure engage volunteers and interns in installation and care, demonstrating stewardship and building community understanding of ecological interventions
- › Landscapes are managed to provide **equitable access and habitat** for both people and wildlife.
- › **Community stewardship** and sustainability is fostered through volunteer programs and educational initiatives.

ABOVE: Sponge Park. (Gowanus Canal Conservancy)

MAINTENANCE PRACTICES

- › **Site and soil analysis**
- › Managing **compost application** according to soil needs
- › Careful **plant selection** (right plant, right place)
- › Plant inventorying and monitoring
- › Insect and wildlife monitoring
- › Utilizing gardening practices as **disturbance to manage succession**
- › Conserve water and control runoff, supplemental mulching to increase water retention
- › **Delayed cutback** of grasses and perennials through fall and winter
- › Creation of **habitat piles** to retain green waste and carbon on site
- › **Green mulching** and **“chop and drop”** of plant material
- › **Integrated Pest Management** strategies
- › Removal of unwanted plants **before going to seed**
- › **Mechanical removal of weeds** with minimal soil disturbance
- › Implement methods of invasive removal based on plant species and phenology, environment, cost, timing and conditions
- › Apply methods like **solarization, occultation, or steaming** to manage larger areas of targeted problem areas
- › Environmental monitoring and responsive management through **data-driven sensing**

RESOURCES & REFERENCES

- [Gowanus Canal Conservancy 2024 GCC Annual Report](#)
- [Gowanus Ecosystems Report](#)
- [Gowanus Lowlands Master Plan](#)
- [SCAPE Studio – Gowanus Project](#)
- [UT Austin – Interview with Asst. Prof. Maggie Hansen](#)

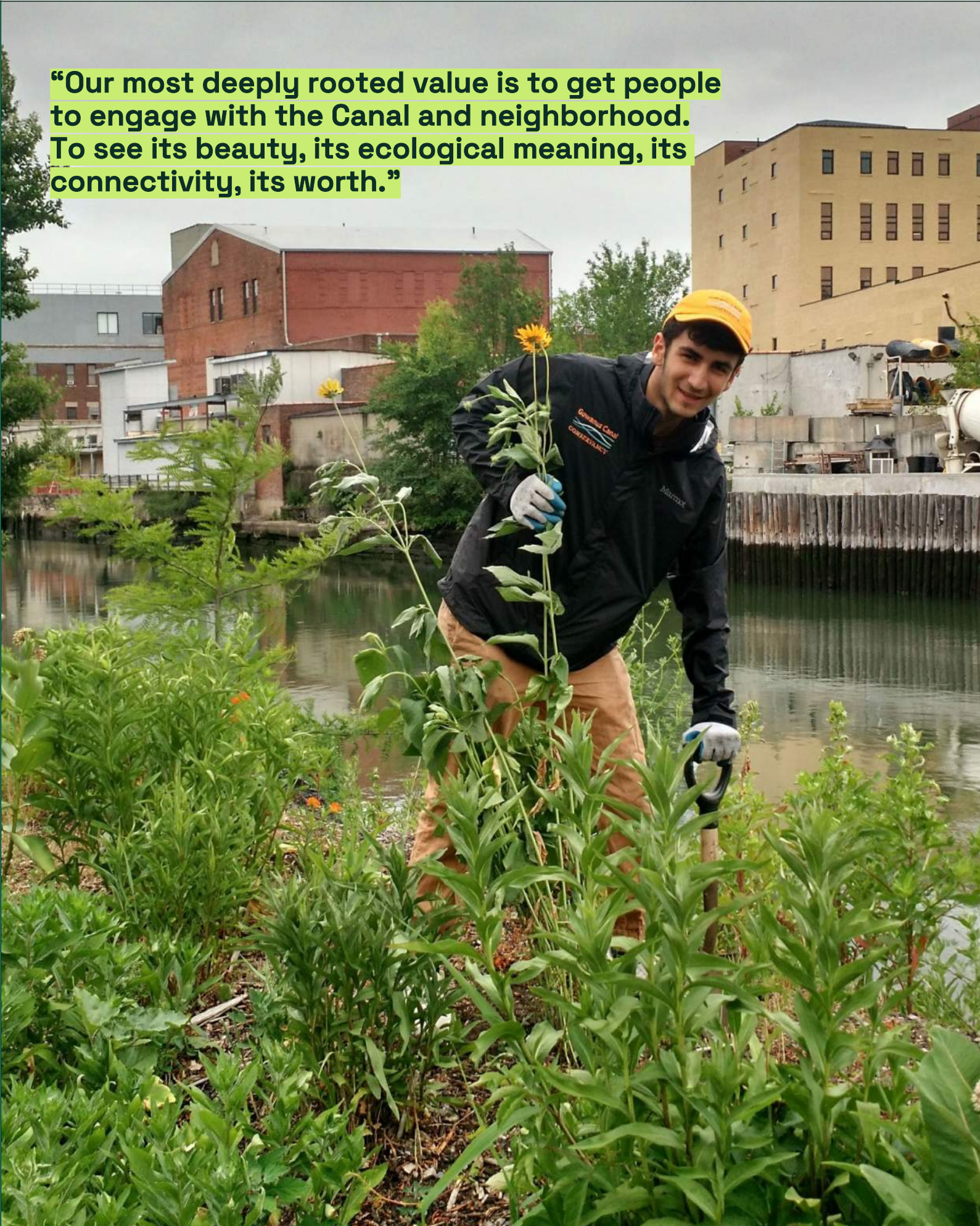
GOWANUS CANAL

BROOKLYN, NY 11222
Multiple Projects*

RAIN COALITION AND STEWARDSHIP

Green infrastructure across New York’s five boroughs is managed by a patchwork array of agencies. In response to the need for better landscape management to keep this infrastructure functional, Gowanus Conservancy and other watershed organizations formed the Rain Garden Action In Neighborhoods (RAIN) Coalition. This workforce development program facilitates staff and volunteer training, sharing of insights, and coordinated stewardship efforts. As staff install and maintain green infrastructure features, they gather insights on plant health, groundwater, and how neighbors perceive the space. By securing paid stewardship contracts, the Conservancy employs and mentors local youth, cultivating the next generation of neighborhood leaders.

“Our most deeply rooted value is to get people to engage with the Canal and neighborhood. To see its beauty, its ecological meaning, its connectivity, its worth.”



MAINTENANCE ROLE

The Gowanus Canal Conservancy (GCC) nonprofit staff includes the Gowanus Green Team: 3 full-time stewardship staff, 4 seasonal staff, 16 youth, and approximately 250 volunteers. Stewardship staff includes people focused on gardening, nursery management and volunteer operations. Nursery volunteers commit approximately 600 hours/year as of 2024. Each project includes difference maintenance compositions.

FUNDING MODEL

The GCC facilitates the development of, advocates for, and manages the landscapes of the open space around the Gowanus canal. They are supported by private donations and a Business Improvement District wherein waterfront property owners pay into a maintenance fund.

QUOTE: Andrew Simons, GCC Board Chair (2024 Annual Report)
ABOVE AND LEFT: Tours and hands-on maintenance bring the community into the process, building trust with residents and city agencies alike. Left, a Green Team member manages vegetation along the canal. Above, paid teen apprentices from the Gowanus Green Team support maintenance efforts. (Gowanus Canal Conservancy)

Keeping Up	Public Parks		Case Studies	36			
STORY MILL PARK 698 BRIDGER DRIVE BOZEMAN, MT, 59715 COMPLETED — 2019		ACRES 60 BUDGET 6.5M	PROJECT TYPE  Public Park CLIMATE ZONE  Humid Continental	PROJECT TEAM Maintenance Team: City of Bozeman’s Parks Division Design Team: Design Workshop, Design 5, Intrinsik Architecture. Stahly Engineering Irrigation Services of Montana, CDS Engineering, RESPEC, Learning by Nature, Biohabitats, Inc., ETM Associates, LLC, LSC Transportation Consultants, Inc.	 STORY MILL COMMUNITY PARK in Bozeman, Montana spans 60 acres at the confluence of Bozeman Creek and the East Gallatin River, adjacent to the historic Bridger Mountains. Developed after a 2008 foreclosure halted a large-scale mixed-use project, the park combines a 40-acre restored nature preserve—including wetlands, forests, and nearly a mile of river frontage—with a 20-acre programmed area featuring trails, a climbing boulder, adventure playground, amphitheater, picnic pavilion, and community garden. Created through collaboration among the City of Bozeman, the Trust for Public Land, nonprofits, and local experts, the park integrates ecological restoration, outdoor recreation, and year-round community programming.	BIODIVERSITY APPROACH › Stormwater filtration and reduction of sediment in the East Gallatin River through the restoration of the Bozeman Creek floodplain and creation of the Bozeman Creek Slough. › Native riparian zones, meadows, and woodland understories established with cottonwoods, willows, junipers, and native seed mixes. In total, 399 established trees were preserved and 613 primarily native trees were newly planted. › Invasive species removed to restore natural processes and reduce fire risk. › Forty-acre nature preserve doubles wetland area, providing habitat for fish, birds, and other wildlife. › Wildlife corridor supports bird species, beaver, otters, and mink. › Diverse ecosystems —including aspen groves, grasslands, shrublands, and understory plantings—support varied wildlife. › Trails connect to regional networks and cultural heritage sites, including the historic Story Mill grain elevators. › Accumulative documentation identified 156 bird species, 16 species of concern, 16 bee species, and 26 butterfly species. › Nature sanctuary integrates quiet wildlife viewing with interpretive programs for education and community engagement. › Wetland restoration promotes overall downstream water health, improving the trout fishery in the East Gallatin River, the most popular trout-fishing creek. ABOVE: Story Mill Park integrates ample interpretive signage along trailways. (Brandon Huttenlocher/Design Workshop, Inc.)	MAINTENANCE PRACTICES › Regular removal of weeds, leaf debris, and root systems in cultivated areas › Mulching around trees and plants, maintaining a 2-inch depth to conserve moisture and protect bases › Raking ornamental grasses such as Blue Oatgrass instead of cutting them › Management of active recreation zones and restored areas using site-specific maintenance strategies › Implementation of City of Bozeman performance-based standards for water use and plant selection MAINTENANCE ROLE The park is maintained through a partnership between the City of Bozeman Parks and Recreation Department, the Trust for Public Land (TPL), the Gallatin River Task Force, and private landscape service providers. City of Bozeman Parks & Rec oversee general park upkeep and development. The City Parks Division manage landscape and irrigation maintenance contracts. Gallatin Valley Food Bank (GVFB) manage the park’s Learning Garden in partnership with the City and TPL, and facilitate volunteers who help with planting, weeding, harvesting, and site prep during the growing season. Montana Fish, Wildlife and Parks, Greater Gallatin Watershed Council, and Trout Unlimited contributed to the initial restoration efforts and ongoing monitoring. FUNDING MODEL A \$200,000 maintenance endowment was established during the site’s transition from the Trust to the City. The park’s operations are also supported by rental income, accounting for 22% of the City’s annual park revenue.
PLANTING TYPOGRAPHY Open Canopy Woodland Meadow Wetland/Riparian		LESSONS LEARNED + A change to the design of the bird blind highlights how small details can affect wildlife interactions. Large open-air window openings, though visually appealing, caused visitors to inadvertently startle birds, reducing observation opportunities. Park staff and birders noted that continuous slatted walls at multiple eye levels would allow unobtrusive viewing, letting birds behave naturally while visitors watch. (Right, Story Mill Park)		RESOURCES & REFERENCES Montana Community Restoring Wetlands — EPA Project Feature — Landscape Performance Series Story Mill Community Park — Design Workshop Smart Water Resources — City of Bozeman			

STORY MILL PARK

698 BRIDGER DRIVE
BOZEMAN, MT, 59715
COMPLETED — 2019

BLENDING PUBLIC SPACE WITH RESTORATION

Story Mill Community Park is a rare example of large-scale ecological restoration on public land, making wetlands, riparian zones, and meadows accessible to the community. Visitors can explore restored landscapes, observe wildlife, and experience firsthand the benefits of conserving water and protecting urban ecosystems. The park also functions as an outdoor classroom, hosting youth camps and university programs where students learn about restoration, soil science, and water management. Research opportunities connect the park’s ecological interventions to education, fostering a deeper public understanding of sustainability, recreation, and the value of resilient, biodiverse urban landscapes.

“Restoration often occurs on private lands. Story Mill is unique because it’s public, and so accessible.”



QUOTE: Maddy Pope, Trust for Public Lands Project Manager
PHOTO: Brandon Huttenlocher/Design Workshop, Inc.

Keeping Up	Public Parks		Case Studies	38
THE GATHERING PLACE 2650 S JOHN WILLIAMS WAY TULSA, OK 74114 COMPLETED — 2018 ACRES 66.5 BUDGET 465M PROJECT TYPE  Public Park CLIMATE ZONE  Humid Subtropical PROJECT TEAM Maintenance Team: GCP Parks, LLC (River Parks Authority). OSU Master Gardeners. Design Team: Michael Van Valkenburgh Associates, Inc; Mack Scogin Merrill Elam		 THE GATHERING PLACE is a 66.5-acre public park along the Arkansas River in Tulsa, Oklahoma, created by the George Kaiser Family Foundation and designed by Michael Van Valkenburgh Associates. Opened in 2018 and free to the public, the park features a lush, naturalistic planting style with dense, mixed plantings that embrace change over time. Its landscapes draw from Oklahoma’s prairies, wetlands, and forests, alongside lawns and formal garden moments. Design and horticulture emphasize preservation and diversity, retaining mature trees and introducing thousands of new plantings to create a resilient, evolving landscape shaped as much by nature as by design. ABOVE: Peggy’s Pond Beach, The Gathering Place. (Shane Bevel)	BIODIVERSITY APPROACH › More than 400 plant species structure the park’s planting palette, many native to Oklahoma and locally sourced. › Sixteen acres of wildflowers were seeded using a custom mix developed with the Lady Bird Johnson Wildflower Center. › Over 1.2 million plants and shrubs were installed across the park. › Approximately 400 existing trees were preserved, and 6,000 new trees were planted. › More than 100 tree species contribute to canopy diversity and resilience. › Nineteen engineered soil types support a wide range of plant communities. › Nearly six million gallons of pond water recirculate through adjacent wetlands for natural filtration. › Underground infiltration basins beneath parking areas filter pollutants before runoff enters the river system. › Wetland infiltration gardens capture roadway and upland runoff along Riverside Drive. › Two 300-foot land bridges reconnect habitats fragmented by Riverside Drive. › Dredged river silt was reused to form park topography and lawn areas. › Sustainably sourced materials, including thermally modified wood and local sandstone, support low-impact construction. › Wetland restoration along the Arkansas River was enhanced through check dams and planting. › Educational programming supports biodiversity awareness through wildlife guides, plant databases, and hands-on learning.	MAINTENANCE PRACTICES › Preservation and long-term care of mature, original site trees › Establishment and management of prairie areas to support wildlife and reduce mowing inputs › Integrated Pest Management using beneficial insects, biological controls, and low-toxicity treatments › On-site composting of woody and herbaceous landscape debris › Reuse of leaf litter as compost for planting beds › Refined mulching techniques to improve efficiency while reducing physical strain on staff › Use of perennial plantings to minimize annual material and labor inputs › Operation of an underground maintenance facility for reduced heating and cooling demand › Management of green roof systems for building insulation and microclimate cooling › Natural filtration of pond water through wetland systems prior to irrigation reuse › Weather-responsive irrigation adjusted using solar- and wind-powered monitoring systems › Use of electric utility vehicles and landscape maintenance equipment where feasible › Recycling of shipping pallets into engineered wood fiber for playground surfacing › Creative reuse of wood from removed trees for site furnishings and play elements › In-house propagation of grasses, sedges, and native forbs for meadow establishment › Staff participation in monarch butterfly tagging and conservation monitoring › Planting and stewardship of endangered tree species in collaboration with regional partners
PLANTING TYPOGRAPHY Open-Canopy Woodland Emergent Wetland/Stormwater Treatment Perennial Block Planting Mixed Perennial Matrix Planting Forest Meadow		LESSONS LEARNED + Integrating Science into Maintenance Practice Strengthens Stewardship - Staff participation in monarch butterfly tagging and conservation monitoring shows how integrating scientific research into routine maintenance improves ecological understanding and management outcomes. Hands-on involvement in monitoring builds staff knowledge of species dynamics, strengthens stewardship, and better aligns daily maintenance decisions with long-term conservation goals. + Partnerships Expand Capacity for Managing Sensitive Plantings - The stewardship of endangered tree species demonstrates the value of collaboration with regional partners. Working with botanical and conservation organizations expands technical expertise, shares responsibility, and supports adaptive management, leading to more resilient long-term care of sensitive plantings.		
		RESOURCES & REFERENCES The Gathering Place — Organization New York Times — Transform with Tulsa (2018) The Architect’s Newspaper — Gathering Place Aims for Reconciliation (2019) Michael Van Valkenburgh Associates — The Gathering Place Project		

THE GATHERING PLACE

2650 S JOHN WILLIAMS WAY
TULSA, OK 74114
COMPLETED — 2018

BIODIVERSITY AS CIVIC INFRASTRUCTURE

As cities compete to attract residents, talent, and investment, public parks increasingly function as strategic civic infrastructure. Design excellence alone is no longer enough; biodiversity, sustainability, and health-centered landscapes now signal economic competitiveness and long-term public value. At the Gathering Place, a single-donor philanthropic model elevates expectations for what a contemporary park can do, allowing biodiversity to be treated as a core civic amenity. Private funding enables ambitious ecological goals and reinforces civic values that resonate with residents, visitors, and investors alike. In this context, philanthropic investment plays a decisive role in redefining parks as high-performing ecological and social assets.

“Parks have become economic development magnets. There is a peacetime arms race as cities compete with each other. Having a great public amenity like a park helps draw residents and investors to a city.”



MAINTENANCE ROLE

The park is operated by GGP Parks, LLC, a subsidiary of the River Parks Authority that operates out of the George Kaiser Family Foundation. Staff includes specialists in horticulture, programming, community engagement, food service, and more, with 45 full-time park management positions, 200 part-time employees during peak summer activity, and 14 park leaders. GGP Parks facilitate in-house leadership and management training programs year round. GGP Parks also coordinates over 450 volunteers who help run the park daily, with over 11,300 hours of volunteer work. Planting is supported by the OSU Master Gardeners.

FUNDING MODEL

The park’s long-term maintenance is secured through a \$100 million endowment established by the George Kaiser Family Foundation, dedicated exclusively to ongoing care and family programming. A foundation subsidiary operates and funds the park for the next 99 years, ensuring maintenance without reliance on municipal operating budgets. Total funding is a combination of more than 80 corporate and philanthropic organizations.

QUOTE: Adrian Benepe, Senior VP Trust for Public Lands, former New York City Department of Parks & Recreation commissioner (New York Times, 2018)

LEFT: The Gathering Place contains a large-scale skate park and BMX pump track designed by California Skate Parks (MVVA)

ABOVE: Maintenance gardener mulches trees at the park. (Kellyn Register, The Gathering Place)

BROOKLYN BRIDGE PARK

BROOKLYN, NY
COMPLETED — 2021

ACRES

85

BUDGET

335M

PROJECT TYPE



Public Park

CLIMATE ZONE



Humid Subtropical

PROJECT TEAM

Maintenance Team: Brooklyn Bridge Park Corporation, a non-profit responsible for maintenance and operations

Design Team: Michael Van Valkenburgh Associates, Inc. *See project page for additional collaborators.*

PLANTING TYPOGRAPHY

- Shrubland Matrix Planting
- Emergent Wetland/Stormwater Treatment
- Mixed Perennial Matrix Planting
- Open-Canopy Woodland
- Perennial Block Planting
- Forest
- Meadow



BROOKLYN BRIDGE PARK stretches 1.3 miles along the East River, transforming 85 acres of former industrial waterfront into a vibrant civic landscape. The park reconnects Brooklyn neighborhoods to the river, offering passive and active recreation, cultural programming, and ecological habitats. Industrial elements are repurposed, diverse aquatic and terrestrial plantings restore native ecosystems, and stormwater management captures and reuses runoff. The maintenance and operations are a model of innovative stewardship, envisioning the park both as a public facility and as a garden, with a strong commitment to ecological horticulture and adaptive management. The park’s economic model for maintenance creates reliable ongoing revenue, creating a financially independent, long-term stewardship approach that supports both the park’s ecological health and public access.

LESSONS LEARNED

- +

A long-term collaborative relationship has emerged between maintenance staff and lead designers at MVVA. Designer involvement was supported by the multi-phase nature of the project, and an ongoing practice of site walks with design and maintenance staff ensures that design intent is considered and adapted over time, and that the horticultural team has agency to make informed decisions as design collaborators.
- +

An ethos of investment in training and workforce development has built a skilled staff of horticulturalists and seasonal workers. The opportunity to grow from a volunteer or intern to a permanent staff member supports workforce retention, builds agency and ownership, and supports long-term institutional memory.

BIODIVERSITY APPROACH

- › **Recycled fill** from regional infrastructure projects was reused to construct park topography, transforming former piers into varied landforms that support diverse habitats.
- › **Salvaged old-growth longleaf yellow pine** from on-site deconstruction was reused for benches, decking, and structures, reducing material waste and preserving site history.
- › A **closed-loop stormwater system** captures rainfall, filters it through freshwater ponds, and stores it underground for reuse in landscape irrigation.
- › **Green roofs on park structures** absorb rainwater, provide habitat, improve building insulation, and reduce urban heat impacts.
- › **Native plant communities**—including woodlands, meadows, salt marshes, and pollinator gardens—recreate historic East River ecologies and strengthen habitat connectivity.
- › **Waterfront restoration** replaces hardened bulkheads with permeable, vegetated edges that support salt marsh function and marine life.
- › **Habitat design** supports migratory species along the Atlantic Flyway by providing forage, shelter, and resting areas for birds.
- › **Milkweed and nectar-rich plantings** support monarch butterfly migration, paired with population tracking and monitoring efforts.
- › **Oyster reef restoration**, in partnership with the Billion Oyster Project, improves water quality and creates habitat for marine species.
- › **Ecological design and interpretation** connect visitors to natural systems, using the park as a living demonstration of urban ecological restoration and stewardship.

MAINTENANCE PRACTICES

- › **Organic management** of lawns, planting beds, and trees, eliminating synthetic fertilizers, pesticides, and herbicides
- › Soil health supported through **regular applications of compost**, compost teas, and organic matter
- › **Lawns maintained at longer heights**, with grass clippings reincorporated to encourage deep root systems
- › **Seasonal shift** of planting and transplanting activities from spring to fall to improve plant establishment and resilience Limited perennial cutbacks in fall, preserving seed sources, overwintering habitat, and natural self-sowing
- › **Cutbacks are timed** in coordination with bird presence and habitat use, through monitoring and input provided by local ornithologists and birding groups.
- › **“Leave the leaves” approach**, retaining leaf litter as mulch and wildlife habitat wherever possible
- › **Targeted removal of duff** only where pests or diseases are present, with infected material replaced by clean mulch or redistributed leaves
- › **Incremental pruning** in six-inch sections, allowing cut material to remain on-site as mulch rather than being removed
- › **Hands-off maintenance philosophy** that prioritizes ecological processes, intervention only when necessary, and long-term landscape health

ABOVE: Birds-eye view of Brooklyn Bridge Park (July Kelco)

RESOURCES & REFERENCES

- [Brooklyn Bridge Park- Sustainability](#)
- [New York Time — Spring Planting and Fall Gardening \(2021\)](#)

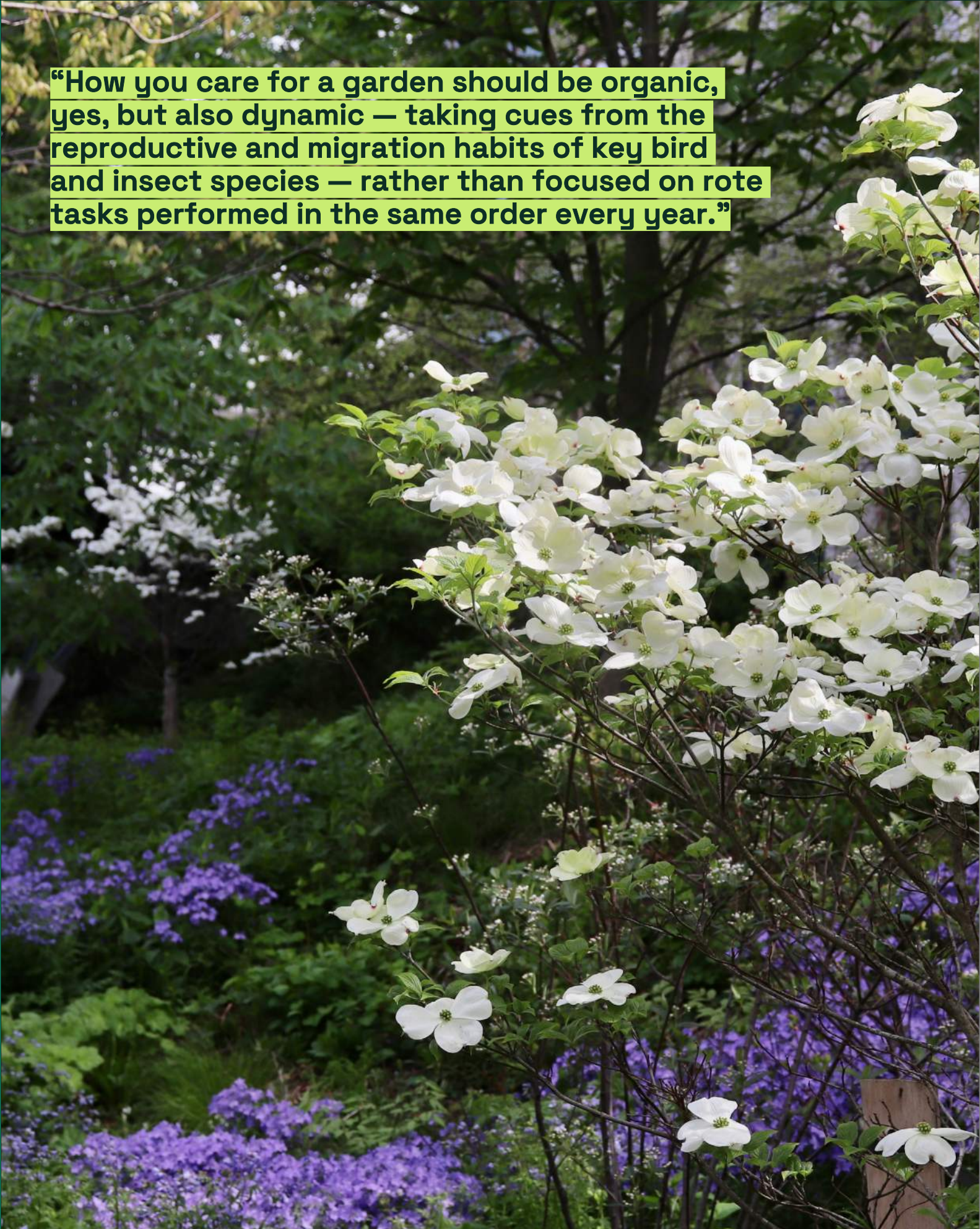
BROOKLYN BRIDGE PARK

BROOKLYN, NY
COMPLETED — 2021

LET SEASONAL WILDLIFE GUIDE PLANTING DECISIONS

Close, season-long observation of wildlife use is essential to successful landscape management. Gardeners noticed migratory birds feeding on spent goldenrod in fall and responded by adding native beautyberry to extend available forage. Importantly, planting was intentionally delayed until the birds had completed migration, avoiding disturbance during a critical feeding period. This experience reinforced that timing is as important as plant selection, and that attentive, on-the-ground observation by gardeners—tracking who is visiting flowers and eating berries—leads to more responsive, wildlife-supportive planting strategies.

“How you care for a garden should be organic, yes, but also dynamic — taking cues from the reproductive and migration habits of key bird and insect species — rather than focused on rote tasks performed in the same order every year.”



MAINTENANCE ROLE

The organization includes 25 full-time in-house staff plus seasonal gardeners, comprising a Director of Horticulture, Deputy Director, 15 gardeners, a groundskeeper, an arborist, a horticulturist, two supervisors, and three interns, with training conducted in-house through experience in New York City gardening or stewardship programs or via the Brooklyn Bridge Park seasonal gardener program leading to full-time hire. Volunteer opportunities span Green Team, Coastal Clean Up, Education, Zone, Docent, Event, Photographer, Fishing, Tides, Kayaking, and corporate volunteer programs, with time commitments varying by program and season, typically two to four hours per month.

FUNDING MODEL

Operations and maintenance are supported through a public/private partnership with a self-sustaining revenue stream generated from redirected real estate taxes within the park’s development zone, supplemented by the Brooklyn Bridge Park Conservancy, corporate partnerships and sponsorships, private donations, concessions and Brooklyn Bridge Park merchandise, and benefit events.

QUOTE AND PHOTOS: Rebecca McMackin, Director of Horticulture of Brooklyn Bridge Park. (Brooklyn Bridge Park Conservancy)

CASE STUDIES: UNIVERSITY CAMPUSES

The selected campus case studies highlight how large-scale institutional landscapes can function as living laboratories for ecological design. Together, they represent a range of higher-education and research settings across diverse ecological and regional contexts. These examples demonstrate how universities are increasingly using their landscapes not only as functional infrastructure, but also as public-facing environments to support biodiversity, learning, and everyday campus life.

The case studies encompass a range of governance and management strategies including long-term ecological master plans, SITES-certified or sustainability-driven development frameworks, and phased implementation strategies that integrate capital projects with ongoing maintenance and operations. Funding structures vary from philanthropic and institutional investment to state-supported public university systems, often supplemented by established campus sustainability initiatives tied to carbon reduction or water conservation.

A consistent theme is the integration of ecological performance with operational feasibility. Maintenance strategies increasingly emphasize reduced-input landscapes, habitat creation, soil and water management systems, and adaptive plant communities designed for long-term resilience. Many campuses also incorporate research, teaching, and community engagement directly into their landscape systems, reinforcing the role of maintenance and management staff as active participants in shaping ecological outcomes. Taken together, these campuses illustrate how institutional landscapes can move beyond conventional ornamental or turf-dominated frameworks toward more diverse, multifunctional, and ecologically responsive systems.



GEORGE W. BUSH PRESIDENTIAL CENTER Texas



DELL MEDICAL DISTRICT CAMPUS Texas



UCLA LANDSCAPE PLAN California



PENN STATE LANDSCAPE IMPLEMENTATION PLAN
Pennsylvania



UC DAVIS CAMPUS California

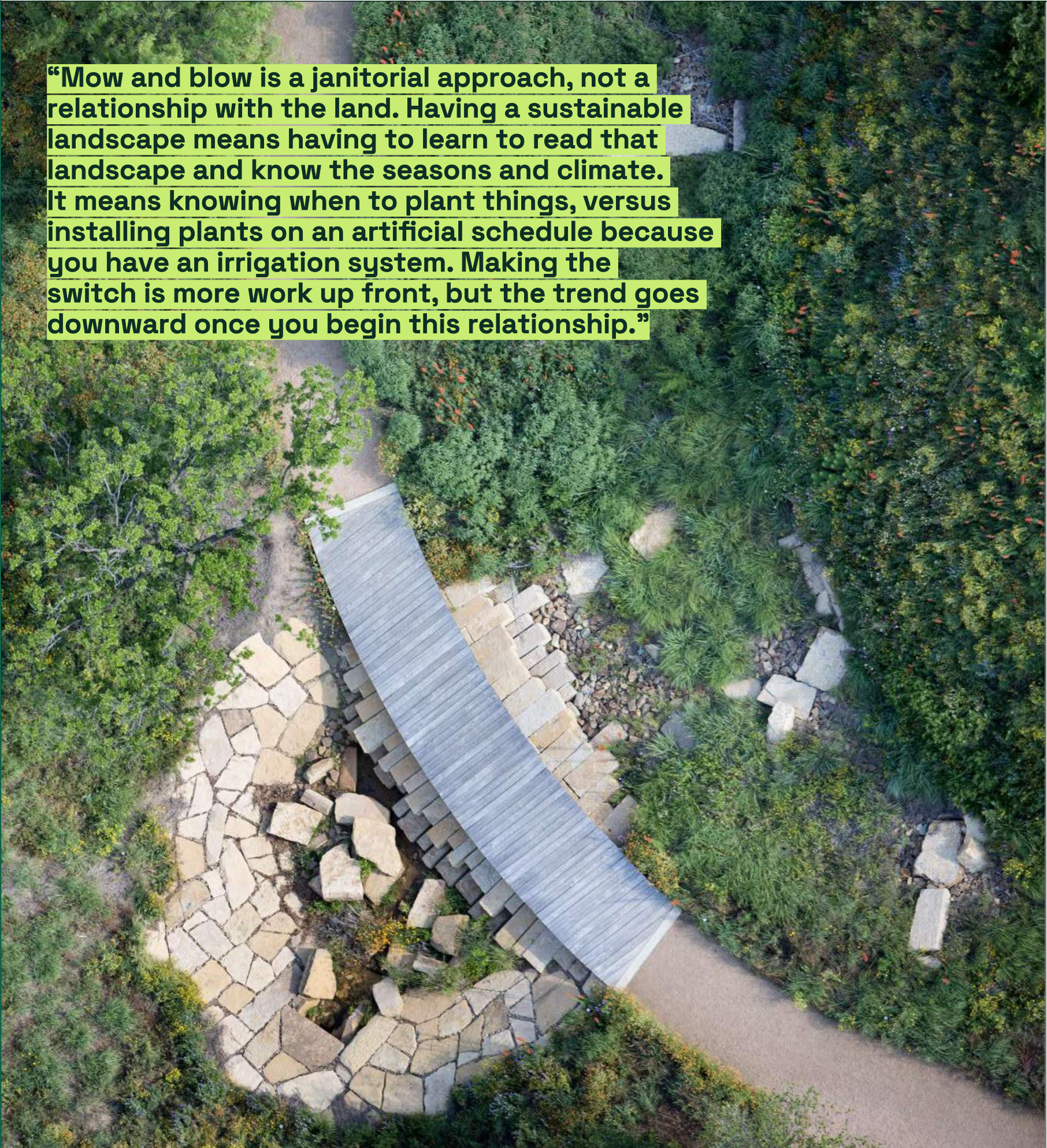
GEORGE W. BUSH PRESIDENTIAL CENTER

SOUTHERN METHODIST UNIVERSITY
2943 SMU BOULEVARD, DALLAS, TX
COMPLETED — 2013

CLIENT LEADERSHIP SHAPES LASTING LANDSCAPES

The George W. Bush Presidential Center demonstrates how visionary client leadership can guide decisions about biodiversity and long-term maintenance. Former First Lady Laura Bush played a key role in shaping the prairie landscape surrounding the library, bringing both design sensibility and practical experience in restoration—having previously restored acres of prairie and grassland on the family’s Texas ranch. She emphasized creating a sanctuary for students at the adjoining SMU campus while showcasing the resilience and beauty of native Texas plants, including trees transplanted from the ranch. Her guidance ensured that biodiversity was prioritized from the outset and that maintenance strategies would support a healthy, enduring landscape capable of thriving in Texas’ climate.

“Mow and blow is a janitorial approach, not a relationship with the land. Having a sustainable landscape means having to learn to read that landscape and know the seasons and climate. It means knowing when to plant things, versus installing plants on an artificial schedule because you have an irrigation system. Making the switch is more work up front, but the trend goes downward once you begin this relationship.”



QUOTE: Environmental Designer John Hart Asher in Wildflower Magazine. (Gaskill, M)

LEFT: Wood bridges and stone checkdams cross shallow bioswales comprised of grasses and sedges. (MVVA)

ABOVE, TOP: Trails are carefully embedded through out the meadoway. (MVVA)

ABOVE, LOWER: Mrs. Bush, MVVA, Landscape contractors and prairie consultants monitoring plant establishment.

Keeping Up	Campuses		Case Studies	45
DELL MEDICAL DISTRICT CAMPUS UNIVERSITY OF TEXAS, AUSTIN AUSTIN, TX COMPLETED — 2017			BIODIVERSITY APPROACH > Design and maintenance teams co-developed short- and long-term stewardship plans. > Native-planted entrances balance ecological performance with a uniform civic character. > Naturalistic meadows increase habitat diversity and ecological function. > 220 native species are propagated on site through seed collection and greenhouse production. > Native and salvaged plants from the original site were conserved and reused. > Native planting has reduced irrigation demand by more than 75%. Riparian restoration removed invasives, stabilized stream banks, and reestablished native plant communities. > 3,318 cubic yards of restored soil support long-term ecological health. > 14 mature live oak trees were relocated and preserved on site. > Regional materials reduced transportation impacts and supported the local economy. Recycled content accounts for 28% of total material costs. > Repurposed trees were used as interior furnishings in Health and Medical Center buildings. > All-electric landscape equipment reduces air and noise pollution.	MAINTENANCE PRACTICES > Rainwater harvesting and reuse for irrigation > Reuse of air-conditioning condensate for landscape irrigation > Irrigation monitored and adjusted by a dedicated irrigation team > Reduced irrigation once plantings are established > Exclusive use of manual and electric-powered landscape tools > Composting of campus-generated organic waste, including coffee grounds, leaves, and grass clippings. Compost tea production (thousands of gallons per batch), tailored for drought resistance, freeze resistance, root soaking, or foliar feeding > Annual soil testing to assess soil health and guide natural amendments > Prescribed burning to remove dead biomass and encourage new grass and wildflower growth > Adaptive management practices, including plant relocation rather than removal and selective maintenance timing > Outreach to set expectations for seasonal variability and non-uniform landscape appearance LEFT: Dell Medical District Campus (Albert Vecerka, Sasaki)
ACRES 16.2 BUDGET 15M			THE DELL MEDICAL SCHOOL district is the first project in Texas to achieve SITES v2 Gold certification. At just over eight acres of dedicated landscape, it is designed to enhance ecosystem services while remaining resilient and cost-effective to maintain. Stormwater systems double as site amenities, connecting visitors to local climate and hydrology through rain gardens, pervious paving, rainwater harvesting, and a green roof. Streetscapes and plazas support social interaction and integrate the campus with the surrounding city.	MAINTENANCE ROLE Landscape maintenance at UT Austin is led by the university’s Landscape Services team, with a landscape supervisor overseeing a dedicated crew of five to six caretakers. The team uses a range of hands-on and professional training approaches, including certification through the Native Plant Society of Texas and on-site instruction with ecological organizations, to build expertise in managing native and ecologically complex landscapes. Volunteer support complements this work through the university’s Urban Forestry program, which offers spring service-learning projects that engage students and community members in stewardship activities
PROJECT TYPE  University Campus CLIMATE ZONE  Humid Subtropical		LESSONS LEARNED + Because it is designed for natural succession, the landscape is very dynamic and changes yearly – one year could be all wildflowers, followed by bunch grasses, then woody plants, or even invasives. + The restoration of Waller Creek is an integral part of the project, allowing for expansion of biodiversity benefits into upland areas of the project site. Riparian restoration removed invasives, stabilized stream banks, and reestablished native plant communities. + Invest in technology that saves manpower – The smart irrigation system pauses irrigation to areas with too much soil moisture, can pump more to drier spots, and provides maintenance staff with real time data.	RESOURCES & REFERENCE Sasaki — Dell Medical District Landscape Sustainable Sites Initiative — Dell Medical District (UT Austin) UT Austin Operations — Landscape Maintenance UT Austin Sustainability — Landscape Stewardship	
PLANTING TYPOGRAPHY Open Canopy Woodland Meadow Shrubland Matrix Planting Mixed Perennial Matrix Planting Perennial Block Planting Stormwater Treatment				

DELL MEDICAL DISTRICT CAMPUS

UNIVERSITY OF TEXAS, AUSTIN
AUSTIN, TX
COMPLETED — 2017

WATER SMART DESIGN

Rooftop gardens totaling 27,000 square feet have required no irrigation since 2017 and minimal maintenance since 2019. These roofs also capture rainwater in a 27,000-gallon cistern used to irrigate the west side of the site. Combined with reclaimed water use and low-water native plantings, the Dell Health District uses approximately 20% less water than a conventional St. Augustine turf landscape. Bioswales, pervious paving, open meadows, and living fire lanes retain up to 85% of a 2-inch storm on site, reducing flood risk to Waller Creek and downstream neighborhoods.

“Fortunately, the landscape maintenance team was able to share their decades of knowledge about techniques that would actually work. An architect can design a site however they want. But if the maintenance team doesn’t share that vision, they will change it to something that functions for them.”



QUOTE: Justin Hayes, Landscape Supervisor, in an article on the Dell District landscape work (UT Austin Facilities Services)

PHOTO: BrightView landscape team installs Dell Medical’s rooftop garden with 7000 individual plants. (John W. Clark, Lady Bird Johnson Wildflower Center.)

Keeping Up	Campuses		Case Studies	47
UCLA LANDSCAPE PLAN 405 HILGARD AVENUE LOS ANGELES, CA 90095 COMPLETED — 2022			BIODIVERSITY APPROACH › Turf reduction of 65% advances landscape conversion and water efficiency. › Native plantings comprise 75% of total planting areas, reducing reliance on exotic and high-water species. › 30% of campus land functions as dedicated habitat to support biodiversity. › Environmental systems prioritize the establishment of key habitat linkages across campus. › Ecological corridors and “unifying plant” species connect the zones, enhancing habitat continuity and overall biodiversity. › Core on-campus and adjacent off-campus habitat areas guide conservation and restoration efforts. › A mapped connectivity network based on landscape “naturalness” directs habitat enhancement priorities. › Four distinctive landscape zones respond to natural ecology, built features, and campus cultural uses. MAINTENANCE ROLE The team includes laborers, groundskeepers, irrigation mechanics, equipment operators, groundskeeper leads, four groundskeeper supervisors, and other roles such as landscape architects, pest control advisors, certified horticulturalists, irrigation water auditors, arborists, turf specialists, and project managers, with landscape teams trained on native plant care in partnership with the Theodore Payne Foundation, and volunteer and internship opportunities available at the UCLA Mathias Botanical Garden.	MAINTENANCE PRACTICES › Incorporate traditional ecological knowledge into routine landscape maintenance practices › Thin overplanted tree groves and implement long-range urban forest and tree diversity planning › Add shrubs to tree understory to enhance habitat complexity › Replant underperforming native landscapes using a revised, site-appropriate plant palette › Gradually replace problematic species with more suitable native alternatives › Train landscape teams on native plant care in partnership with the Theodore Payne Foundation › Phase out formal hedges and highly pruned forms in favor of naturalistic pruning practices › Retain and process green waste on campus for compost and mulch; salvage larger wood for reuse › Leave fallen leaves in place to support soil health and habitat › Reduce mowing intensity; cease mowing in low-use lawns until access is required FUNDING MODEL Public funding through the UC system. All new buildings must include funding for ongoing landscape maintenance. NOTABLE RECOGNITIONS UCLA’s efforts in taking an ecological approach to grounds maintenance and pest management were awarded a Gold level <u>Green Grounds Certification</u> by Re:wild Your Campus.
ACRES* 419 BUDGET VARIOUS		THE UCLA LANDSCAPE PLAN provides a long-term framework to guide both major capital projects and incremental landscape change through day-to-day management. It promotes responsible environmental practices, including turf conversion to native plantings, increased habitat connectivity, urban forest stewardship, and climate adaptation. The plan organizes campus landscapes into distinct ecological zones—Hill District, Alluvial Corridor, Grand Savanna, and Urban Canyon—each with tailored plant palettes. It identifies priority restoration areas for native habitat conservation and expands Tongva land caretaking through indigenous plantings, interpretation, and staff training that integrates traditional ecological knowledge into campus stewardship. ABOVE: Mildred E. Mathias Botanical Garden at UCLA (Halinda Yu/Daily Bruin)		
PROJECT TYPE CLIMATE ZONE University Campus Hot Summer Mediterranean		LESSONS LEARNED + Landscape laboratory for research, teaching, and learning: Students engage with the Edible Campus Initiative, conduct biennial surveys of outdoor spaces, and promote pollinator habitat through Bee Campus programs. + The University’s landscape maintenance staff receives training from the Theodore Payne Foundation, which specializes in training institutional maintenance teams on native and ecological gardening techniques. Areas of focus include species-specific pruning, non-chemical weed control, irrigation, and which plants need less maintenance. + Minimizing green waste and overall expenses: Centralizing green waste collection for on-site composting and mulching, phasing out aggressive pruning, and using total asset management to plan funding demonstrate how thoughtful landscape practices can reduce maintenance costs while enhancing ecological and aesthetic value.		RESOURCES & REFERENCE UCLA Landscape Plan (2022) UCLA Landscape Plan Appendix UCLA Sustainability — Landscape & Biodiversity Green Grounds Certification — Award Announcement
PLANTING TYPOGRAPHY Open Canopy Woodland Forest Meadow Shrubland Matrix Planting Shrub-Dominated Block Planting Perennial Block Planting Emergent Wetland/Stormwater Treatment				

UCLA
LANDSCAPE
PLAN

405 HILGARD AVENUE
LOS ANGELES, CA 90095
COMPLETED — 2022

NON-ESSENTIAL TURF CONVERSION

Turf contributes to the classic campus aesthetic and supports recreation, leisure, and events. However, excess turf in underused areas consumes resources, provides little biodiversity value, and is costly to maintain. In response to community input and sustainability goals, UCLA is converting non-essential turf into spaces for student-led programming, ecological plantings, and more resilient, low-maintenance landscapes.

“The goal is setting an example with climate-resilient landscapes that also support human and ecological health that hopefully become standard way beyond our campus.”



QUOTE: Nurit Katz, UCLA’s chief sustainability officer (UCLA News Room, 2025)
PHOTO: Peter Bohler, *Oasis of Nature* (2022)

PENN STATE SUSTAINABLE LANDSCAPE IMPLEMENTATION PLAN

PENN STATE UNIVERSITY PARK CAMPUS, 201 OLD MAIN, UNIVERSITY PARK, PA 16802
COMPLETED — 2024

ACRES

426.5

BUDGET

175K

PROJECT TYPE



University Campus

CLIMATE ZONE



Humid Continental

PROJECT TEAM

Maintenance: Penn State Staff, Horticulturalists, Campus Custodians.

Design: Stephen Stimson Associates Landscape Architects, Inc.
Phyto Studio. Climate Positive Design
The Pennsylvania Horticultural Society

PLANTING TYPOGRAPHY

Open-Canopy Woodland	
Shrub-dominated block planting	
Perennial block planting	
Mixed perennial matrix planting	
Forest	Meadow



THE PENN STATE SUSTAINABLE LANDSCAPE IMPLEMENTATION PLAN is a planning effort explores how ecological landscape management can transition Penn State’s tree-and-lawn–dominated campus into a more ecologically intensive, lower-input system, supporting the university’s goal of net-zero carbon emissions by 2035. The framework emphasizes ecological intensification through high species diversity, layered planting, and high-performing flowering species, alongside greater self-reliance in plant procurement. Revisions to campus design standards prioritize material reuse, soil restoration, reduced paving and lawn, and lower embodied carbon. Pilot projects at Westgate Meadow and Chapel Woods test multiple planting typologies, demonstrating reduced maintenance costs while advancing carbon sequestration, biodiversity, and long-term ecological performance.

LESSONS LEARNED

- +

Early and **proactive weed management** is essential to prevent the establishment of a persistent weed seed bank.
- +

An **area-based maintenance model** builds accountability while benefiting from a collaborative team structure that allows horticultural staff to train entry-level crew members.
- +

Including two to three years of establishment maintenance within the **installation contract** supports long-term planting success.
- +

Sustainable landscape planning can be effectively **funded through student facilities fees** when supported by a clear proposal and governance process.

BIODIVERSITY APPROACH

- Baseline landscape operational greenhouse gas emissions were calculated using **Pathfinder**.
- Converting large lawn areas** to alternative planting typologies enables campus carbon neutrality.
- A **5–10–15 tree diversity standard** guides campus resilience across species, genus, and family.
- Landscape strategies **prioritize expanded tree canopy**, restoration of Hort Woods, and sustainable ground flora.
- Hort Woods is positioned as a **connective forest system** within the campus landscape.
- Six ground-flora typologies** guide lawn conversion: stylized sun meadow, stylized shade meadow, meadow conversion, low shrub massing, block planting, and matrix planting.
- Site suitability, installation, and management guidance support **long-term performance** across diverse campus conditions.

MAINTENANCE PRACTICES

- › **Annual mowing** of stylized sun meadows prior to bulb emergence
- › Strategically timed **cutting of turf-to-meadow** conversion areas
- › Manual weed removal
- › Targeted **spot treatment** of invasive species
- › **Occasional overseeding** with desirable species in sunny meadow types
- › **Removal** of tree seedlings and climbing vines
- › **Minimal shrub pruning** to preserve natural form
- › Infill planting in block beds to maintain weed suppression
- › **Fertilizer or compost** applied only when site conditions require

MAINTENANCE ROLE

Staff is organized into three unionized categories under an area maintenance model: outdoor custodial staff (grade 8) responsible for trash, mowing, leaf collection, and snow removal with the least training; supervisors (grade 7) overseeing two to three grade 8 areas with responsibilities including pruning, pesticide application, and some horticultural training; and horticulturalists (grade 6) with significant training and experience assigned to horticulturally intensive garden spaces of 0.5–1 acre or to rehabilitation of rain gardens or green roofs.

FUNDING MODEL

Arboretum requires that 50% of construction costs go into maintenance endowment. Tree endowment covers cost of new trees on campus each year.

RESOURCES & REFERENCES

[Sustainable Landscape Implementation Plan – PENN STATE](#)
[PSU — Sustainable Landscapes Endowment](#)

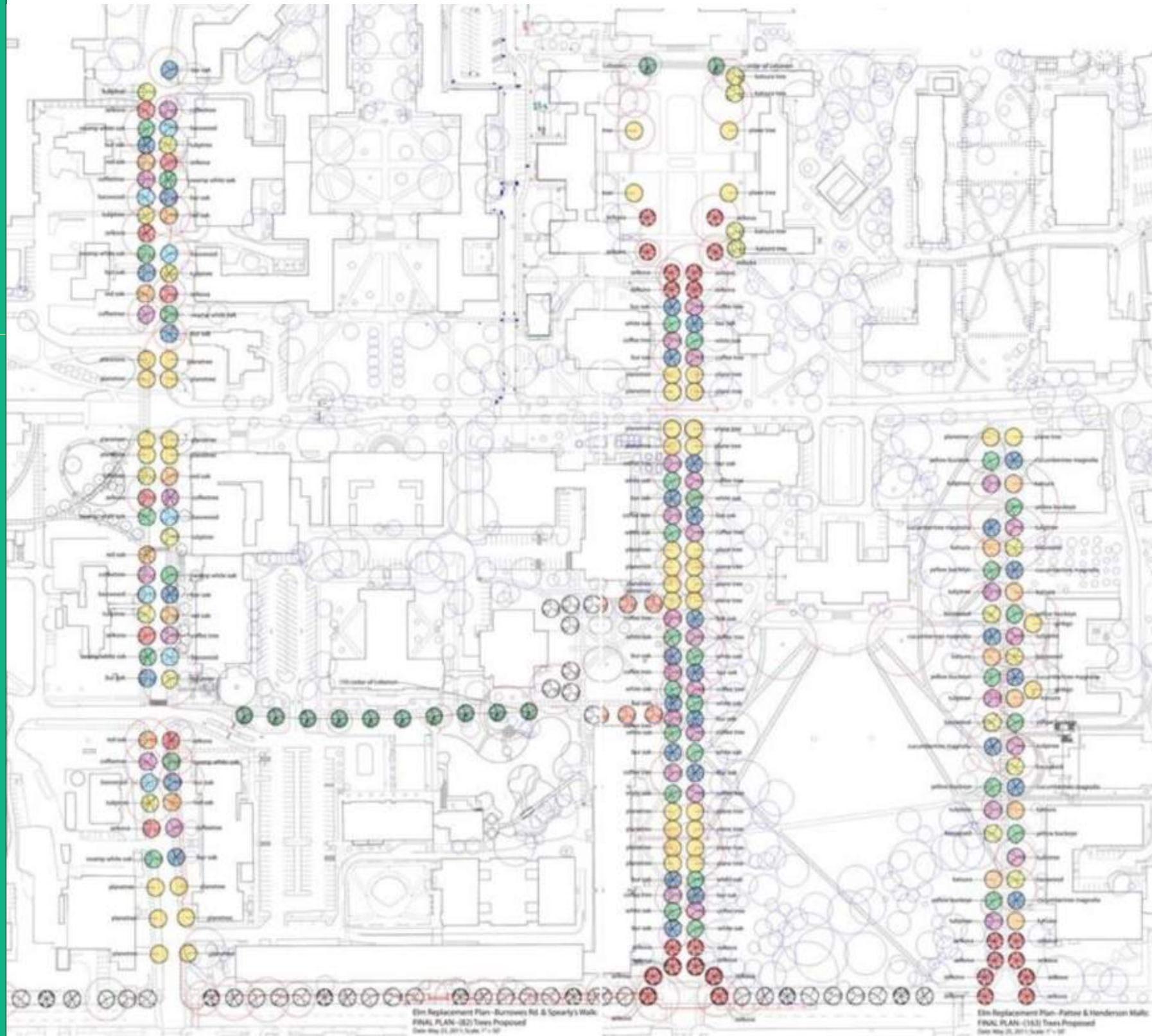
ABOVE LEFT: Student volunteers plant trees at the plan’s kickoff event. (Patrick Mansell / Penn State)
ABOVE RIGHT: Perennial understory plantings (Penn State)

PENN STATE SUSTAINABLE LANDSCAPE IMPLEMENTATION PLAN

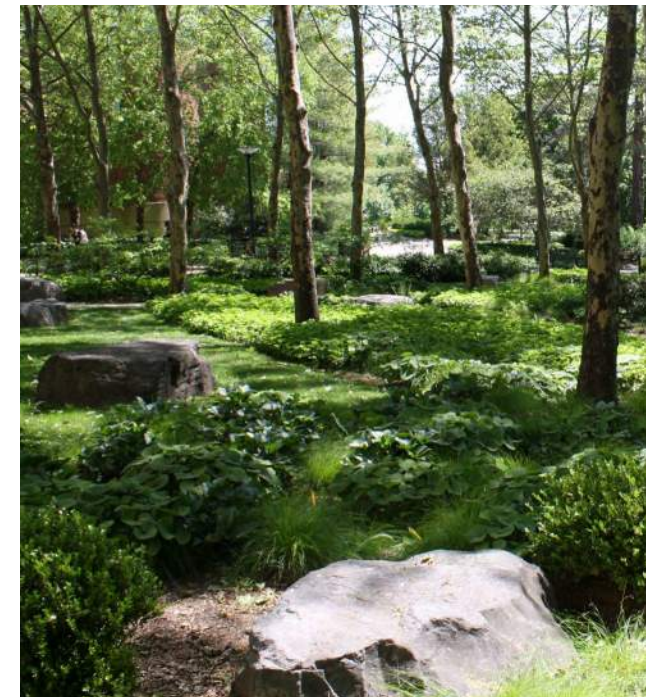
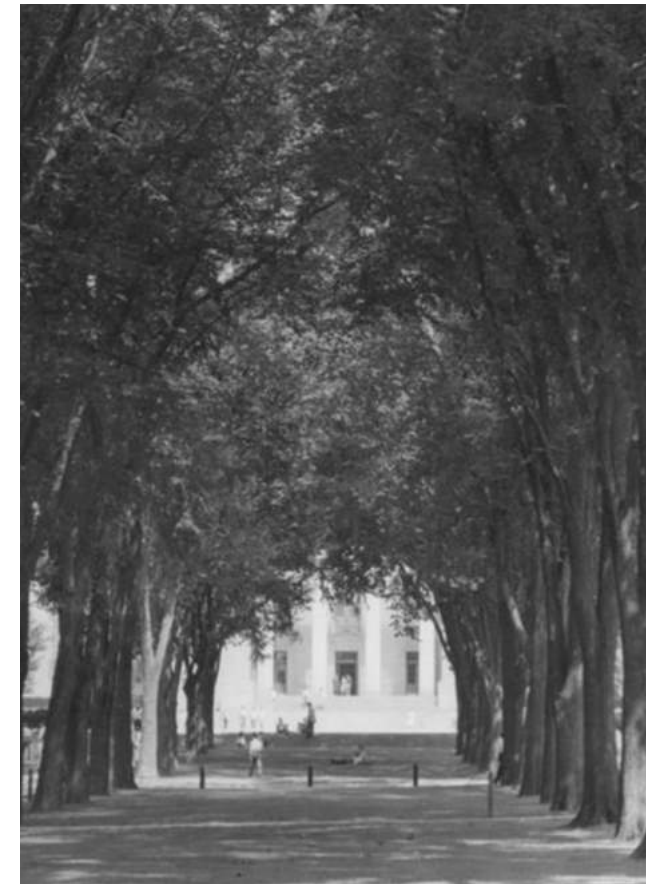
**PENN STATE UNIVERSITY PARK
CAMPUS, 201 OLD MAIN, UNIVERSITY
PARK, PA 16802
COMPLETED — 2024**

FOREST RESILIENCE

Allées of American Elms were planted along Penn State's malls and streets in the late 19th and early 20th centuries, creating an iconic "gothic cathedral" effect. The dominance of elms left the campus urban forest vulnerable to Elm Yellow and Dutch Elm disease, creating large gaps in the canopy. Tree replacement focuses on diversity, exceeding the 10-20-30 rule and targeting a more ambitious 5-10-15 distribution: No more than 5% of any one species, 10% of any one genus, and 15% of any one family.



Penn State Planting Plan (Derek Kalp)



ABOVE: Pattee mall area elms at Penn State (Derek Kalp)

BELOW: Tree diversity at Penn State, Peace Garden
(Sustainable Landscape Plan, 2023)

Keeping Up	Campuses		Case Studies	51				
UC DAVIS CAMPUS DAVIS, CA COMPLETED — Ongoing		ACRES* 700 BUDGET VARIOUS	PROJECT TYPE  University Campus CLIMATE ZONE  Hot Summer Mediterranean	PROJECT TEAM Maintenance Team: Unionized Grounds Grew, Arboretum Volunteers Design Team: UC Davis Landscape Architecture Staff. Outside consultants vary by project. PLANTING TYPOGRAPHY Open Canopy Woodland Meadow Shrubland Matrix Planting Shrub-Dominated Block Planting Perennial Block Planting Emergent Wetland/Stormwater Treatment	 THE UC DAVIS CAMPUS is guided by the Living Landscape Adaptation Plan, a 70-year strategy to create climate-resilient, low-input landscapes that conserve water, enhance biodiversity, and support learning across 1000-acres of campus areas, with focus on 700-acres of central campus*. The plan transitions water-intensive turf to drought-tolerant plantings, modernizes irrigation, and manages a diverse urban forest of 14,000 trees representing more than 100 species. Covering one-fifth of campus, this canopy provides shade, habitat, carbon sequestration, and energy savings. Stormwater is captured and stored in soils to support long-term tree health, while campus landscapes function as a living laboratory for research, teaching, and community engagement. ABOVE: Seating at the Aroretum waterway (UC Davis Arboretum & Public Garden)	BIODIVERSITY APPROACH > Valley-wise landscape design prioritizes low-water plantings across campus. > Approximately 600 acres of turf have been converted to more sustainable landscape typologies. > Green infrastructure systems, including stormwater basins, rain gardens, and bioswales, manage runoff and improve water quality. > The Putah Creek Riparian Reserve provides protected habitat for sensitive species and serves as a living laboratory for teaching and research. > On-campus mitigation areas integrate habitat protection with academic study and ecological restoration. > The Living Landscape Adaptation Plan guides campus-wide responses to climate change impacts through resilient landscape strategies. MAINTENANCE PRACTICES > Reduced reliance on synthetic herbicides through cultural and mechanical controls > Manual weed removal using hand tools such as hula hoes, shovels, and rakes > Staff-led “Weed Parties” to collaboratively remove invasive species > Application of bark mulch in planting beds to suppress weed germination > Use of groundcovers and dense planting to outcompete weeds naturally > Targeted pest and weed management using integrated chemical and non-chemical methods > Collaboration with UC Davis experts to refine Integrated Pest Management strategies > Close coordination between design and grounds teams to align intent and long-term maintenance	MAINTENANCE ROLE Landscape maintenance is managed by a public, unionized grounds crew of approximately 60 full-time staff, including groundskeepers, garden specialists, arborists, irrigation specialists, and supervisors. Training is primarily hands-on and field-based, with Arboretum-developed volunteer training now being extended to grounds staff to support shared ecological practices. Volunteers contribute through weekly gardening shifts, single-day community events, and plant sales, with regular roles requiring a commitment to training and service. Student involvement is supported through “Learning by Leading” internships that pair students with grounds and Arboretum staff, providing hands-on experience in ecological landscape management, horticulture, urban forestry, and site stewardship. FUNDING MODEL Public funding through the UC system. All new buildings must include funding for ongoing landscape maintenance. NOTABLE RECOGNITIONS > UCD is the “greenest” campus in North America and the seventh most sustainable campus in the world, according to the 2025 UI GreenMetric World University Rankings > Accredited by the Professional Grounds Management Society with a 4/4 star ranking for their environmental stewardship, economic performance and social responsibility practices	RESOURCES & REFERENCE UC Davis — Sustainability Plan UC Davis — Arboretum UC Davis — Sheep Mowers Program
		LESSONS LEARNED + Design for desire lines: Trampling issues have been reduced by installing walkways where people naturally want to walk, rather than forcing movement through planted areas. + Start with the soil: Swales perform and age better when built with properly engineered soils, including low pH and high permeability, improving long-term function and maintainability. + Match planting complexity to maintenance capacity: Dense, diverse plantings generate significant weed pressure and required more intensive care than the available maintenance model could provide. + Invest in horticultural expertise: Shifting resources from general groundskeeping to gardener-groundskeepers with stronger horticultural training has improved decision-making, weed control, and overall landscape performance.						

UC DAVIS CAMPUS

DAVIS, CA
COMPLETED — Ongoing

THE UC DAVIS SHEEPMOWERS PROGRAM uses campus sheep as a living landscape management tool, replacing conventional lawn mowing with a practice that delivers ecological, operational, and social benefits. Grazing reduces fuel use and emissions, supports biodiversity, and creates moments of calm and connection for students, staff, and visitors. At the Contained Research Facility, the sheep provide a critical biosecurity function. Mechanical lawnmowers are not permitted because debris thrown by equipment could break greenhouse glass and allow dangerous plant pests and pathogens to escape. By grazing the landscape surrounding the greenhouses, the Sheepmowers safely maintain vegetation without machinery, supporting both campus operations and agricultural biosecurity.

“We really need to look at how we can get the most out of landscape management, in all forms — in the physical environment as well as mental health.”



QUOTE: Haven Kiers, Professor of Landscape Architecture and Environmental Design, UC Davis — [“Surprising benefits of sheep mowers”](#)

PHOTO: Sheep mowers graze on campus, accompanied and supported by student spectators. (UC Davis Arboretum and Public Garden)

04

THE DIALOGUE

Arboretum staff and volunteers discuss maintenance approach (UC Davis Arboretum & Public Garden)

THE DIALOGUE: A PROCESS FOR CO-CREATING ECOLOGICALLY VIBRANT LANDSCAPES

The Dialogue builds on our Case Studies by translating their lessons into a practical framework for improving how biodiverse landscapes are conceived, delivered, and maintained. It responds to the growing need for stronger alignment between ecological intent and the realities of implementation, particularly across design, management, and long-term stewardship.

By focusing on communication and collaboration across disciplines and roles, the guide supports more coherent and resilient approaches to creating and sustaining biodiverse public landscapes.

Ecologically vibrant landscapes do not emerge from design alone – they are shaped over time through care, adaptation, and the shared decisions of the people who steward them. Yet in many projects, limited collaboration and weak communication between designers, clients, and maintenance teams create mismatched expectations and management practices that undermine ecological goals.

This advocacy guide reframes maintenance as an integral part of the design process from the very beginning. It presents a series of structured conversations that can help align vision, resources, and day-to-day practices, supporting landscapes that are both ambitious in their ecological goals and grounded in long-term stewardship.

TOP: Site walk at Dell Medical District, UT Austin (Kathryn Gatliff)
MIDDLE: Volunteers remove weeds at the UC Davis Arboretum (UC Davis Arboretum and Public Gardens)
BOTTOM: Gowanus Green Team plants a tree adjacent to the canal (Gowanus Conservancy)

The goals of this guide are to:

- › Foster early and ongoing conversations between designers, maintenance teams, and clients to support realistic, long-term ecological goals
- › Build a shared vision for success that guides everyday design and maintenance decisions
- › Empower designers to integrate maintenance approaches into their work and advocate for the resources needed to support long-term care
- › Elevate maintenance professionals as knowledgeable collaborators, strengthening agency and dignity in their role
- › Document a more integrated, collaborative process that moves beyond the traditional design–bid–build–maintain model



DIALOGUE IN TALKING POINTS

00 LAYING YOUR OWN GROUNDWORK



Preparing a pitch for biodiversity in a world of weedwhackers

- › How can **policy support** an ecological agenda?
- › What **state or local codes**, local agency goals or guidelines, certifications, or **client priorities** would align with design team goals for biodiversity?
- › Can you recommend **local skilled maintenance** providers or training resources?
- › Are there **local precedents** for the goal landscape?

01 BUYING INTO WILDNESS



Aligning ecological goals and client expectations

- › Setting **realistic expectations**: High-biodiversity landscapes require different maintenance than conventional techniques (e.g. retraining of maintenance staff, horticultural work by specialized contractors, conservancy groups or volunteers)
- › **Client and design team goals** for biodiversity and habitat
- › What steps can support these goals if alternative maintenance isn't viable?
- › **Who will maintain** the landscape and what **horticultural training** will they have?
- › How much of a **wild appearance** is acceptable to the client? To the public?
- › Defining other **planting performance goals** (e.g. shade, cooling, wellbeing, stormwater management, carbon capture, food, recreation, aesthetics)
- › Will there be an **education or stewardship** program?

02 BRING MAINTENANCE TO THE TABLE



Calibrating design ambitions and maintenance approach

- › **Maintenance team goals** for biodiversity and habitat
- › What **maintenance approach** will be used (e.g., ecological gardening, regenerative practices, adaptive management)?
- › **Who will maintain** the landscape and what **horticultural training** will they have?
- › What is the maintenance **budget and what does it cover** (labor, materials, equipment, training, replanting, arborist services, design walk-throughs)?
- › Will **volunteers** be used? How will volunteers be trained, and who will coordinate and lead volunteer days?
- › What **pest and weed management** is planned, and are chemical treatments acceptable?

03 GROUNDED DESIGN



Ongoing dialogue to fine-tune design, documentation, and construction

- › Plan set review by the maintenance team at **each milestone**
- › What **questions, concerns, or practical insights** do maintenance staff have about the proposed design, and how can their feedback be incorporated before implementation?
- › Where will **plants be sourced**? Will any be contract-grown? Are local ecotypes or seed sources required?
- › **Soil-health**: existing soil protection, amendment, import, soil biology
- › Will the design team participate in maintenance staff **training**?
- › Will the design team provide a **maintenance manual**? How to document the design intent for the project to guide future decisions?
- › Will the design team stay **involved after construction** (e.g., seasonal walk-throughs, plant-replacement reviews)?

04 NOT JUST A HANDOFF



A collaborative transition from construction to long-term maintenance

- › How long is the contractor's **maintenance period**?
- › How does contractor maintenance compare to the long-term **landscape management approach**?
- › Opportunities for **continuity** between construction maintenance and long-term management
- › What is the **design team's role** in the maintenance transition?
- › **Plant replacement** expectations: replace failures with same or different species? Who decides?
- › Are **irrigation changes** expected during the maintenance transition?
- › Has the contractor's maintenance team faced **weeds, pests, or invasive species**? How were they managed?

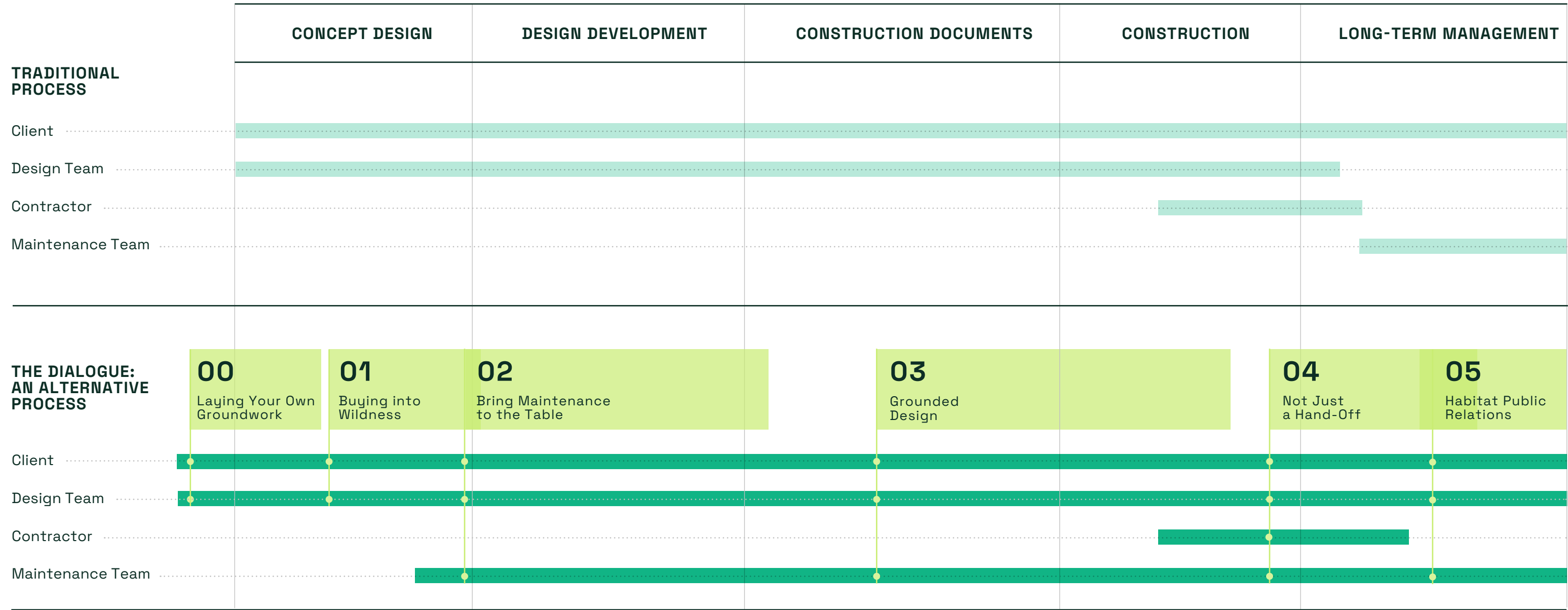
05 HABITAT PUBLIC RELATIONS



Engaging with public perception of wildness and care in the landscape

- › What are **public expectations** for tidiness or highly manicured plantings vs. a wild appearance?
- › Is **outreach** planned (social media, educational signage) for public awareness about biodiversity?
- › How can landscape managers or **gardeners engage with the public**?
- › Opportunities for public involvement in landscape **stewardship**
- › Opportunities for **biodiversity-related programming** (e.g. site walks, school tours, engagement with birding or other wildlife groups, bioblitzes, or children's educational programming)
- › Are there planted areas with **limited public access**? What is the approach for edge protection, fencing, and signage?

DIALOGUE IN PROJECT PROCESS



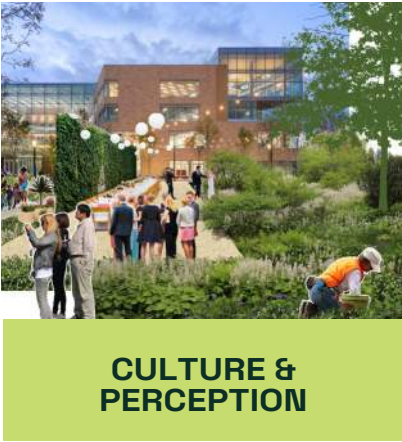
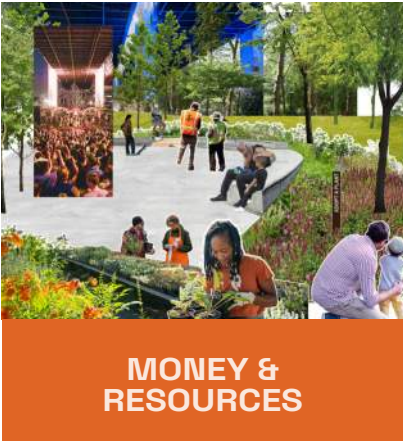
The conventional design-bid-build-maintain process involves little overlap or collaboration between designers, contractors, and maintenance professionals (top chart). The alternative process outlined in **The Dialogue** extends involvement of the design and maintenance teams throughout the project (bottom chart). This creates opportunities for conversations that promote collaboration at key points.

05

UPKEEP CATALOG

Maintenance gardener assesses pruning needs
(UC Davis Arboretum and Public Garden)

INTRODUCTION TO THE UPKEEP CATALOG



Guided by the findings of Phase 1 and the primary barriers to adoption identified through the survey and interview process, the Upkeep Catalog compiles a structured inventory of strategies for the maintenance and management of ecologically vibrant landscapes. Its purpose is to translate emerging knowledge and practice into a usable reference that supports more effective, scalable approaches to long-term landscape stewardship.

PURPOSE

The catalog emerges from a central finding of this research: many ecologically ambitious landscapes struggle over time not because of deficiencies in design, but because conventional maintenance systems, staffing structures, operational expectations, and institutional practices are often poorly aligned with ecological performance goals. In many cases, maintenance protocols developed for conventional ornamental landscapes are applied to biodiverse plant communities, resulting in ecological decline, aesthetic misinterpretation, or the gradual erosion of design intent. The Upkeep Catalog responds to this disconnect by reframing maintenance not as a fixed set of repetitive tasks, but as an adaptive stewardship practice requiring ecological understanding, observation, and site-responsive decision-making.

The catalog draws from a broad range of sources, including partner and expert interviews, survey results, and case study research conducted in Phases 1 and 2.

Together, these sources reveal a growing body of alternative landscape management approaches that extend beyond conventional maintenance systems. These include innovative funding models, workforce development and staff training programs, community stewardship initiatives, and ecological maintenance practices that prioritize adaptive, site-responsive care. Many of the strategies included emphasize the importance of ecological literacy, interdisciplinary coordination, and workforce training in supporting long-term landscape performance.

The Upkeep Catalog is structured as a translation system between the primary barriers to ecological landscape maintenance and actionable interventions capable of addressing them. The five major categories of the catalog were developed directly in response to the five principal barriers identified through the research process, creating a framework that links systemic challenges to corresponding operational, cultural, financial, spatial, and institutional strategies.

SEE PAGE 82

GROUNDRAFT

A Guide for Maintenance Teams

Groundcraft compiles a practical set of field-based maintenance strategies, operational techniques, and adaptive management practices for the care of biodiverse landscapes. While the Upkeep Catalog focuses on broader systems of stewardship, governance, funding, and cultural perception, Groundcraft centers on the day-to-day realities of landscape maintenance at the site scale. Its purpose is to translate ecological design intent into clear, actionable practices that can support the long-term health, legibility, and resilience of dynamic plant communities.



For example, barriers related to limited training and technical expertise are addressed through strategies focused on workforce capacity and skill building, including training systems, educational resources, management structures, and maintenance tools. Funding and resource constraints are addressed through financial and resource systems such as alternative funding models and long-term investment strategies. Conventional aesthetic expectations are addressed through cultural perception and public narrative strategies that focus on storytelling, interpretation, outreach, and public education. Communication gaps between designers, owners, and maintenance teams are addressed through design and spatial frameworks that support adaptive management, vegetation establishment, and clearer long-term maintenance intent. Finally, limitations within traditional maintenance firms are addressed through governance, coordination, and stewardship systems that strengthen institutional structures, interdisciplinary coordination, and long-term operational support.

Taken together, these categories form a broader lifecycle framework for biodiverse landscape implementation and stewardship—one that recognizes successful ecological maintenance as dependent not only on design, but also on people, resources, public acceptance, spatial systems, and institutional capacity. In this sense, the catalog is organized around five interdependent dimensions of long-term landscape stewardship: people (capacity), money (resources), culture (acceptance), space (design), and institutions (governance). These categories are further resolved into subcategories, offering a clear structure for navigating different modes of ecological maintenance and management.

Rather than serving as a comprehensive or static taxonomy, this inventory is filtered and synthesized to identify practices that directly respond to the primary barriers to adoption and are applicable to the focal landscape types examined in this research. The catalog also recognizes that barriers to ecological landscape management are often institutional and cultural as much as technical, requiring shifts in organizational practices, maintenance culture, procurement systems, and public expectations surrounding landscape appearance and care.

Distinct from the Groundcraft Guide, which focuses on core maintenance practices and field techniques, the Upkeep Catalog centers on systems of care, operations, and long-term stewardship. Entries are presented in a handbook-style format, supported by references and links to related case studies and external resources, enabling practitioners to trace ideas back to precedent projects and supporting evidence.

LEFT: Watering plants at the university teaching nursery (UC Davis Arboretum and Public Garden)

Growing and selling biodiverse plants helps support the garden while making ecologically rich landscapes more visible and accessible. University teaching nurseries play an important role in showing that biodiverse landscapes can be beautiful and intentional,.

INTERVENTION FOCUS

MONEY & RESOURCES

STRATEGIES

- 1 Garden Sponsorship Programs
- 2 Community-Supported Landscape Model
- 3 Adopt-a-Plant Program
- 4 Adopt-a-Garden Program
- 5 Earned Revenue and Ticketed Programming
- 6 Creative Funding Alignment
- 7 Public–Private Stewardship Partnership
- 8 Health Sector Funding Integration
- 9 Lottery-Based Maintenance Funding
- 10 Ecological Performance Grants
- 11 Pilot-to-Funding Scaling Model
- 12 Phased Funding Allocation
- 13 Maintenance Endowment Fund
- 14 Full-Cost Budgeting
- 15 Capital-to-Care Planning
- 16 Workforce Investment Funding Model
- 17 Performance-Based Maintenance Funding
- 18 Volunteer Tool Libraries
- 19 Community Seed Collection and Propagation
- 20 In-House Plant Propagation
- 21 Site-Grown Plant Sale Programs
- 22 Material Salvage Networks

INTERVENTION TOPICS

- Funding Mechanisms
- Institutional Funding Strategies
- Long-Term Financial Planning
- Resource Self-Sufficiency

FINANCIAL AND RESOURCE SYSTEMS

This category focuses on the financial structures, funding strategies, and resource allocation models needed to support the long-term stewardship of biodiverse landscapes. A major barrier to ecological landscape maintenance is the mismatch between short-term capital investment and the ongoing labor, expertise, and operational resources required to sustain complex living systems over time. The strategies in this category seek to address this imbalance by developing more resilient, diversified, and maintenance-oriented funding approaches.



ABOVE: Plant Sale (UC Davis Arboretum and Public Garden)

Interventions include alternative funding mechanisms, maintenance endowments, public–private partnerships, earned revenue models, phased budgeting approaches, and cost-reduction strategies such as in-house propagation and site-grown plant programs. Many of these approaches reposition biodiverse landscapes as multifunctional assets that provide ecological, social, infrastructural, and public health benefits, allowing them to access funding streams beyond traditional landscape budgets. Collectively, these strategies support a shift from one-time installation funding toward long-term investment in stewardship capacity, ecological performance, and sustained landscape care.

KEY BARRIER

Limited Funding and Resources

Biodiverse landscapes frequently lack stable, long-term funding and operational resources to support ongoing maintenance, stewardship, and adaptive management.

INTERVENTION FOCUS

MONEY & RESOURCES

STORY

An interstitial site is reenvisioned as a flexible platform for revenue-generating program that supports the management of this landscape, and many others throughout the community. The space is pragmatic, anticipating and funneling foot traffic from event attendees, and introducing surprisingly lush moments of intrepid vegetation that can withstand the demands of the site. At the same time, it invites visitors to engage directly in ways that reduce resource demands (such as by volunteering as stewards) and build a broader support base for ecological landscapes.

SAMPLE STRATEGIES

- A** Earned Revenue and Ticketed Programming
- B** Public-Private Stewardship Partnership
- C** Phased Funding Allocation
- D** Adopt-a-Plant Program
- E** Site-Grown Plant Sale Programs
- F** In-House Plant Propagation



Keeping Up	Money & Resources		UpKeep Catalog	62
GARDEN SPONSORSHIP PROGRAMS Funding Mechanisms Partner with organizations to fund garden installation and maintenance through sponsorship agreements. IN PRACTICE: Brooklyn Bridge Park. Gowanus Canal	ADOPT-A-PLANT PROGRAM Funding Mechanisms Provide a tax-deductible sponsorship program in which modest donations (“adopting” a plant) from individuals aggregate to support plant purchase and long-term maintenance. Sponsors contribute to the ongoing evolution of the garden while acknowledging that plant compositions may change over time. IN PRACTICE: Oudolf Garden Detroit	CREATIVE FUNDING ALIGNMENT Institutional Funding Strategies Classify biodiverse landscapes as a cultural asset (public art) to access arts grants.	ECOLOGICAL PERFORMANCE GRANTS Institutional Funding Strategies Pursue grants tied to measurable ecological outcomes such as pollinator habitat creation, stormwater capture, urban heat reduction, or biodiversity enhancement. Framing landscapes as measurable, functional infrastructure expands access to environmental funding.	
		PUBLIC-PRIVATE STEWARDSHIP PARTNERSHIP Institutional Funding Strategies Combine funding from public agencies with private donors, foundations, or corporate sponsors to support both installation and long-term care. This diversifies funding sources and reduces reliance on a single entity. IN PRACTICE: Brooklyn Bridge Park. Gowanus Canal, The Gathering Place, Republic Square	PILOT-TO-FUNDING SCALING MODEL Long-Term Financial Planning Use small-scale pilot projects to demonstrate success and secure larger funding for expansion. This approach builds confidence among funders through proven outcomes, makes practices into attractive, accessible entry points that spark curiosity, encourage environmental awareness, and motivate people to adopt more sustainable choices in their own lives. IN PRACTICE: Gowanus Canal	
 ADOPT-A-GARDEN PROGRAM Funding Mechanisms Invite individuals, community groups, or organizations to financially support specific areas within a landscape. This localized funding model builds personal connection while contributing to overall maintenance needs. IN PRACTICE: The Ramble ABOVE: Purdue University’s “Adopt-a-Spot” Program (Haven Kiers)	COMMUNITY-SUPPORTED LANDSCAPE MODEL Funding Mechanisms Adapt a community-supported agriculture (CSA) model to landscapes by inviting recurring contributions from local residents in exchange for engagement, access, or educational benefits. This creates a steady, community-based funding stream.	HEALTH SECTOR FUNDING INTEGRATION (NATURE RX MODEL) Institutional Funding Strategies Leverage the documented health benefits of nature to Secure funding from healthcare or wellness programs by positioning landscapes as preventative health infrastructure.	PHASED FUNDING ALLOCATION Long-Term Financial Planning Distribute funding across multiple project phases, prioritizing higher investment during early establishment and adjusting resources as the landscape matures. This aligns financial inputs with ecological needs over time. IN PRACTICE: Penn State Sustainable Landscape Implementation Plan	
	EARNED REVENUE AND TICKETED PROGRAMMING Funding Mechanisms Reinvest proceeds from earned revenue from rentable spaces or ticketed events on-site to a dedicated maintenance fund. Include a park maintenance fund surcharge in the ticket cost of events to support long-term maintenance. IN PRACTICE: Under the K Bridge Park		LOTTERY-BASED MAINTENANCE FUNDING Institutional Funding Strategies Allocate public lottery revenues to support the ongoing care and upkeep of landscapes, rather than directing funds primarily toward new capital projects. EXPLORE: Care Not Capital	

Keeping Up	Money & Resources		UpKeep Catalog	63
MAINTENANCE ENDOWMENT FUND Long-Term Financial Planning Establish a dedicated fund whose interest or returns are used exclusively to support ongoing landscape maintenance. This ensures consistent, long-term financial support independent of annual budget fluctuations. IN PRACTICE: Oudolf Garden Detroit, Story Mill Park, The Gathering Place	WORKFORCE INVESTMENT FUNDING MODEL Long-Term Financial Planning Direct funding toward training, wages, and professional development for maintenance staff rather than solely toward physical landscape improvements. This approach strengthens long-term care capacity and performance. IN PRACTICE: Brooklyn Bridge Park, Oudolf Garden Detroit	 COMMUNITY SEED COLLECTION AND PROPAGATION Resource Self-Sufficiency Engage volunteers, students, and maintenance staff in the hand collection of seeds from existing plantings on-site or from nearby local populations (with appropriate permission) for use in nursery propagation for future plantings. This process supports experiential ecological education by teaching the full plant life cycle while also fostering a sense of ownership and stewardship through participation in collecting, growing, installing, and maintaining the resulting plants within the landscape. IN PRACTICE: UC Davis ABOVE: Milkweed seeds (UC Davis Arboretum and Public Garden)	SITE-GROWN PLANT SALE PROGRAMS Resource Self-Sufficiency Propagate and sell plants grown on site as a means of fundraising, public education, and ecological outreach. Offer species that have been trialed and proven to perform well in local conditions (including native and habitat-supporting plants) to generate financial support for the garden while expanding the use of ecologically beneficial plantings into surrounding residential landscapes and strengthening regional biodiversity. IN PRACTICE: UC Davis, Under the K Bridge Park	
FULL-COST BUDGETING Long-Term Financial Planning Include long-term maintenance costs in initial project budgets to ensure sustainability. If possible, include initial 1-3 years of long-term maintenance funding in initial capital improvement budget and bidding. IN PRACTICE: Gowanus Canal, GWB Presidential Center	PERFORMANCE-BASED MAINTENANCE FUNDING Long-Term Financial Planning Tie funding allocations to ecological and aesthetic performance metrics rather than fixed maintenance schedules. This approach incentivizes high-quality outcomes and adaptive management practices.			
CAPITAL-TO-CARE PLANNING Long-Term Financial Planning Support capital projects only once their associated maintenance, operations, and replacement costs are identified and supported with dedicated funding. This approach addresses the common imbalance between readily available construction funding and limited maintenance budgets, helping institutions sustain the long-term performance and quality of their built and landscape assets. IN PRACTICE: Oudolf Garden Detroit	VOLUNTEER TOOL LIBRARIES Resource Self-Sufficiency Maintain shared community tool libraries that support volunteer stewardship and neighborhood participation in ecological maintenance activities. Shared equipment reduces costs while increasing access and community engagement. IN PRACTICE: UC Davis	IN-HOUSE PLANT PROPAGATION Resource Self-Sufficiency Propagate plants in-house from locally-collected seed or cuttings to fill gaps and replant on site. IN PRACTICE: Presidio Tunnel Tops	MATERIAL SALVAGE NETWORKS Resource Self-Sufficiency Develop partnerships with municipalities, contractors, arborists, or local organizations to recover and reuse materials such as logs, stone, soil, compost, nursery pots, or salvaged construction elements within landscape projects. Reusing locally available materials reduces costs, diverts waste streams, and supports more resource-efficient and ecologically grounded landscape management practices.	

INTERVENTION FOCUS

CULTURE & PERCEPTION

STRATEGIES

- 1 Blooming Calendar
- 2 Expanded Pollinator Storytelling
- 3 Horticultural Health Engagement
- 4 Invasive Species Educational Materials
- 5 Guided Walks
- 6 Seasonal Change Interpretation
- 7 Container Gardening with Native Plants
- 8 Chic Sustainability
- 9 Top 10 Plant List Spotlight Series
- 10 Demonstration/ Pop-Up Gardens
- 11 Nature-integrated Play Landscapes
- 12 Mature Garden Design Awards
- 13 Maintenance Transparency & Normalization
- 14 Culture of Care Framework
- 15 Visible Stewardship Activities
- 16 Invasive Plant “Bounty” Program
- 17 Native Plant Giveaway Programs
- 18 Seasonal Stewardship Celebrations
- 19 Habitat Building
- 20 Stewardship Through Repeated Care

INTERVENTION TOPICS

- Ecological Storytelling – Guides & Resources
- Elevating Perception of Biodiversity
- Elevating Perception of Maintenance
- Inviting Interaction – Stewardship



CULTURAL PERCEPTION AND PUBLIC NARRATIVE

This category focuses on reshaping how biodiverse landscapes are understood, valued, and supported by the public. Many ecological landscapes face resistance not because of ecological performance, but because they conflict with conventional expectations of neatness, maintenance, and visual order. The strategies in this category use education, storytelling, interpretation, visibility, and community participation to build broader cultural acceptance of ecologically vibrant landscapes and the stewardship practices required to sustain them.

ABOVE: Golden hour highlights the seasonal plantings at Oudolf Garden Detroit (Ryan Southen Photography)

Interventions include public engagement programs, interpretive materials, volunteer initiatives, demonstration gardens, and outreach campaigns that make ecological processes more visible, relatable, and accessible. These strategies help connect people to landscapes through seasonal change, pollinator activity, play, gardening, public health, and hands-on stewardship experiences. Collectively, they aim to foster ecological literacy, strengthen public investment in long-term care, and reposition maintenance and stewardship as skilled, valuable, and culturally meaningful practices.

SEE PAGE 18

KEY BARRIER

Conventional Aesthetic Norms

Public and institutional expectations for tidy, manicured landscapes can conflict with the dynamic and seasonal appearance of ecologically diverse plantings.

INTERVENTION FOCUS

CULTURE & PERCEPTION

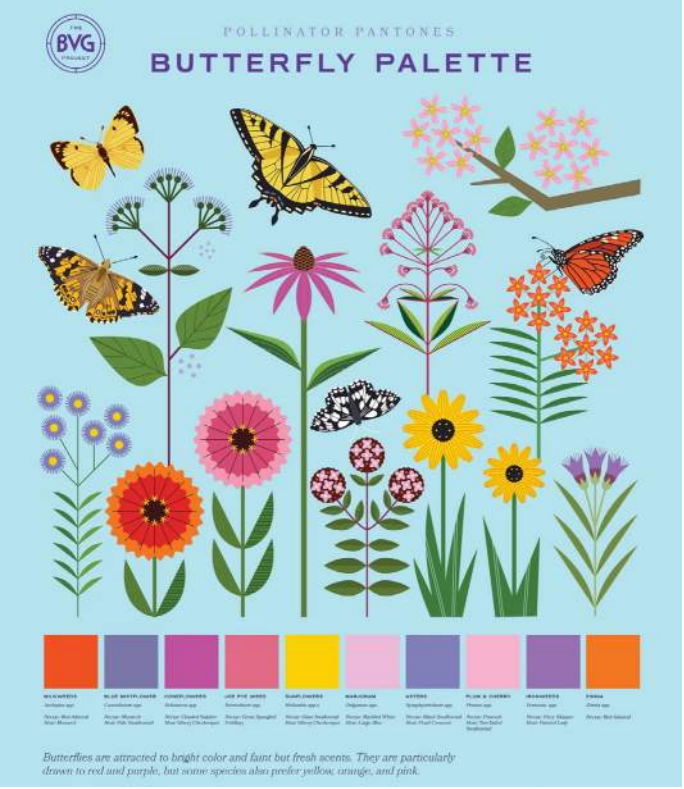
STORY

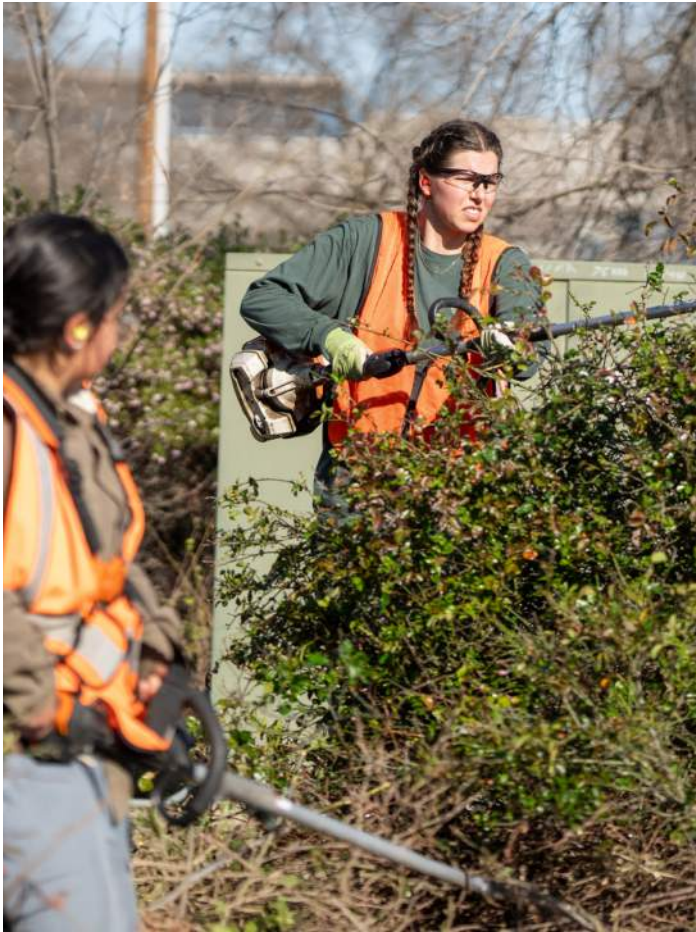
A garden terrace enlivens a central open space at a public university. The rich, layered plantings serve as a chic backdrop for an elevated event space, their exuberant flowering a foil to the nearby institutional buildings. Visitors are invited to engage deeply with the garden, whether they are attending an event celebrating the seasonal blooms, or participating in a guided walk about the ecological benefits of the space. Maintenance activities are not hidden, but are seen as an opportunity to normalize and educate about the ongoing needs of vibrant landscapes.

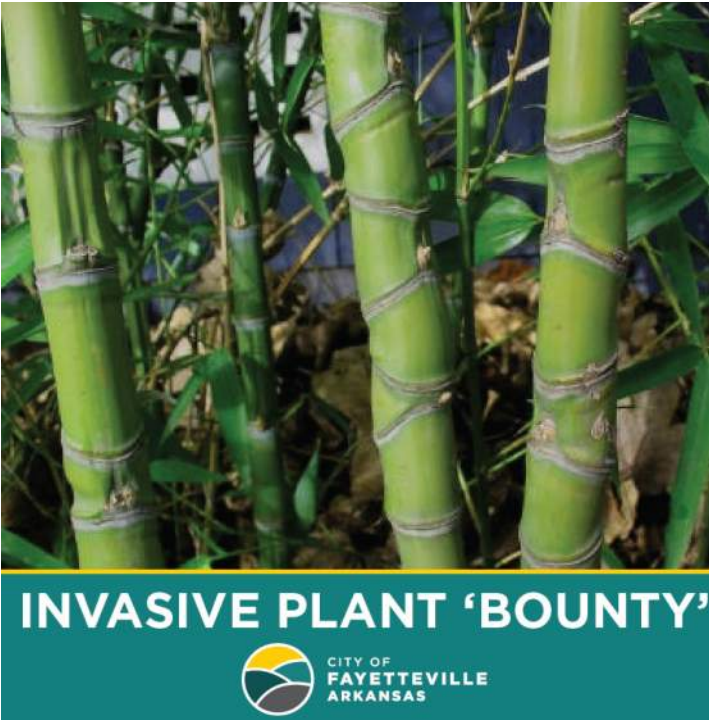
SAMPLE STRATEGIES

- A** Chic Sustainability
- B** Blooming calendar
- C** Guided Walks
- D** Container gardening with native plants
- E** Demonstration Gardens
- F** Culture of Care Framework



Keeping Up	Culture & Perception		UpKeep Catalog	66
HORTICULTURAL HEALTH ENGAGEMENT Ecological Storytelling – Guides & Resources Frame gardening and landscape maintenance as a public health and wellbeing benefit, emphasizing the documented physical and mental health benefits of time spent in nature. By publicizing the restorative effects of outdoor activity—such as stress reduction, improved mood, and increased physical activity—this approach encourages volunteer participation in garden care and maintenance as a form of accessible, nature-based health support. EXPLORE: Care Not Capital	EXPANDED POLLINATOR STORYTELLING Ecological Storytelling – Guides & Resources Use highly visible and charismatic pollinators (like hummingbirds, butterflies, and honey bees) in graphic and outreach materials to engage public interest, while also intentionally highlighting lesser-known pollinators such as native bees, moths, beetles, and bats. This approach leverages the appeal of “iconic” species as entry points for education, then broadens public understanding by sharing the ecological importance and often overlooked roles of more cryptic pollinators, using their relative obscurity to tell deeper stories. EXPLORE: The Biodiversity Victory Garden Project  ABOVE: Butterfly Palette poster from the Biodiversity Victory Gardens project, featuring well-known butterflies as well as lesser-known species, and the plants that support them. (Betsy Peterson)	BLOOMING CALENDAR Ecological Storytelling – Guides & Resources Provide visual or digital resources that document seasonal bloom periods throughout the year. This supports both maintenance planning and public	TOP 10 PLANT LIST SPOTLIGHT SERIES Elevating Perception of Biodiversity Highlight and distribute seasonly curated “Top 10” plant lists featuring standout species for specific uses or conditions, paired with educational materials and opportunities for the public to explore and adopt recommended plants. IN PRACTICE: University of California, Davis	
		GUIDED WALKS Ecological Storytelling – Guides & Resources Organize guided walks that engage the public in observing ecological benefits, such as microclimate conditions, presence of birds or pollinators, and urban heat patterns. These programs combine education, data collection, and awareness-building around environmental performance in landscapes. IN PRACTICE: Under the K Park Bridge EXPLORE: McGolrick Park Horticulture and Stewardship Work Plan	INVASIVE SPECIES EDUCATIONAL MATERIALS Ecological Storytelling – Guides & Resources Develop accessible guides that help the public identify invasive plants and recommend appropriate native or non-invasive alternatives. These materials support broader participation in ecological stewardship. IN PRACTICE: The Ramble EXPLORE: Invasive Species Guide, Fayetteville	CHIC SUSTAINABILITY Elevating Perception of Biodiversity Introduce elements of green infrastructure (such as green roofs, floating wetlands, and green walls) that inspire and engage community members through visible, thoughtfully designed ecological features. Often small in scale but high in design quality, these interventions make sustainability approachable and appealing in everyday spaces. Blending aesthetics with ecological function transforms sustainable practices into accessible entry points that spark curiosity and motivate people to adopt more sustainable choices in their own lives.
		SEASONAL CHANGE INTERPRETATION Ecological Storytelling – Guides & Resources Develop signage, graphics, or digital interpretation that explains seasonal dormancy, seed set, wildlife cycles, and ecological succession. Helping visitors understand that landscapes change over time reframes seasonal decline or irregular appearance as intentional ecological processes rather than neglect.	CONTAINER GARDENING WITH NATIVE PLANTS Elevating Perception of Biodiversity Promote the use of native plants in container arrangements using familiar design frameworks (e.g., thriller, filler, spiller). This makes native planting more accessible and relatable at small scales. EXPLORE: Missouri Botanical Garden	

Keeping Up	Culture & Perception			UpKeep Catalog	67
 NATURE-INTEGRATED PLAY LANDSCAPES Elevating Perception of Biodiversity Design play environments that are embedded within and evolve alongside biodiverse, site-specific plant communities. By using native species and natural materials, these landscapes create immersive, layered spaces that support exploration, ecological learning, and age-diverse play experiences. As vegetation matures over time, the play environment adapts and becomes more complex, fostering curiosity, inclusion, and a deeper connection between people and the surrounding ecosystem. IN PRACTICE: Presidio Tunnel Tops; The Gathering Place ABOVE: Nature play area at the Gathering Place (MVVA) DEMONSTRATION/POP-UP GARDENS Elevating Perception of Biodiversity Install small-scale gardens that showcase ecological design principles and allow for public education and internal testing.	MATURE GARDEN DESIGN AWARDS Elevating Perception of Maintenance Honor and celebrate successful biodiverse landscapes that have been in place for at least 10 years. By focusing on long-term performance rather than initial installation, these awards highlight gardens that demonstrate sustained ecological health, resilience, and quality of maintenance over time, encouraging designers and clients to prioritize durability and ongoing care. EXPLORE: Care not Capital	MAINTENANCE TRANSPARENCY & NORMALIZATION Elevating Perception of Maintenance Openly communicate the real, ongoing costs and labor required to sustain landscapes, particularly high-quality naturalistic designs. Publicize maintenance needs using well-known examples such as the The High Line to challenge the assumption that naturalistic plantings are inherently low-maintenance. It promotes a more accurate understanding that ecological and designed landscapes require sustained investment, skilled care, and long-term stewardship. EXPLORE: Care not Capital	CULTURE OF CARE FRAMEWORK Elevating Perception of Maintenance Make maintenance work visible and legible to the public as skilled, intentional, and essential. Highlighting the labor and expertise behind landscape care challenges perceptions of maintenance as menial and reinforces its cultural and ecological value. This approach elevates gardening and stewardship as central to the identity of a site, fostering respect for maintenance workers while shifting institutional and public priorities away from one-time capital investment toward long-term care.  ABOVE: Student interns cut back branches on the UC Davis campus (UC Davis Arboretum and Public Garden)	VISIBLE STEWARDSHIP ACTIVITIES Elevating Perception of Maintenance Make ecological maintenance activities visible to the public through scheduled volunteer days, interpretive pruning demonstrations, or active stewardship events. Publicly witnessing maintenance labor helps reinforce that biodiverse landscapes are intentionally cared for and professionally managed. IN PRACTICE: Brooklyn Bridge Park, Gowanus Canal, Oudolf Garden Detroit, Penn State, Presidio Tunnel Tops, UC Davis, UCLA Landscape Plan	



INVASIVE PLANT “BOUNTY” PROGRAM

Inviting Interaction – Stewardship

Incentivize the removal of invasive species through a plant “bounty” program. Residents who remove designated invasive species from their property receive a free native tree or shrub in return. By pairing removal with replacement, the program reduces the spread of aggressive species that outcompete native plants while increasing public awareness and participation in long-term ecological stewardship across the city.

IN PRACTICE: The Ramble

EXPLORE: [City of Fayetteville Plant Bounty Program](#)

ABOVE: Bounty poster (City of Fayetteville, AR)

NATIVE PLANT GIVEAWAY PROGRAMS

Inviting Interaction – Stewardship

Distribute locally grown native plants to the public to promote ecological gardening practices.. This community outreach approach introduces residents to regionally appropriate plant species, encourages their use in home landscapes, and connects participants directly to the garden or park system. By linking plant distribution with access to the growing site and mature plantings in the landscape, the program also creates opportunities for education, interpretation, and dialogue about plant selection, ecology, and maintenance practices.

EXPLORE: [North Brooklyn Parks Alliance](#)

SEASONAL STEWARDSHIP CELEBRATIONS

Inviting Interaction – Stewardship

Organize recurring seasonal events centered around ecological maintenance activities such as seed collection, meadow cutting, planting days, pollinator counts, or habitat clean-ups. Framing stewardship as a social and cultural event transforms maintenance from invisible labor into a shared community ritual, strengthening long-term emotional connection, ecological awareness, and collective investment in the landscape.

IN PRACTICE: Gowanus Canal

HABITAT BUILDING

Inviting Interaction – Stewardship

Engage volunteers and community members in constructing small-scale habitat features such as bee hotels, brush piles, bird nesting structures, dead hedges, or amphibian refugia. Hands-on participation in habitat creation helps demystify ecological management practices while building deeper understanding of species needs and ecological relationships within the landscape.



ABOVE: Community-built insect hotel (UC Davis Arboretum and Public Garden)

STEWARDSHIP THROUGH REPEATED CARE

Inviting Interaction – Stewardship

Create recurring opportunities or programs for community members to participate in ongoing seasonal maintenance activities rather than one-time volunteer events alone. Regular engagement through planting, watering, seed collection, pruning, or monitoring helps participants develop long-term familiarity, emotional attachment, and a stronger sense of responsibility toward the evolving landscape.

INTERVENTION FOCUS

PEOPLE & SKILLS

STRATEGIES

- 1 Bilingual Training Resources
- 2 Plant ID Flash Cards
- 3 Gallery of Pruning Gone Bad
- 4 Laminated Weed Identification Guides
- 5 Planting Documentation (Laminated Plans)
- 6 Pollinator ID Flash Cards
- 7 Bird ID Flash Cards
- 8 Simplified Maintenance Manuals
- 9 Ecological Power Tool Training
- 10 Citizen Science Protocol Systems
- 11 Peer-to-Peer Demonstration Days
- 12 Maintenance Staff Recognition Program
- 13 Staff-Led Landscape Experimentation
- 14 Volunteer-to-Professional Pathways
- 15 Maintenance Zone Assignment
- 16 Seasonal Maintenance Schedule
- 17 Institutional Knowledge Documentation
- 18 Field-Based Decision Autonomy
- 19 Shared Seasonal Goal Setting
- 20 Site Walks (Designer/Maintenance)

INTERVENTION TOPICS

- Accessible Training Resources
- Engagement & Sense of Ownership
- Staff Management Systems



WORKFORCE CAPACITY & SKILL BUILDING

This category focuses on the knowledge, training systems, tools, and management practices needed to support effective ecological landscape maintenance. Biodiverse landscapes often require a different set of observational skills, ecological understanding, and maintenance approaches than conventional ornamental landscapes, yet many maintenance systems lack the training resources and organizational structures necessary to support this work. The strategies in this category aim to build workforce confidence, technical capacity, and long-term stewardship knowledge across all levels of maintenance practice.

RIGHT Haven Kiers demonstrating seed saving techniques (UC Davis Arboretum and Public Garden)

Interventions include accessible training materials, multilingual resources, field identification tools, simplified maintenance manuals, seasonal management systems, and hands-on coordination practices that support communication between designers and maintenance staff. Many of these approaches emphasize visual learning, in-field reference tools, and experiential knowledge-building to make ecological maintenance practices more understandable and practical within day-to-day operations. Collectively, these strategies help strengthen ecological literacy, improve maintenance consistency, foster staff ownership and accountability, and elevate landscape stewardship as a skilled and valued profession.

SEE PAGE 18

KEY BARRIER

Lack of Training and Technical Expertise

Maintenance staff and organizations often lack the ecological knowledge, training resources, and technical skills needed to successfully manage biodiverse landscapes over time.

INTERVENTION FOCUS

PEOPLE & SKILLS

STORY

A vibrant perennial garden at a university arboretum is a hub of ecological education. There is an ethos of celebrating maintenance workers as skilled gardeners, and their presence in the landscape allows them to serve as guides, neighbors, and educators to the visiting public. They are supported by academics, managers, and a design team that has developed easy-access guides, and management structures that build a sense of ownership and agency.

SAMPLE STRATEGIES

- A Seasonal Maintenance Schedule
- B Staff-Led Landscape Experiment
- C Site Walks (Designer-Maintenance)
- D Volunteer-to-Professional Pathway
- E Peer-to-Peer Demonstration Days
- F Pollinator ID Flashcards
- G Citizen Science Protocols



BILINGUAL TRAINING RESOURCES

Accessible Training Resources

Provide maintenance training and resources in multiple languages to improve accessibility and effectiveness

EXPLORE: [Theodore Payne California Native Plant Landscaper Certificate Program](#)



PLANT ID FLASH CARDS

Accessible Training Resources

Provide a set of portable, image-based reference cards featuring plants from the site, paired with key identification traits and basic maintenance information. This supports quick, in-field recognition of species, helping maintenance staff distinguish intended plants from weeds and manage them appropriately.

TOP: Theodore Payne Native Plant Flash Cards (LA Times)
RIGHT: Electric trimmer training (UC Davis Arboretum and Public Garden)

GALLERY OF PRUNING GONE BAD

Accessible Training Resources

Create a curated collection of images that document common pruning errors across trees and shrubs, paired with clear explanations and corrective techniques. This resource uses visual comparison to help maintenance staff quickly recognize poor practices in the field, understand their impacts on plant health and structure, and apply proper pruning methods with greater confidence and consistency.

EXPLORE: [Plant Amnesty](#)

LAMINATED WEED IDENTIFICATION GUIDES

Accessible Training Resources

Supply simple reference materials that help maintenance staff quickly identify common weeds and prioritize removal.

PLANTING DOCUMENTATION (LAMINATED PLANS)

Accessible Training Resources

Provide accessible, regularly updated, on-site planting plans and updates that easily allow maintenance staff to identify intended species and distinguish them from weeds.

POLLINATOR ID FLASH CARDS

Accessible Training Resources

Provide a set of portable, image-based reference cards featuring common pollinator species found on or near the site, paired with key identification traits and information about their ecological roles and plant relationships. This tool supports quick, in-field recognition of species while increasing understanding of pollinator diversity and guiding maintenance practices that support their life cycles.

BIRD ID FLASH CARDS

Accessible Training Resources

Provide a set of portable, image-based reference cards featuring common bird species found on or near the site, paired with key identification traits and basic habitat information. This tool supports quick, in-field recognition of species while building awareness of wildlife presence and informing maintenance practices that protect and enhance bird habitat.

SIMPLIFIED MAINTENANCE MANUALS

Accessible Training Resources

Develop clear, visual, and concise maintenance guides that are accessible to all staff levels. Avoid overly technical documentation in favor of practical instruction.

IN PRACTICE: The Ramble

ECOLOGICAL POWER TOOL TRAINING

Accessible Training Resources

Provide specialized training for the use of power tools within biodiverse and naturalistic plantings, emphasizing precision, timing, and ecological sensitivity rather than broad, uniform application. This repositions tools such as string trimmers from “mow-and-blow” maintenance toward targeted interventions (i.e., selective cutback of species like California fuchsia, managing weeds around establishing plants, or reducing biomass without soil disturbance and improves efficiency while supporting ecological goals and plant community development.

IN PRACTICE: UC Davis, UCLA Landscape Plan



Keeping Up	People & Skills			UpKeep Catalog	72
CITIZEN SCIENCE PROTOCOL SYSTEMS Engagement & Sense of Ownership Develop structured citizen science programs or utilize existing observation platforms (such as iNaturalist) that provide clear protocols for data collection, species identification, and reporting. These systems engage volunteers and staff in standardized ecological monitoring while improving data reliability and long-term stewardship engagement. IN PRACTICE: Under the K Bridge Park, Gowanus Canal	STAFF-LED LANDSCAPE EXPERIMENTATION Engagement & Sense of Ownership Pilot programs for staff to test and evaluate small-scale management approaches, planting strategies, or ecological interventions within designated trial areas. Allowing staff to participate directly in experimentation and problem-solving reinforces professional expertise, encourages innovation, and builds stronger long-term investment in landscape outcomes.  Experimental green roof (Haven Kiers)	MAINTENANCE ZONE ASSIGNMENTS Staff Management Systems Assign specific areas of the landscape to individual staff members. This fosters familiarity, accountability, and proactive management. IN PRACTICE: Penn State Sustainable Landscape Implementation Plan		FIELD-BASED DECISION AUTONOMY Staff Management Systems Empower trained maintenance staff to make limited site-based management decisions in response to observed conditions without requiring extensive supervisory approval for every intervention. Allowing appropriate levels of autonomy supports faster response times, encourages ecological observation, and reinforces professional ownership and accountability within the maintenance team.	
		SEASONAL MAINTENANCE SCHEDULE Staff Management Systems Develop clear, seasonally organized maintenance guidelines that outline tasks and timing. This supports consistency and reduces uncertainty in landscape care. IN PRACTICE: Oudolf Garden		SHARED SEASONAL GOAL SETTING Staff Management Systems Establish collaborative seasonal goal-setting processes that involve maintenance staff in identifying priorities, challenges, and desired ecological outcomes for the landscape. Involving staff in setting goals strengthens team alignment, reinforces shared responsibility, and helps connect day-to-day maintenance activities to broader ecological and organizational objectives.	
MAINTENANCE STAFF RECOGNITION PROGRAM Engagement & Sense of Ownership Publicly recognize and celebrate the knowledge, observations, and contributions of maintenance staff through signage, social media, awards, newsletters, or public programming. Elevating the visibility of maintenance expertise reinforces the cultural value of stewardship work while helping staff feel respected, invested, and connected to the long-term success of the landscape.	VOLUNTEER-TO-PROFESSIONAL PATHWAYS Engagement & Sense of Ownership Design pathways that allow highly engaged volunteers to transition into internships, seasonal employment, fellowships, or advanced stewardship roles. Providing opportunities for increasing responsibility helps sustain long-term engagement while expanding workforce development and ecological stewardship capacity.	INSTITUTIONAL KNOWLEDGE DOCUMENTATION Staff Management Systems Create systems for recording site-specific maintenance knowledge, lessons learned, and management observations over time through shared notes, annotated plans, photographs, or digital logs. Preserving institutional knowledge helps reduce information loss during staff turnover while improving continuity, consistency, and long-term ecological management capacity. IN PRACTICE: Brooklyn Bridge Park		SITE WALKS (DESIGNER-MAINTENANCE COORDINATION) Staff Management Systems Conduct regular on-site meetings between designers and maintenance staff during establishment phases. These walks support alignment, troubleshooting, and knowledge transfer.	

INTERVENTION FOCUS

DESIGN SYSTEMS

STRATEGIES

- 1
- Sightline-Oriented Planting Design
- 2
- Shrub-Based Garden Structure
- 3
- Mowing (Site Design + Practice)
- 4
- Annual Wildflower Seeding
- 5
- Maintenance Access Design
- 6
- Design Intent & Performance Framework
- 7
- Pilot Projects (Design Testing)
- 8
- Plant Quality Control
- 9
- Regional and Recycled Material Sourcing
- 10
- Multifunctional Habitat Elements
- 11
- Pollinator Host–Nectar Plant Palettes
- 12
- Tuck Away Plants
- 13
- Urban Understory Planting
- 14
- Habitat Refugia Zones
- 15
- Wildlife-Informed Planting Design
- 16
- Landscape Evolution & Successional Design
- 17
- Gradual Ecological Intensification
- 18
- Designate Non-Irrigated Areas
- 19
- Extended Site Preparation
- 20
- Vegetation Salvage and Reuse
- 21
- Designed–Wild Juxtaposition
- 22
- Defined Bed Edging
- 23
- Access- Control Boundaries
- 24
- Meadow Design Rule (30% Flowering)
- 25
- Seasonal Structure Planting

INTERVENTION TOPICS

- Calibrating Design to Maintenance Capacity
- Construction/Field Methods
- Designing Habitat
- Ecological Transition Strategies
- Increasing Legibility



DESIGN AND SPATIAL FRAMEWORKS

This category focuses on spatial and design strategies that support the long-term success, legibility, and maintainability of biodiverse landscapes. Many ecological landscapes fail not because of ecological intent, but because planting systems are difficult to interpret, establish, maintain, or integrate into conventional operational frameworks. The strategies in this category address this challenge by using design itself as a tool for communication, ecological function, and long-term management.

ABOVE: Stormwater meadow designed for wildlife habitat (UC Davis Arboretum and Public Garden)

Interventions include planting frameworks, habitat-based design strategies, spatial organization techniques, vegetation establishment systems, and approaches that make ecological landscapes more understandable and manageable for both maintenance staff and the public. These strategies help create landscapes that are ecologically functional while remaining visually legible, operationally realistic, and adaptable over time. Collectively, they support the development of biodiverse landscapes that can evolve dynamically while still maintaining clarity of intent, spatial order, and long-term resilience.

KEY BARRIER

Weak Communication Between Designers, Owners, and Maintenance

Poor coordination and knowledge transfer between project stakeholders can result in maintenance practices that undermine long-term ecological and design goals.

SEE PAGE 18

INTERVENTION FOCUS

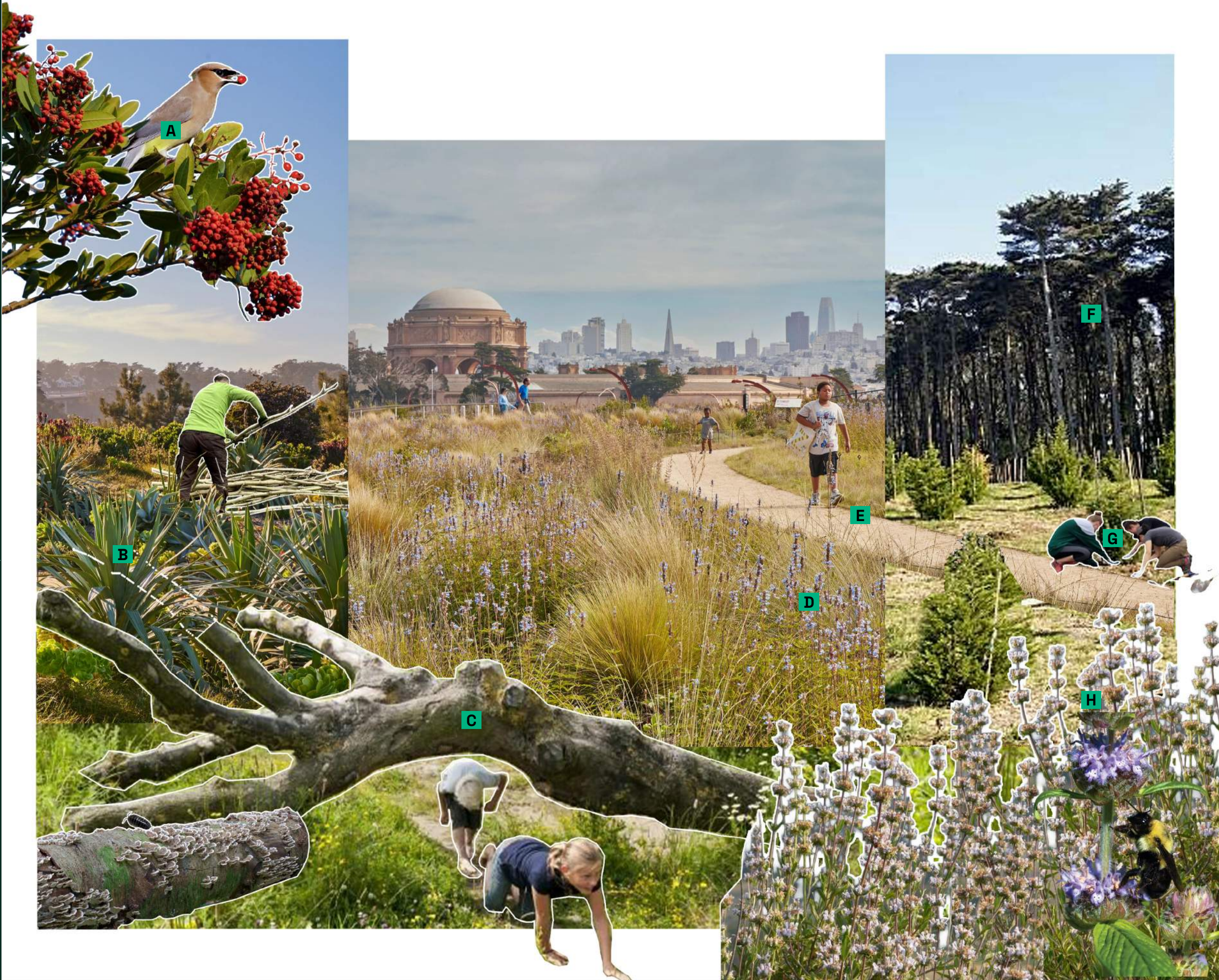
DESIGN SYSTEMS

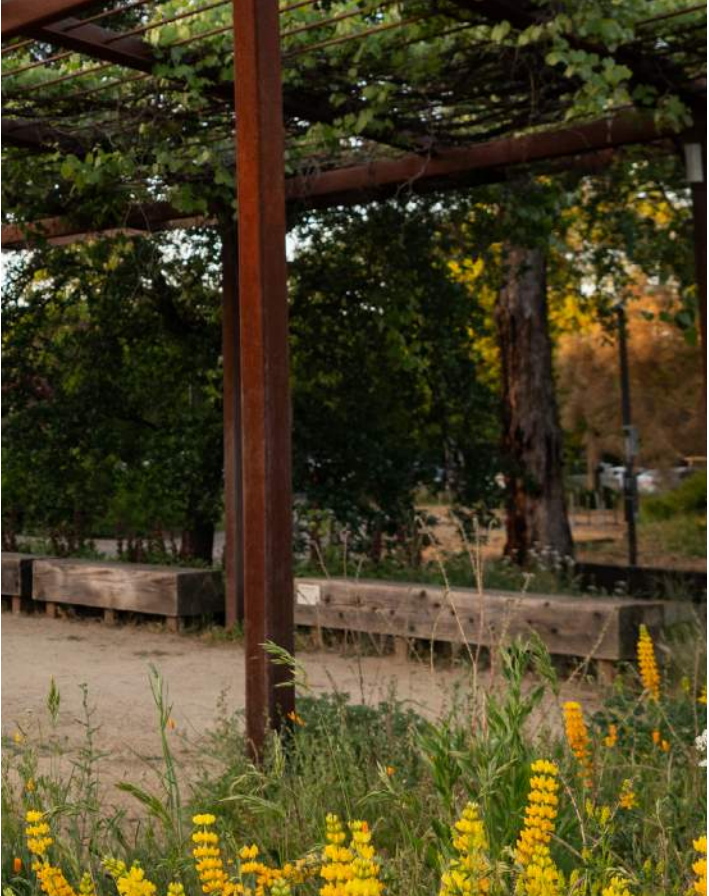
STORY

A landmark public park translates ecological performance to an urban habitat that feels at home in the city. Thoughtful design details control foot traffic in plantings and create unique microclimates and niches to enhance habitat. The vibrancy of a native meadow is curated to enhance legibility and signal care, and is calibrated to the level of maintenance available.

SAMPLE STRATEGIES

- A** Wildlife-Informed Planting Design
- B** Seasonal Structure Planting
- C** Multifunctional Habitat Elements
- D** Meadow Design Rule (30% Flowering)
- E** Defined Bed Edging
- F** Habitat Refugia Zones
- G** Landscape Evolution & Successional Design
- H** Pollinator Host-Nectar Plant Palettes



Keeping Up	Design Systems			UpKeep Catalog	75
SIGHTLINE-ORIENTED PLANTING DESIGN Calibrating Design to Maintenance Capacity Structure plantings to maintain clear visibility corridors in key public areas such as paths, intersections, and gathering spaces. This supports passive surveillance, reduces perceived risk, and ensures naturalistic landscapes remain legible and navigable. 	MOWING - SITE DESIGN & PRACTICE Calibrating Design to Maintenance Capacity Design and manage landscapes to minimize complex mowing operations. This includes relocating site furnishings to hardscape or mulch areas, simplifying bed geometry to avoid tight turns, consolidating site elements like bollards and signage, and maintaining higher mowing heights to reduce stress on turf and frequency of mowing. IN PRACTICE: Dell Medical Center	DESIGN INTENT & PERFORMANCE FRAMEWORK Calibrating Design to Maintenance Capacity Document aesthetic, environmental, and functional goals of the project and define clear cultural and ecological performance criteria to guide its ongoing design, management, and evaluation.			
	ANNUAL WILDFLOWER SEEDING Calibrating Design to Maintenance Capacity Introduce fast-growing annuals to suppress weeds and provide early visual interest during establishment phases. EXPLORE: Theodore Payne Training	PILOT PROJECTS (DESIGN TESTING) Construction / Field Method Test new planting strategies, species, or maintenance approaches through small-scale or full-scale mock-ups before broader implementation. This allows for refinement of design and management techniques based on real-world performance. IN PRACTICE: Brooklyn Bridge Park, Gowanus Canal EXPLORE: Why you should do your planting in the fall, Brooklyn Bridge Park, New York Times (2021)			
SHRUB-BASED GARDEN STRUCTURE Calibrating Design to Maintenance Capacity Prioritize shrubs to provide durable, legible structure that is easier to maintain than herbaceous plantings. IN PRACTICE: Presidio Tunnel Tops, The Ramble	MAINTENANCE ACCESS DESIGN Calibrating Design to Maintenance Capacity Ensure all planted areas are accessible via paths or stepping systems to prevent soil compaction and to facilitate routine maintenance.	PLANT QUALITY CONTROL Construction / Field Method Reject unhealthy or compromised plant material at delivery to ensure strong establishment and reduce long-term issues.	REGIONAL AND RECYCLED MATERIAL SOURCING Construction / Field Method Prioritize the use of locally sourced and recycled materials in landscape construction to reduce transportation impacts, support regional economies, and minimize resource extraction. This includes incorporating materials with recycled content and repurposing on-site elements (such as salvaged trees used for site furnishings) to reduce waste and reinforce a site-specific design identity. IN PRACTICE: Dell Medical District Campus		
TOP: Clear sightlines (UC Davis Arboretum and Public Garden) RIGHT: Benches made from fallen campus trees (UC Davis Arboretum and Public Garden)					

Keeping Up	Design Systems		UpKeep Catalog	76
MULTIFUNCTIONAL HABITAT ELEMENTS Designing Habitat Utilize natural or reclaimed materials (such as dead logs, gabion walls, brush stacks, or salvaged construction materials) as integrated design features that serve both ecological and human functions. These elements provide habitat value for wildlife while also acting as seating, focal points, gathering spaces, or wayfinding destinations within a landscape, combining biodiversity support with experiential and spatial design functions. 	TUCK AWAY PLANTS Designing Habitat Include high value native plants (pollinator, food source, habitat) in designs but don’t make them the focal point of the garden. Instead, “tuck” them away behind larger plants or in less visible areas of the landscape.	 WILDLIFE-INFORMED PLANTING DESIGN Designing Habitat Incorporate knowledge of wildlife use into planting decisions by selecting species that provide nectar, fruit, or habitat at critical times. Align planting strategies with seasonal patterns of wildlife activity to support ecological function. IN PRACTICE: Brooklyn Bridge Park	GRADUAL ECOLOGICAL INTENSIFICATION Ecological Transition Strategies Identify underutilized or underperforming landscape areas, especially lawn areas, and transition them to more ecologically intensive planting types over time as funding becomes available. IN PRACTICE: Presidio Tunnel Tops; Penn State	
	POLLINATOR HOST-NECTAR PLANT PALETTES Designing Habitat Design planting schemes that intentionally pair nectar-producing plants with the specific larval host plants required by pollinator species, particularly butterflies. This approach includes both adult food sources and the plants needed for caterpillar development (e.g., pipevine for pipevine swallowtail, milkweed for monarchs, and pawpaw for gulf fritillary). By integrating these full life-cycle plant relationships into garden design, sites can support higher biodiversity, increase pollinator populations, and create opportunities for ecological storytelling, interpretation, and public education		URBAN UNDERSTORY PLANTING Designing Habitat Introduce layered plantings in urban spaces to improve habitat, reduce disturbance, and suppress weeds. This practice of establishes layered, low- to mid-height vegetation beneath and between urban infrastructure elements such as street trees, tree pits, medians, and other residual or paved spaces. Introducing structurally diverse and dense plant communities into these areas helps suppress weeds, reduce soil compaction and trampling, and discourage informal uses such as dog disturbance, while also improving ecological function by creating habitat-rich, multi-layered environments that support urban biodiversity.	DESIGNATE NON-IRRIGATED AREAS Ecological Transition Strategies Designate non-irrigated planting areas in portions of the site where a less manicured appearance is acceptable. Select drought-adapted plants for non-irrigated areas and prioritize locally-native, high habitat-value species. IN PRACTICE: Republic Square
	HABITAT REFUGIA ZONES Designing Habitat Designate portions of the landscape where disturbance is minimized and vegetation is allowed to remain relatively undisturbed over time. Refuge areas support overwintering insects, nesting birds, soil organisms, and long-term ecological continuity within actively managed public landscapes.	LANDSCAPE EVOLUTION & SUCCESSIONAL DESIGN Ecological Transition Strategies Establish a design strategy that anticipates how a landscape will change ecologically and aesthetically over 1-, 3-, and 10-year timeframes. establishing management expectations and allowing species composition and structure to evolve as the site matures.	LEFT: Hammock posts double as insect hotels (Haven Kiers) TOP RIGHT: Sweat bee on oregano flower (UC Davis Arboretum and Public Garden)	

IN PRACTICE: George W. Bush Presidential Center

Ecological Transition Strategies

Conserve and repurpose existing vegetation on-site by retaining mature trees, shrubs, and perennials where possible, or carefully transplanting and relocating them within the landscape.

IN PRACTICE: Dell Medical District Campus

Increasing Legibility

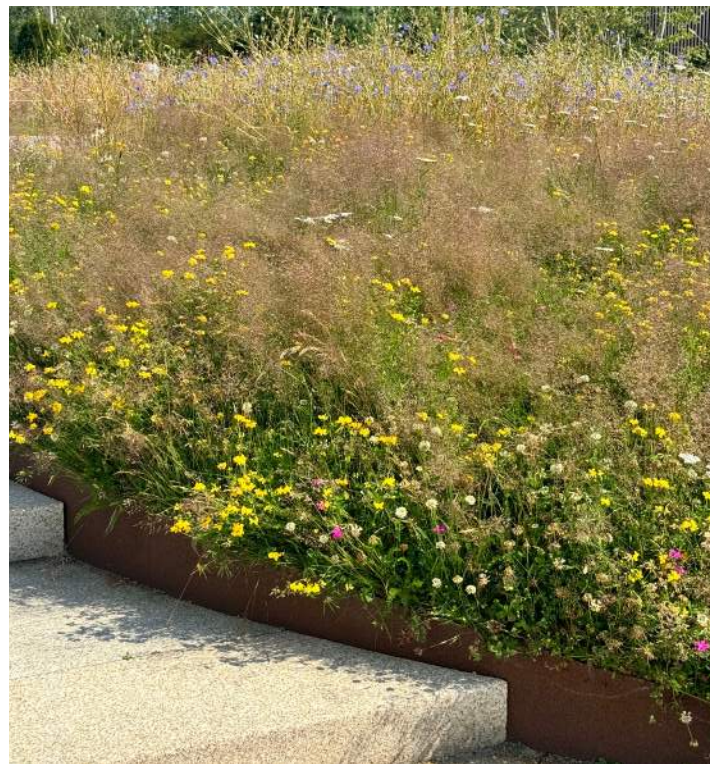
Juxtapose formal design elements with naturalistic plantings to create legible, dynamic landscapes. Combining recognizable “garden-like” features (such as topiary, hedges, or geometric forms) with more dynamic landscapes like wildflower meadows provides a sense of familiarity while reinterpreting traditional garden aesthetics in a more ecological and contemporary way.

EXPLORE: Care not Capital

Increasing Legibility

Use durable edging materials to create clear boundaries between planting areas and adjacent spaces. This helps control plant spread and reinforces visual order.

IN PRACTICE: Republic Square



Increasing Legibility

Use fencing, shrubs, or other barriers to discourage animal intrusion and pedestrian traffic, while also defining clean, orderly edges within the landscape.

IN PRACTICE: Republic Square, Presidio Tunnel Tops,
The Ramble

Increasing Legibility

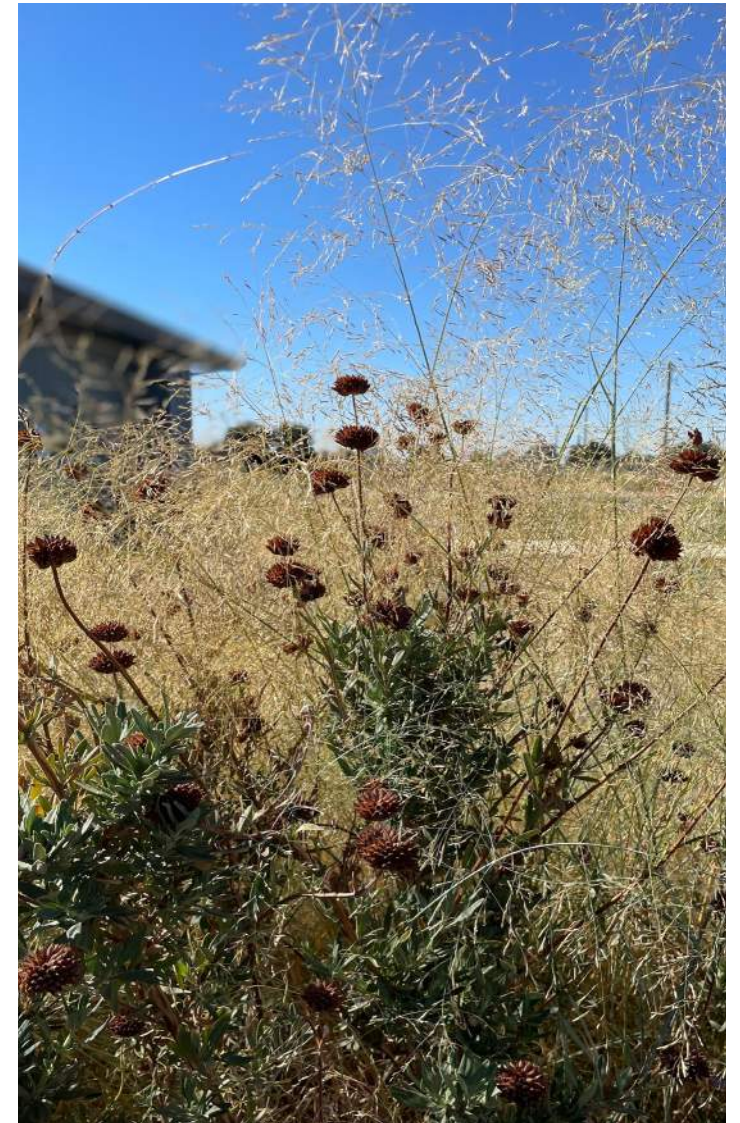
Ensure that at least 30% of a meadow is in bloom at any time to maintain legibility as an intentionally designed landscape. This floral presence should be distributed seasonally, ensuring that spring, summer, and fall each include active bloom through a succession of species. The planting is organized using a continuous groundcover matrix that provides spatial cohesion and weed suppression, within which larger blocks or drifts of individual species are inserted to simplify maintenance, strengthen visual structure, and ensure clearer patterns of seasonal interest. Juxtapose formal design elements with naturalistic plantings to create legible, dynamic landscapes. Combining recognizable “garden-like” features (such as topiary, hedges, or geometric forms) with more dynamic landscapes like wildflower meadows provides a sense of familiarity while reinterpreting traditional garden aesthetics in a more ecological and contemporary way.

EXPLORE: Meristem Horticulture

Increasing Legibility

Incorporate evergreen species, strong branching forms, persistent seed heads, or winter-interest plants to maintain recognizable structure throughout dormant seasons. Year-round visual organization helps biodiverse landscapes remain legible and intentional even during seasonal decline.

IN PRACTICE: Oudolf Garden Detroit



ABOVE: Structural seed heads in fall (Haven Kiers)

LEFT: Architectural steel edging defines the boundary between meadow and path (Haven Kiers)

INTERVENTION FOCUS

GOVERNANCE & STEWARDSHIP

STRATEGIES

- 1 “Friends of” Organization
- 2 Landscape Conservancy (or Alliance/Trust)
- 3 Student Horticultural Internship Programs
- 4 Stewardship Programming
- 5 Monitoring Partnership Networks
- 6 Baseline Condition Documentation
- 7 Public Risk Communication Frameworks for Biodiverse Landscapes
- 8 Public Use Conflict Management Frameworks
- 9 Public Safety vs Habitat Retention Decision Frameworks
- 10 Designer–Maintenance Integration Protocols
- 11 Plant Replacement Frameworks
- 12 Applied Landscape Research Partnership Program
- 13 Maintenance Transition Planning
- 14 Maintenance Workforce Sponsorship
- 15 Urban Forest Stewardship & Workforce Development
- 16 Tiered Volunteer Stewardship Programs
- 17 Tiered Landscape Career Pathway Programs

INTERVENTION TOPICS

- Cast of Characters
- Decision–Making Tools
- Workforce Development

GOVERNANCE, COORDINATION AND STEWARDSHIP SYSTEMS

This category focuses on the organizational structures, decision-making frameworks, partnerships, and workforce systems needed to sustain biodiverse landscapes over time. Ecological landscapes often require forms of coordination, communication, and long-term stewardship that extend beyond the capacity of conventional maintenance models. The strategies in this category address the institutional and operational systems that support continuity of care, strengthen collaboration between stakeholders, and build long-term stewardship capacity.

ABOVE: Sustainable Horticulture internship at UC Davis (UC Davis Arboretum and Public Garden)



Interventions include stewardship organizations, nonprofit partnerships, volunteer and internship programs, workforce development pathways, monitoring networks, applied research collaborations, and decision-making frameworks that guide maintenance and management over time. Many of these strategies focus on improving coordination between designers, maintenance staff, researchers, institutions, and the public while also creating clearer systems for adaptation, communication, and accountability. Collectively, they support a shift from short-term project delivery toward long-term stewardship models that recognize ecological landscape management as an ongoing, collaborative, and institutionally supported practice.

KEY BARRIER

Lack of Capacity in Traditional Maintenance Firms

Conventional maintenance systems and contractors are often structured around standardized, efficiency-driven practices that are not well suited to the adaptive care required by biodiverse landscapes.

SEE PAGE 18

INTERVENTION FOCUS

GOVERNANCE & STEWARDSHIP

STORY

A well-loved urban wild is cared for by a coalition of knowledgeable and skilled maintenance staff and dedicated volunteer stewards. Student interns find opportunities for ongoing skill development, first as seasonal laborers, then as full-time staff. From invasive removal to bioblitzes, the site’s managers seek opportunities to carefully observe the landscape and tailor their management actions to the changing needs of the land, guided by clear decision-making frameworks.

SAMPLE STRATEGIES

- A** Public Use Conflict Management Frameworks
- B** Student Horticultural Internship Programs
- C** Urban Forest Stewardship
- D** Monitoring Partnership Networks
- E** Designer-Maintenance Integration Protocols
- F** Tiered Landscape Career Pathway Programs
- G** Plant Replacement Frameworks



Keeping Up	Governance & Stewardship		UpKeep Catalog	80
“FRIENDS OF” ORGANIZATION Cast of Characters Establish a nonprofit or community-based support group dedicated to the advocacy, fundraising, and long-term stewardship of a specific garden, park, or landscape. In addition to generating financial support, these groups often coordinate volunteers, support educational programming, facilitate community engagement, and serve as a liaison between the public, designers, and managing agencies. They can also play a key role in advocacy for maintenance funding, policy support, and the protection of landscape quality over time, helping ensure the site’s ecological and cultural value is sustained beyond initial design and construction. IN PRACTICE: UC Davis	STUDENT HORTICULTURAL INTERNSHIP PROGRAMS Cast of Characters Create a structured, hands-on internship program that provides students with practical experience in landscape maintenance, horticulture, and ecological stewardship within campus, park, or public garden settings. Interns work alongside professional staff to gain foundational skills in plant care, irrigation, soil management, and seasonal landscape operations, while also developing leadership, teamwork, and workplace readiness skills. By combining technical skill-building with professional development, the internship prepares students for future employment and advanced study in related fields. se durable edging materials to create clear boundaries between planting areas and adjacent spaces. This helps control plant spread and reinforces visual order. IN PRACTICE: Penn State Sustainable Landscape Plan, UC Davis, UCLA Landscape Plan	 MONITORING PARTNERSHIP NETWORKS Cast of Characters Establish collaborations with local nonprofits, municipalities, and universities to support long-term monitoring of wildlife and biodiversity. These partnerships expand technical capacity, provide access to research expertise, and ensure consistent data collection over time while strengthening connections between the landscape, academic institutions, and the broader community. IN PRACTICE: Dell Medical District ABOVE: Student intern planting native grass plugs (UC Davis Arboretum and Public Garden)	ECOLOGICAL MAINTENANCE REVIEW COMMITTEE Decision-Making Tools Establish interdisciplinary review teams that include designers, maintenance staff, ecologists, and stakeholders to periodically evaluate ecological performance and management priorities. Collaborative review processes support adaptive management and improve long-term alignment between design intent and maintenance practices.	
	LANDSCAPE CONSERVANCY (OR ALLIANCE/TRUST) Cast of Characters Create a formal nonprofit stewardship organization responsible for the long-term care, management, fundraising, and advocacy of a specific landscape or network of landscapes. Unlike volunteer-driven “Friends of” groups, conservancies employ professional staff, manage or supplement maintenance operations, administer capital and endowment funding, and coordinate public programming. They operate through formal agreements with public agencies or landowners to ensure sustained ecological health, design integrity, and financial stability. IN PRACTICE: Under the K Bridge Park, Gowanus Canal, The Gathering Place		STEWARDSHIP PROGRAMMING Cast of Characters Establish collaborations with local nonprofits, municipalities, and universities to support long-term monitoring of wildlife and biodiversity. These partnerships expand technical capacity, provide access to research expertise, and ensure consistent data collection over time while strengthening connections between the landscape, academic institutions, and the broader community.	BASELINE CONDITION DOCUMENTATION Decision-Making Tools Record pre-installation ecological and physical site conditions, including vegetation composition, soil characteristics, and water dynamics. This documentation serves as a benchmark for evaluating long-term ecological change and design performance. IN PRACTICE: Gowanus Canal

Keeping Up	Governance & Stewardship		UpKeep Catalog	81
PUBLIC USE CONFLICT MANAGEMENT FRAMEWORKS Decision-Making Tools Establish maintenance and design protocols that address conflicts between ecological planting areas and informal public uses such as dogs, bicycles, and unplanned circulation. This includes spatial strategies, behavioral cues, and adaptive management responses.	PLANT REPLACEMENT FRAMEWORKS Decision-Making Tools Define guidelines for replacing plant material over time, including criteria for substitution, adaptation to site conditions, and maintaining design intent while allowing flexibility.	MAINTENANCE TRANSITION PLANNING Decision-Making Tools Develop structured handoff processes between installation teams and long-term maintenance staff, including training, site walks, documentation, and establishment benchmarks. Early coordination improves continuity of care and reduces loss of design intent during post-construction transitions.	TIERED VOLUNTEER STEWARDSHIP PROGRAMS Workforce Development Structure volunteer opportunities to accommodate different levels of availability, experience, and commitment. Offer entry-level participation through one-time events and more advanced roles through recurring volunteer teams with greater responsibility. As volunteers deepen their involvement, provide training, skill development, and stewardship opportunities, with pathways to fellowships, internships, and careers in landscape maintenance and ecological management. IN PRACTICE: UC Davis	
	APPLIED LANDSCAPE RESEARCH PARTNERSHIP PROGRAM Decision-Making Tools Invite academics, researchers, and ecological consultants to participate in the design and management of on site “living laboratories.” The sites support hands-on teaching, field research, and experimentation, with an emphasis on sharing results, improving practices, and publicizing applied research outcomes for broader community benefit.  ABOVE: Carp research on UC Davis campus (Gregory Urquiaga)	MAINTENANCE WORKFORCE SPONSORSHIP Workforce Development Invite businesses, donors, or foundations to fund the specialized training and professional development of gardeners and landscape maintenance workers. Instead of investing primarily in naming rights or capital projects, this approach prioritizes long-term landscape care by strengthening the skills and expertise of the people responsible for maintaining gardens and public spaces, resulting in higher-quality, more sustainable outcomes and a greater long-term return on investment.		TIERED LANDSCAPE CAREER PATHWAY PROGRAMS Workforce Development Create clear advancement pathways that move staff from entry-level grounds positions into increasingly skilled horticultural and ecological management roles. Progression is based on training, experience, and demonstrated competencies, with increased compensation, professional development, and responsibility at each level. By combining hands-on work with education and mentorship, the program builds workforce capacity, improves retention, and recognizes landscape maintenance as a skilled profession. IN PRACTICE: Gowanus Canal, Brooklyn Bridge Park
DESIGNER-MAINTENANCE INTEGRATION PROTOCOLS Decision-Making Tools Establish formal processes for ongoing collaboration between designers and maintenance teams beyond project completion. This ensures alignment between design intent and long-term management.		URBAN FOREST STEWARDSHIP & WORKFORCE DEVELOPMENT Workforce Development Develop long-term urban forest stewardship programs that prioritize tree diversity, health, and resilience while building professional capacity through hands-on training in tree care, assessment, pruning, and management. Participants contribute to real-world monitoring and maintenance activities, supporting both urban forest health and workforce development. IN PRACTICE: Under the K Bridge Park, Gowanus Canal		

06

GROUND-CRAFT GUIDE

Maintenance team member, UC Davis. (Haven Kiers)

INTRODUCTION TO THE GROUNDRAFT GUIDE

Groundcraft compiles a practical set of field-based maintenance strategies, operational techniques, and adaptive management practices for the care of biodiverse landscapes. While the Upkeep Catalog focuses on broader systems of stewardship, governance, funding, and cultural perception, Groundcraft centers on the day-to-day realities of landscape maintenance at the site scale. Its purpose is to translate ecological design intent into clear, actionable practices that can support the long-term health, legibility, and resilience of dynamic plant communities.

The guide emerges from a central finding of this research: the success of biodiverse landscapes depends not only on ecological design, but also on the quality, precision, and adaptability of ongoing maintenance practices. Conventional maintenance systems are often optimized for simplified ornamental landscapes and frequently rely on standardized routines that can unintentionally undermine ecological function. In contrast, biodiverse landscapes require forms of care that are observational, responsive, and closely attuned to seasonal and site-specific conditions.

TOP: Stewards hand-weeding at Presidio Tunnel Tops (Presidio Trust)
BOTTOM LEFT: Vegetation management on the UC Davis campus (UC Davis Arboretum and Public Garden)
BOTTOM RIGHT: Replanting at Dell Medical District by Campus maintenance staff (UT Austin)

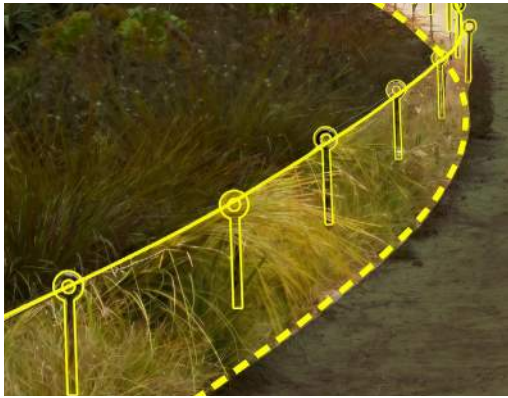
Drawing from case study research, interviews, surveys, and precedent analysis conducted throughout Phases 1 and 2, Groundcraft documents a range of practical strategies related to field operations, maintenance workflows, material systems, and on-site management. These include approaches to vegetation establishment, adaptive pruning and cutback techniques, ecological weed management, irrigation practices, and seasonal maintenance timing, alongside guidance related to tools, access, ergonomics, and operational organization.

A central premise of the guide is that maintenance outcomes are shaped not only by ecological knowledge, but also by the physical and operational systems that structure landscape care. The guide therefore emphasizes the importance of maintainability in landscape design, including considerations such as physical access, worker ergonomics, soil protection, and the organization of maintenance tasks and responsibilities. It also recognizes that tools and material infrastructure—including irrigation hardware, edging systems, and equipment selection—directly influence ecological outcomes, labor efficiency, and worker wellbeing.



GROUNDRAFT CATEGORIES

Rather than functioning as a fixed maintenance manual, Groundcraft approaches landscape care as an adaptive and iterative practice. Entries are organized as field-oriented strategies and techniques that can be applied across a range of site conditions and management contexts. Together, these practices support a more ecologically informed model of landscape maintenance that aligns day-to-day operations with long-term biodiversity goals and stewardship outcomes.



CUES TO CARE



MONITORING & ADAPTING
MANAGEMENT



VEGETATION MANAGEMENT



WEED MANAGEMENT



PEST MANAGEMENT



TEAM MANAGEMENT



REDUCING INPUTS: MATERIALS



REDUCING INPUTS: LABOR



TOOLS



HEALTHY SOILS



REPLANTING



ECOLOGICAL TIMING
& SEASONAL OPERATIONS

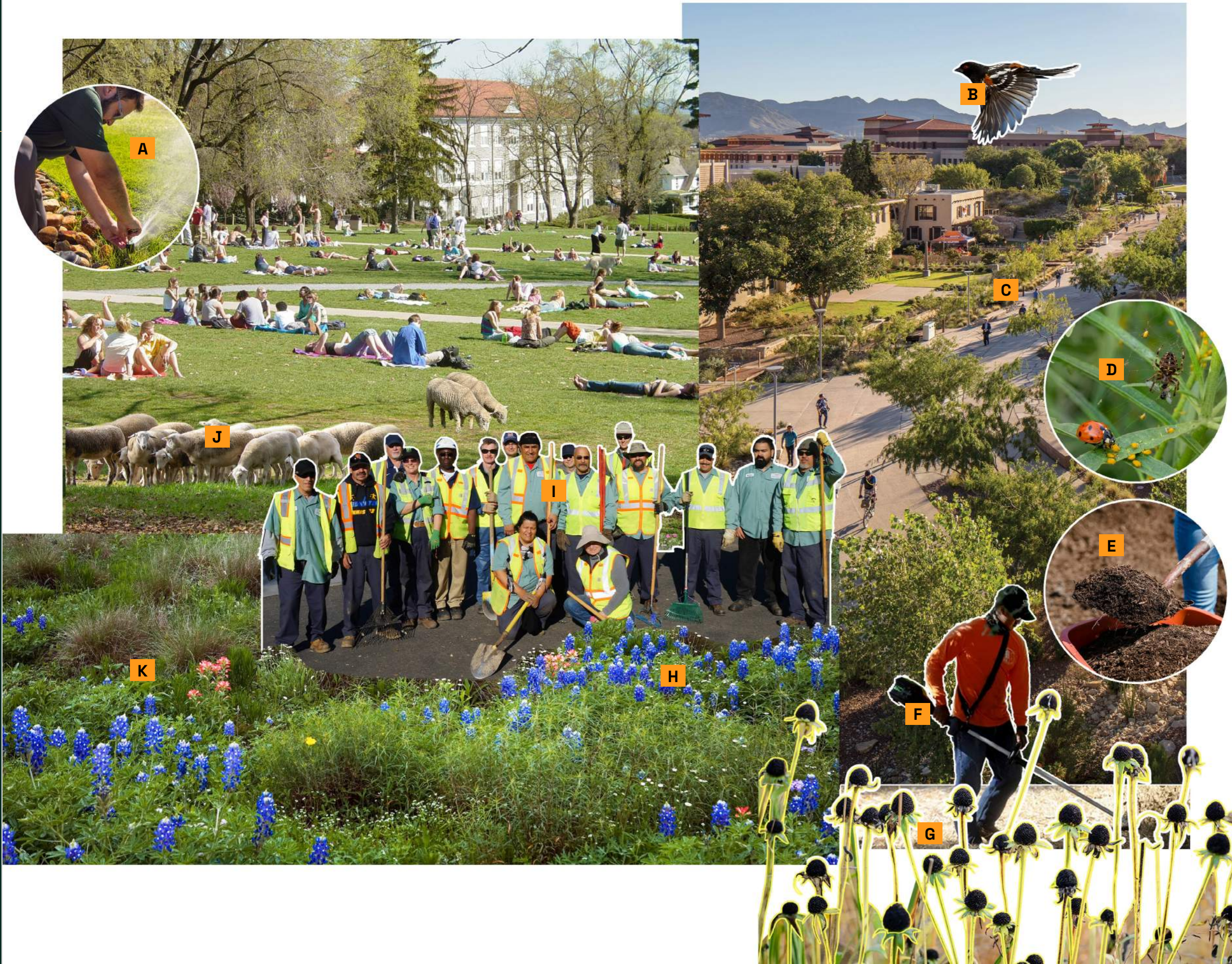
GUIDE TO
GROUNDCRAFT

STORY

A public university campus is converting lawns to native and naturalized planting areas to build biodiversity, store carbon, and reduce water use. Their in-house maintenanc professionals receive regular training on new skills to care for the new landscapes on campus. This training builds their knowledge and expertise, gives them more opportunities to make decisions in their work, and makes them feel more connected to the landscapes they care for.

SAMPLE STRATEGIES

- A** Irrigation Monitoring and Adjustment
- B** Indicator Species Monitoring
- C** Mullet Gardens
- D** Integrated Pest Management
- E** Soil Building Strategies
- F** Battery-Powered Tools
- G** Delayed Spring Cleanup
- H** Regional Identity Planting
- I** Cross-Training Maintenance Staff
- J** Hands-Off Maintenance





CUES TO CARE

Landscape Legibility

Use visible signs of maintenance and intention to signal that a landscape is designed and cared for. “Cues to care” is a design principle coined by landscape ecologist Joan Nassauer that describes the use of visible signs of human intention and maintenance to signal that a landscape is deliberately designed rather than neglected. In naturalistic or ecologically rich plantings, elements such as defined edges, mown borders, repeated patterns, or maintained focal points help communicate order and care, allowing biodiverse or “messy” vegetation to be perceived as intentional, valued, and well-managed rather than abandoned.

MULLET GARDENS

Landscape Legibility

Design landscapes with a highly maintained, orderly appearance in prominent or highly visible areas, while allowing less visible spaces to support more experimental, naturalistic, or ecologically intensive management. This “business in the front, party in the back” approach uses visible order to build acceptance for biodiversity and ecological stewardship.

HIDDEN HABITAT

Landscape Legibility

Add dead logs, leaf piles, twigs, etc. to the back of a garden to create habitat without compromising design

SEASONAL FOCAL POINT MAINTENANCE

Landscape Legibility

Maintain selected focal areas—such as entrances, pathways, signage, and gathering spaces—to a higher standard of seasonal care while allowing leaf litter and other seasonal materials to remain in less-visible portions of the landscape. This targeted approach supports habitat and ecological function while demonstrating stewardship and helping the public understand seasonal landscape management practices.



Fall clean up along street median (UC Davis Arboretum and Public Garden)

REPEATED PLANTING PATTERNS

Landscape Legibility

Incorporate repeated species, recognizable plant groupings, or consistent spatial rhythms throughout biodiverse landscapes to create visual coherence and legibility. Repetition helps more complex or dynamic plant communities feel organized and designed, even as vegetation changes seasonally or self-organizes over time.

LOW-VISIBILITY PLANT TESTING

Landscape Legibility

Trial new or experimental species in less visible areas before incorporating them into primary design zones.

MANAGED DESIRE PATHS

Landscape Legibility

Monitor and respond to informal circulation patterns by reinforcing preferred routes through maintained paths, mown edges, stepping stones, planting adjustments, or other visible cues that guide movement through the landscape. Clearly legible circulation patterns help reduce trampling, soil compaction, and vegetation damage while signaling intentional stewardship and improving the long-term usability and care of biodiverse planting areas.

MONITORING & ADAPTIVE MANAGEMENT



PHOTO-POINT MONITORING SYSTEMS

Monitoring & Adaptive Management

Establish fixed photographic viewpoints and invite visitors to digitally submit their photos to visually track landscape change over time. These systems provide an accessible, low-cost method for evaluating vegetation growth, seasonal variation, and long-term ecological transformation, while also fostering meaningful public engagement with the landscape. By encouraging community members to repeatedly observe and document the same locations, photo monitoring programs help participants develop a deeper awareness of ecological processes and environmental change.

LONG-TERM ECOLOGICAL MONITORING PROTOCOLS

Monitoring & Adaptive Management

Establish standardized systems for tracking vegetation, soil conditions, and hydrological performance over time. These protocols provide continuous data to evaluate landscape health and inform adaptive maintenance decisions.

ADAPTIVE MANAGEMENT PROTOCOLS

Monitoring & Adaptive Management

Implement structured “if–then” response systems that link observed site conditions to specific maintenance actions. Adjust maintenance practices based on observed ecological succession, allowing desirable species to establish while selectively managing unwanted shifts. This creates a feedback loop where management strategies evolve based on real-time ecological performance, replacing static maintenance schedules with responsive, time-based strategies.

INDICATOR SPECIES MONITORING

Monitoring & Adaptive Management

Track the presence, abundance, or behavior of selected plant, insect, or bird species as indicators of broader ecological health and landscape performance. Monitoring indicator species can help identify shifts in biodiversity, habitat quality, or ecosystem function over time, allowing maintenance teams to detect emerging issues early and adapt management strategies accordingly.

SITE DISTURBANCE MAPPING

Monitoring & Adaptive Management

Regularly document and map areas of soil compaction, erosion, trampling, drainage issues, vegetation decline, or invasive species encroachment across the site.

MAINTENANCE OUTCOME AUDITS

Monitoring & Adaptive Management

Evaluate not only whether maintenance tasks were completed, but whether desired ecological and aesthetic conditions were achieved. This shifts evaluation from activity-based metrics to performance-based landscape outcomes.

EVENT RECOVERY MANAGEMENT

Monitoring & Adaptive Management

Implement post-event restoration protocols following festivals, concerts, or high-use gatherings to address compaction, vegetation damage, irrigation impacts, and debris accumulation. Rapid recovery practices help restore ecological function while reducing long-term degradation from concentrated public use.

WEEKLY ECOLOGICAL ATTENTION

Monitoring & Adaptive Management

Conduct brief but consistent weekly maintenance walkthroughs to identify emerging weeds, irrigation problems, pest outbreaks, trampling damage, or plant stress before conditions escalate. Frequent low-intensity observation and intervention helps prevent landscapes from becoming “out of control,” reducing the need for disruptive large-scale corrective maintenance while supporting more responsive ecological management.

VEGETATION MANAGEMENT



TARGETED GRAZING (GOATS/SHEEP)

Vegetation Management

Use grazing animals to manage vegetation in areas that are difficult to access or maintain with conventional equipment. In addition to providing an effective, low-impact maintenance strategy, this approach offers visible and engaging evidence of sustainable land management, helping to reduce public concern about landscape care, spark curiosity, and foster community connection through memorable, shared experiences in public space.

LEAVE THE LEAVES (CHOP AND DROP/GREEN MULCHING)

Vegetation Management

Leave fallen leaves, plant trimmings, or cut vegetation in place to naturally decompose and return nutrients to the soil. Rather than removing organic material as waste, this approach treats plant debris as a resource, creating a protective mulch layer that improves soil health, retains moisture, suppresses weeds, and supports beneficial organisms such as insects and microbes.

SELECTIVE MEADOW MAINTENANCE

Vegetation Management

Retain larger, structurally dominant plants while removing fine-textured or visually declining herbaceous growth . This strategy preserves the seasonal architectural framework of species such as Joe Pye weed and Hibiscus, which help conceal senescent bulb foliage and maintain visual order within a dynamic understory. It also supports continued nutrient cycling and ecological function without compromising the overall aesthetic integrity of the meadow.

INCREMENTAL CUTBACK (6-INCH RULE)

Vegetation Management

Cut back grasses and herbaceous material in small segments (approximately 6 inches or less) so that debris can be left in place as mulch. This reduces labor associated with removal and supports on-site nutrient cycling.



Cutting and leaving stems (UC Davis Arboretum and Public Garden)



PROTECTIVE PATH ROUTING

Vegetation Management

Use temporary or permanent circulation cues such as mown paths, stepping stones, fencing, or mulch trails to direct pedestrian movement away from vulnerable planting areas. Guiding circulation helps reduce trampling, soil compaction, and plant damage while maintaining public access and legibility.

ABOVE: A mown path through the meadow (Saxon Holt)

DOG-RESISTANT PLANTING BUFFERS

Vegetation Management

Use dense, layered planting zones, low fencing, logs, boulders, thorny or texturally resistant species, and strategically placed circulation routes to discourage dogs from entering sensitive planting areas. Designing and maintaining physical and visual barriers helps reduce trampling, soil compaction, digging, and urine damage while preserving habitat value and minimizing conflicts between ecological function and public use.

PRESCRIBED BURNS

Vegetation Management

Use controlled burns at strategic intervals to remove dead biomass and encourage new plant growth and seed germination.

HOLLOW STEM RETENTION

Vegetation Management

Retain hollow and pithy stems after cutback to provide insect habitat, ensuring they are in place during target insect species reproductive or overwintering period.

RAKING ORNAMENTAL GRASSES

Vegetation Management

Retain larger, structurally dominant plants while removing fine-textured or visually declining herbaceous growth . This strategy preserves the seasonal architectural framework of species such as Joe Pye weed and Hibiscus, which help conceal senescent bulb foliage and maintain visual order within a dynamic understory. It also supports continued nutrient cycling and ecological function without compromising the overall aesthetic integrity of the meadow.

WEED MANAGEMENT



SHEET MULCHING (LASAGNA GARDENING)

Weed Management

Suppress existing vegetation by layering biodegradable materials such as cardboard and organic mulch. This method builds soil while reducing weed pressure.

TEMPORARY WEED SUPPRESSION COVERS

Weed Management

Use biodegradable weed suppression materials such as burlap, cardboard, jute mesh, or organic fiber blankets during establishment phases to reduce weed competition while young plantings become established. Temporary suppression strategies can reduce labor-intensive weeding needs without permanently limiting soil respiration or ecological function.

HAND WEEDING

Weed Management

Remove weeds manually before they set seed, ensuring complete root removal.

SOIL SOLARIZATION

Weed Management

Remove weeds and invasive plants manually before they set seed to prevent reestablishment. Mechanical and low-impact removal options include: hand pulling, flame weeding, solarization, vinegar applications, and steaming. Chemical treatments may be used responsibly only as a last resort.

SOIL SURFACE STRIPPING

Weed Management

Remove the top layer of soil from a container-grown plant before installation and discard it or add to the base of the planting hole. This reduces the introduction of weed seeds and nursery-associated contaminants into the landscape.

MECHANICAL AND LOW-IMPACT INVASIVE PLANT AND WEED REMOVAL

Weed Management

Remove weeds and invasive plants manually before they set seed to prevent reestablishment. Mechanical and low-impact removal options include: hand pulling, flame weeding, solarization, vinegar applications, and steaming.



Flame weeding (Saxon Holt)

PEST MANAGEMENT



INTEGRATED PEST MANAGEMENT (IPM)

Pest Management

Implement IPM protocols to reduce unnecessary pesticide use, focusing on long-term monitoring and prevention. Reducing pesticide use supports native insect populations, especially in combination with habitat creation.

PREVENTATIVE MANAGEMENT OF INVERTEBRATE PESTS

Pest Management

Reduce pest vulnerability by supporting overall plant health through appropriate watering, soil care, species selection, and reduced mechanical damage. Healthy, well-adapted plants are generally more resilient to pest outbreaks and environmental stress, reducing the need for intensive pest intervention over time.

DEBRIS CLEARING

Pest Management

If a severe outbreak occurs, clear vegetation and debris to reduce hosts. Replant as needed once outbreak is controlled.

TARGETED MANUAL REMOVAL

Pest Management

Use hand removal, pruning, or localized treatment methods to manage pest outbreaks before they become widespread. This helps minimize ecological disturbance, reduce reliance on broad-spectrum chemical treatments, and preserve beneficial insects and surrounding plant communities.

MONITORING AND EARLY DETECTION

Pest Management

Conduct routine inspections of plant health, leaf damage, insect activity, and signs of disease to identify pest issues before they become severe.



Plant health inspection (UC Davis Arboretum and Public Garden)

PLANT STRESS REDUCTION

Pest Management

Reduce pest vulnerability by supporting overall plant health through appropriate watering, soil care, species selection, and reduced mechanical damage. Healthy, well-adapted plants are generally more resilient to pest outbreaks and environmental stress, reducing the need for intensive pest intervention over time.

TEAM MANAGEMENT



ROUTINE TEAM SITE WALKS

Team Management

Conduct regular group walkthroughs of the landscape to discuss site conditions, maintenance priorities, emerging issues, and long-term goals. Collaborative site walks help align maintenance practices across team members while encouraging shared observation, communication, and collective problem-solving.

COLLABORATIVE SPECIES LEARNING

Team Management

Encourage maintenance staff to photograph unfamiliar plants, insects, fungi, or wildlife encountered on-site and bring them to team meetings for group discussion and identification. Creating opportunities for staff to share observations and teach one another helps build ecological knowledge collectively, strengthens engagement with the landscape, and supports more informed and responsive maintenance practices over time.

LIVING MAINTENANCE MANUALS

Team Management

Create dynamic, regularly updated digital maintenance guides that evolve alongside the landscape. These manuals incorporate lessons learned, updated practices, and changing site conditions.

AREA MAINTENANCE MODEL

Team Management

Assign responsibility for specific landscape areas to individuals to instill a sense of personal accountability and care. By fostering ownership over a space, this approach encourages greater accountability, attentiveness, and pride, often resulting in more consistent, thoughtful, and responsive maintenance.

SPECIES-SPECIFIC MAINTENANCE KNOWLEDGE

Team Management

Develop maintenance familiarity with the growth habits, pruning needs, seasonal cycles, and ecological functions of individual plant species rather than applying uniform maintenance approaches across all vegetation. Species-specific knowledge helps prevent improper pruning, unnecessary removal, and poorly timed interventions while supporting healthier and more ecologically functional plant communities.

CROSS-TRAINING MAINTENANCE STAFF

Team Management

Train maintenance staff across multiple skill areas—including planting identification, irrigation, pruning, ecological management, and equipment operation—to build flexibility and shared understanding within the maintenance team. Cross-training improves long-term resilience, reduces knowledge silos, and allows teams to respond more effectively to changing site conditions and staffing needs.

MAINTENANCE FEEDBACK LOOPS

Team Management

Create systems that allow maintenance staff to regularly communicate observations, challenges, and recommendations to supervisors, designers, and managers. Incorporating frontline maintenance knowledge into decision-making helps identify recurring issues early and supports more responsive, adaptive, and practical management strategies.

SEASONAL MAINTENANCE PLANNING MEETINGS

Team Management

Hold recurring seasonal planning meetings to review upcoming maintenance priorities, ecological timing considerations, staffing needs, and lessons learned from previous seasons. Coordinated seasonal planning helps teams anticipate changing landscape conditions and shift from reactive maintenance toward more proactive and adaptive management approaches.



INNOVATIVE SOURCES OF IRRIGATION

Reducing Inputs - Materials

Integrate non-potable and site-derived water sources into irrigation systems to reduce reliance on municipal potable water. This includes rainwater harvesting, reuse of air-conditioning condensate, and graywater systems (such as purple pipe infrastructure).

ON-SITE MULCH GENERATION

Reducing Inputs - Materials

Reuse leaves, pruned branches, and other plant debris as mulch within the landscape rather than removing and disposing of organic material off-site. Processing and redistributing green waste on-site reduces disposal costs, decreases the need for imported mulch materials, and helps improve soil moisture retention and long-term soil health.

MATERIAL REUSE AND CIRCULAR RESOURCE SYSTEMS

Reducing Inputs - Materials

Reduce costs by reusing on-site materials such as plant debris, soil, and salvaged construction elements. This lowers input costs while supporting ecological function.



Grass clippings used as mulch (Saxon Holt)

TARGETED MATERIAL APPLICATIONS

Reducing Inputs - Materials

Apply mulch, compost, fertilizers, and soil amendments only where monitoring indicates they are needed rather than uniformly across the entire site. Targeted applications reduce unnecessary material use and costs while helping prevent over-application, runoff, and unintended ecological impacts.

DURABLE AND REPAIRABLE MATERIALS

Reducing Inputs - Materials

Select long-lasting, repairable site materials and infrastructure components to reduce replacement frequency and long-term material consumption. Durable edging, irrigation components, furnishings, and site elements can reduce waste generation, minimize recurring maintenance inputs, and improve overall operational efficiency over time.

IRRIGATION MONITORING AND ADJUSTMENT

Reducing Inputs - Materials

Adjust irrigation types, coverage, and run-times in response to changes in plant health. Use soil moisture monitoring and flow monitoring to maximize efficiency and maintain appropriate soil moisture levels. Routinely audit irrigation systems to monitor performance and identify leaks.



Irrigation system inspection (Haven Kiers)

REDUCING INPUTS - LABOR



STRATEGIC PLANT EDITING

Reducing Inputs - Labor

Regularly thin, divide, relocate, or selectively remove species that become overly aggressive, decline in performance, or outcompete neighboring plants. Small, ongoing editing interventions help maintain balance within dynamic plant communities while reducing the need for large-scale corrective maintenance later.

PROACTIVE WEED TIMING

Reducing Inputs - Labor

Prioritize weed removal before flowering and seed set to reduce long-term weed pressure and minimize repeated labor-intensive interventions. Early, targeted removal strategies can significantly reduce future maintenance demands while preventing invasive spread within biodiverse planting systems.

MINIMAL PRUNING

Reducing Inputs - Labor

Preserve the natural form of shrubs by minimizing pruning. Use thinning cuts wherever possible and do not shear shrubs into shapes.

HANDS-OFF MAINTENANCE

Reducing Inputs - Labor

Reduce maintenance intensity, prioritizing ecological processes and intervening only when necessary and for long-term landscape health



Reduced maintenance treatments (Saxon Holt)

SELF-SOWING AND PLANT SUCCESSION

Reducing Inputs - Labor

Allow desirable species to reseed and spread naturally within planting areas rather than routinely replacing plants through intensive replanting efforts. Supporting controlled self-organization can reduce long-term planting labor while helping landscapes adapt dynamically to changing site conditions over time.

DENSE PLANT COVERAGE

Reducing Inputs - Labor

Encourage dense, healthy plant growth to shade soil surfaces and suppress weed establishment naturally. Maintaining thick vegetative coverage reduces open ground available for weed colonization, helping decrease the need for frequent weeding, mulching, and other labor-intensive maintenance interventions over time.

PROACTIVE WEED TIMING

Reducing Inputs - Labor

Prioritize weed removal before flowering and seed set to reduce long-term weed pressure and minimize repeated labor-intensive interventions. Early, targeted removal strategies can significantly reduce future maintenance demands while preventing invasive spread within biodiverse planting systems.

TOOLS



BATTERY-POWERED TOOLS

Tools

Use lightweight, electric tools to reduce emissions, noise, and physical strain while maintaining efficiency. Electric tools reduce carbon output and can be part of an overall carbon-emissions reduction scheme.

LOW-IMPACT ACCESS EQUIPMENT

Tools

Use wheelbarrows, carts, track mats, or lightweight utility vehicles designed to minimize soil compaction and disturbance during maintenance operations. Low-impact equipment helps protect soil structure, root systems, and sensitive planting areas.

MAINTENANCE BY HAND IN SENSITIVE AREAS

Tools

Prioritize hand tools and manual maintenance techniques within ecologically sensitive or densely planted areas where large machinery may damage vegetation, compact soils, or reduce habitat quality.

HIGH-QUALITY TOOLS

Tools

Provide durable, ergonomic tools that improve efficiency and reduce physical strain on maintenance staff. Recommended tools include: Dutch hoe, broadfork, bypass pruning shears, a hori hori (soil knife), pruning saw.



High quality hand pruners break up root bound grass plugs (UC Davis Arboretum and Public Garden)

TOOL MAINTENANCE AND SHARPENING PROGRAMS

Tools

Implement regular cleaning, sharpening, and maintenance schedules for hand tools and power equipment to improve efficiency, safety, and longevity. Well-maintained tools reduce physical strain on workers, improve the quality of pruning and cutting tasks, and minimize unnecessary damage to plants and soils.

FLEXIBLE HOSE AND IRRIGATION MANAGEMENT SYSTEMS

Tools

Use lightweight, mobile hoses, quick-connect fittings, and adaptable irrigation tools that allow maintenance staff to efficiently target watering needs without dragging heavy equipment through planting areas. Flexible watering systems help reduce plant damage, soil compaction, and unnecessary water use while improving responsiveness during establishment and drought periods.

PRECISION IRRIGATION NOZZLES AND DRIP SYSTEMS

Tools

Use low-flow irrigation hardware such as drip emitters, pressure-compensating nozzles, and targeted spray heads to deliver water more efficiently and reduce overspray and runoff. Precision irrigation systems help conserve water, reduce weed growth in non-target areas, and support healthier plant establishment and long-term resilience.



UC Davis Arboretum staff install drip irrigation (UC Davis Arboretum and Public Garden)



NO-TILL GARDENING

Healthy Soils

Avoid soil disturbance to preserve structure, reduce weed emergence, and support long-term soil health.

SOIL BIOLOGY ENHANCEMENT

Healthy Soils

Introduce mycorrhizae and beneficial microbes to improve plant health, nutrient uptake, and soil structure.

SOIL BUILDING STRATEGIES

Healthy Soils

Incorporate practices such as cover cropping, composting, and organic amendments to improve soil structure and fertility prior to planting.

COMPOST TEA

Healthy Soils

Steep compost in water to extract beneficial microorganisms and soluble nutrients. This can be applied to soil or plant surfaces to support microbial activity, improve plant health, and enhance nutrient availability within the landscape.

SOIL TESTING

Healthy Soils

Sample and analyze soils regularly (e.g. annually) and before applying fertilizers or amendments to assess health and guide amendment or other interventions.

ROTATING MAINTENANCE ACCESS ROUTES

Healthy Soils

Vary maintenance circulation routes and staging areas to avoid repeated soil compaction in the same locations over time. Rotating access patterns helps preserve soil structure, improve infiltration, and reduce long-term damage to root systems and understory vegetation.

REPLANTING



PLANT SELECTION AND ADAPTIVE REPLANTING (PROVEN SUCCESS)

Replanting

Choose biodiverse plant palettes based on availability, reliability, and demonstrated success in similar conditions, rather than experimenting with untested species or specifying plants that are difficult to source. In the long-term maintenance of an established garden, fill gaps with species that are performing well on-site in similar microclimate conditions.

PLANT PROTECTION MEASURES

Replanting

Utilize temporary measures to safeguard newly installed plants during establishment. This can include using wooden stakes to clearly mark plant locations (helping prevent mowing or accidental trampling while making plants easier to see and irrigate) and installing protective cages to shield them from damage by people or dogs until they are fully established.

SPONTANEOUS URBAN PLANT INTEGRATION

Replanting

Allow or incorporate self-seeding species that are adapted to local conditions to reduce maintenance.

NURSE ROCKS

Replanting

Place a rock (the size of a softball or larger) on the southwest side of a new plant’s crown to shelter the crown and roots from heat, help the soil retain moisture, and function as a natural drip system while the plant establishes.

REGIONAL IDENTITY PLANTING

Replanting

Incorporate regionally recognizable species to create a strong sense of place, such as Texas bluebonnets, California poppy, or native sunflowers in newly planted beds. The flowers will engage visitors while main plants become established.



TEMPORARY IRRIGATION TAPERING

Replanting

Gradually reduce irrigation frequency as plants establish to encourage deeper root growth and improve long-term drought resilience. Slowly tapering supplemental water helps plants adapt to local climatic conditions while reducing long-term irrigation dependence and maintenance inputs.

STRATEGIC SHADE PROTECTION

Replanting

Use temporary shade cloth, nurse plants, or adjacent vegetation to protect newly installed plants from heat stress and excessive solar exposure during establishment. Reducing environmental stress during early establishment improves plant survival while decreasing irrigation demands and

MICROCLIMATE-BASED PLANT PLACEMENT

Replanting

Adjust planting selection and maintenance practices in response to localized microclimate conditions such as reflected heat, shade, wind exposure, or concentrated runoff. Matching plants to fine-scale site conditions improves establishment success, reduces stress, and minimizes long-term maintenance

ECOLOGICAL TIMING & SEASONAL OPERATIONS



DELAYED SPRING CLEANUP

Ecological Timing & Seasonal Operations

Delay cutting back stems, leaf litter, and other dormant vegetation until temperatures have consistently warmed in spring to protect overwintering pollinators and beneficial insects. Allowing plant material to remain through winter provides habitat, food sources, and insulation for wildlife while also helping improve soil health and moisture retention.

SEASONAL MOWING WINDOWS

Ecological Timing & Seasonal Operations

Schedule pruning, mowing, and tree work according to seasonal ecological cycles rather than fixed calendar intervals. Timing disruptive maintenance activities to avoid peak flowering periods, bird nesting seasons, or pollinator activity can help support biodiversity while still maintaining the landscape’s appearance and long-term functionality.

FALL PLANTING

Ecological Timing & Seasonal Operations

Install plants in fall rather than spring to allow root systems to establish under cooler, more stable conditions. This reduces irrigation needs, improves plant survival, and lowers maintenance demands during the following

HABITAT MULCHING

Ecological Timing & Seasonal Operations

Conduct late-winter cutbacks of herbaceous vegetation and retain the resulting stems and plant debris on-site by relocating it to less visible areas of the garden. This material is left in place to provide overwintering habitat for insects and other wildlife while gradually decomposing and contributing organic matter back into the system over time.



Volunteers use a mulching mower at Oudolf Garden Detroit (Ryan Southen)

ROTATIONAL OR PHASED MAINTENANCE

Ecological Timing & Seasonal Operations

Delay cutting meadow or grassland vegetation until plants have flowered and dispersed seed to support natural regeneration and improve long-term plant community resilience. This approach helps sustain plant diversity over time while also providing extended habitat and food resources for pollinators and other wildlife.

SEASONAL OBSERVATION WALKS & ADAPTIVE MANAGEMENT PLANNING

Ecological Timing & Seasonal Operations

Conduct regular seasonal site walks to observe plant health, wildlife activity, hydrologic conditions, and overall landscape performance throughout the year. Using direct observation to inform seasonal management plans allows maintenance practices to respond to changing site conditions, improving long-term ecological function while reducing unnecessary or poorly timed interventions.

APPENDICES

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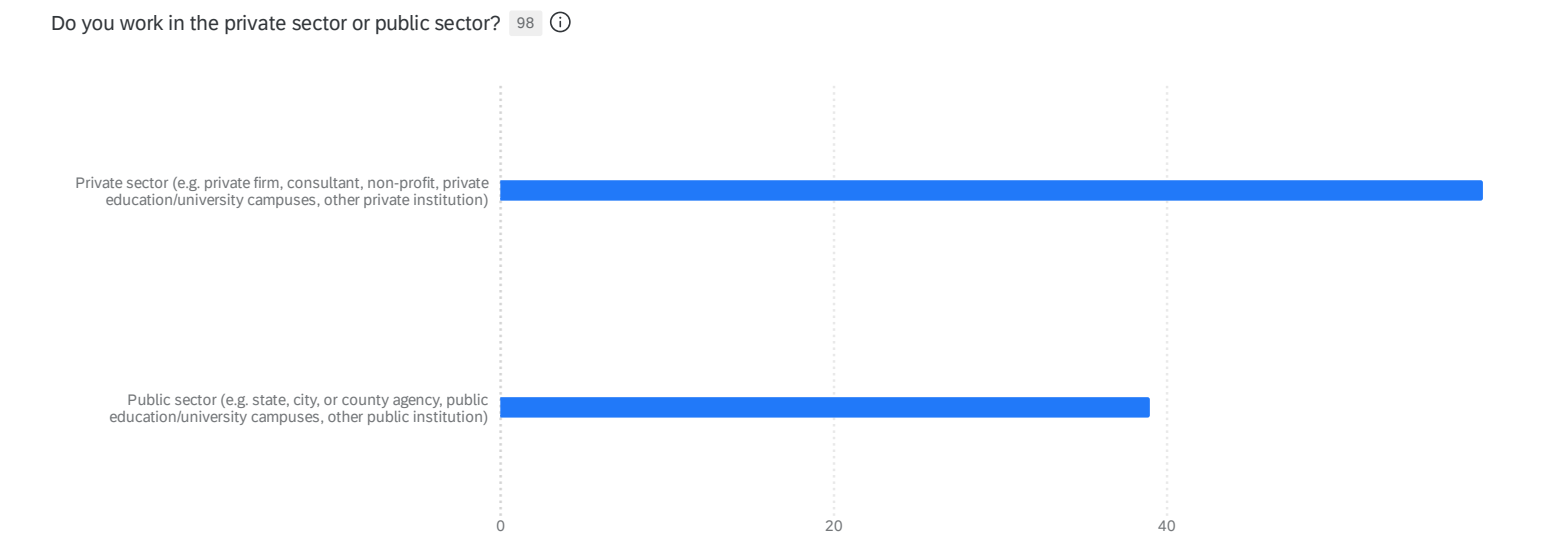
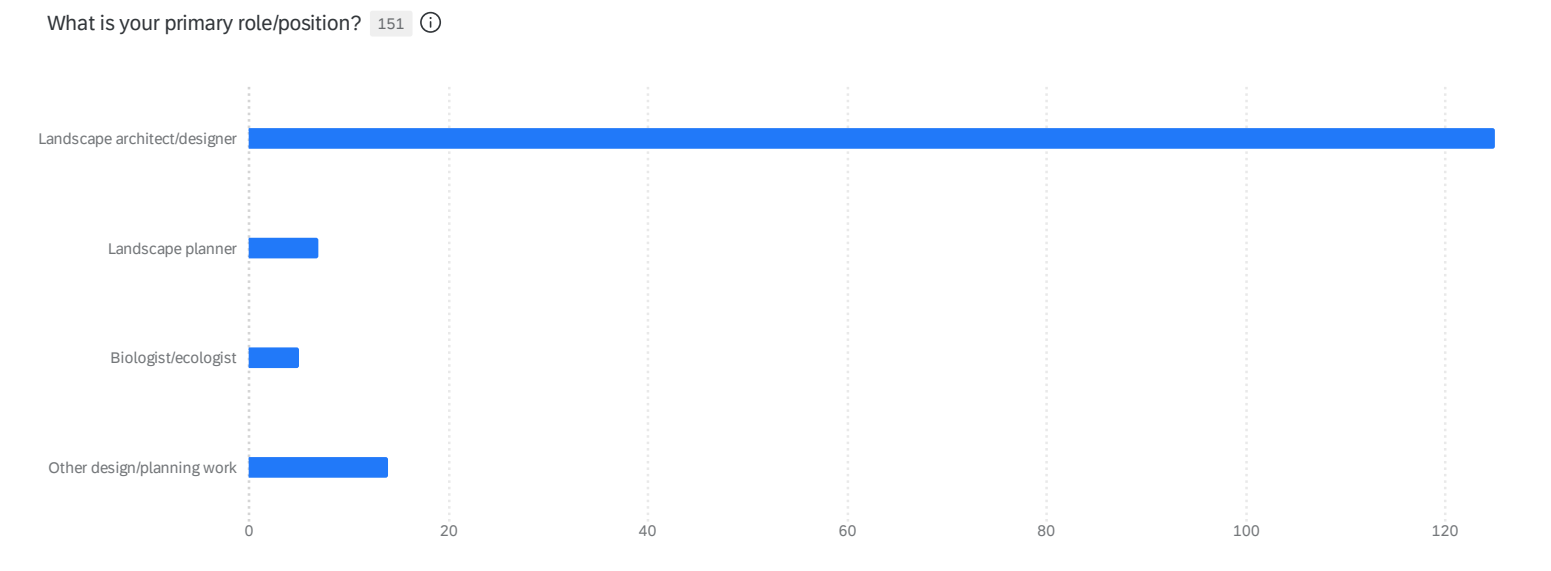
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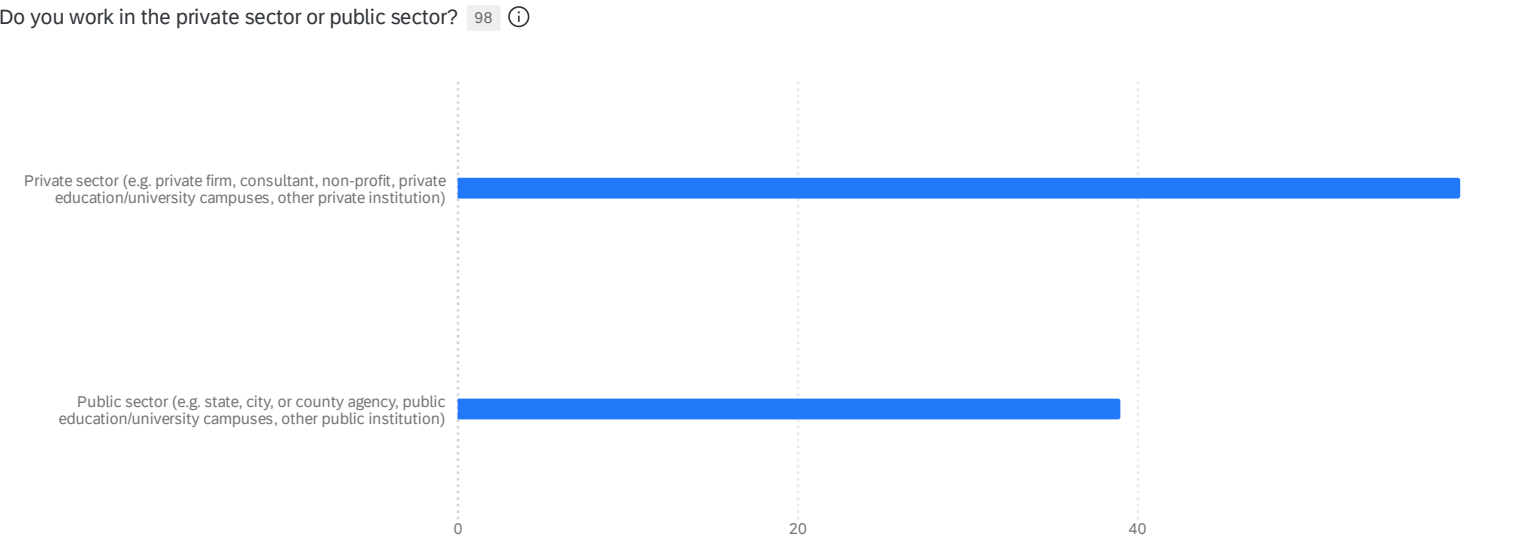
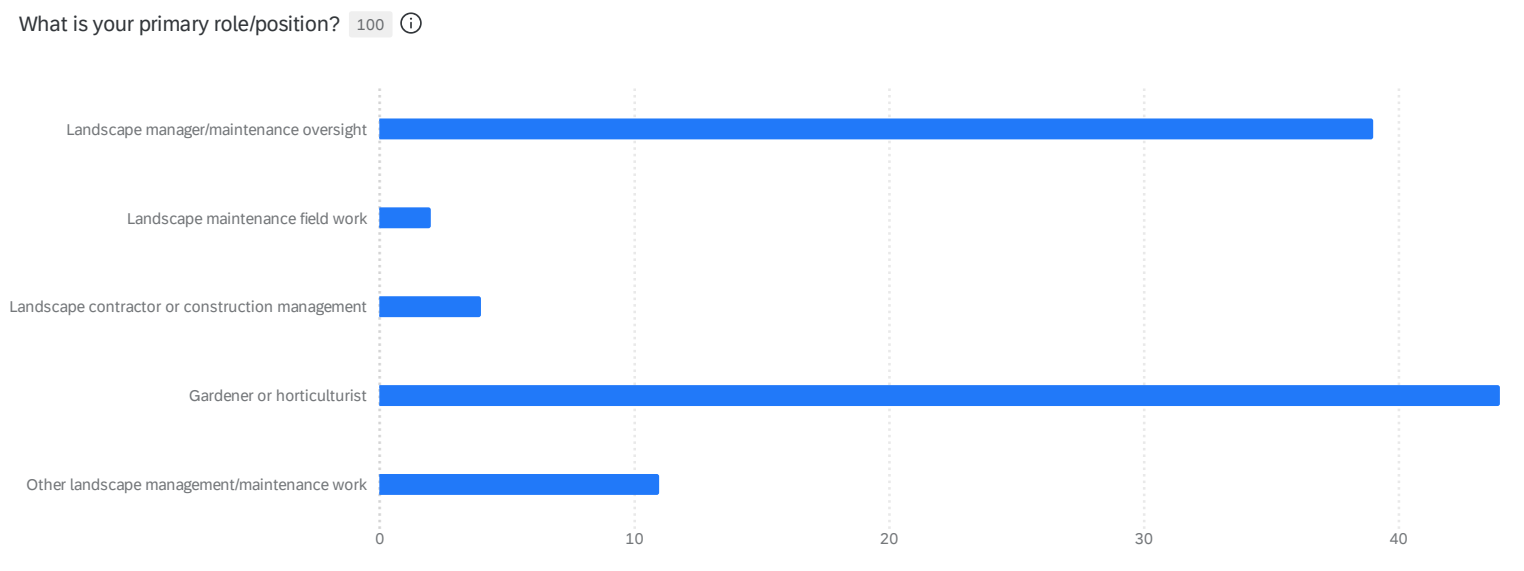
APPENDIX B: SURVEY RESULTS

Background Information

DESIGN



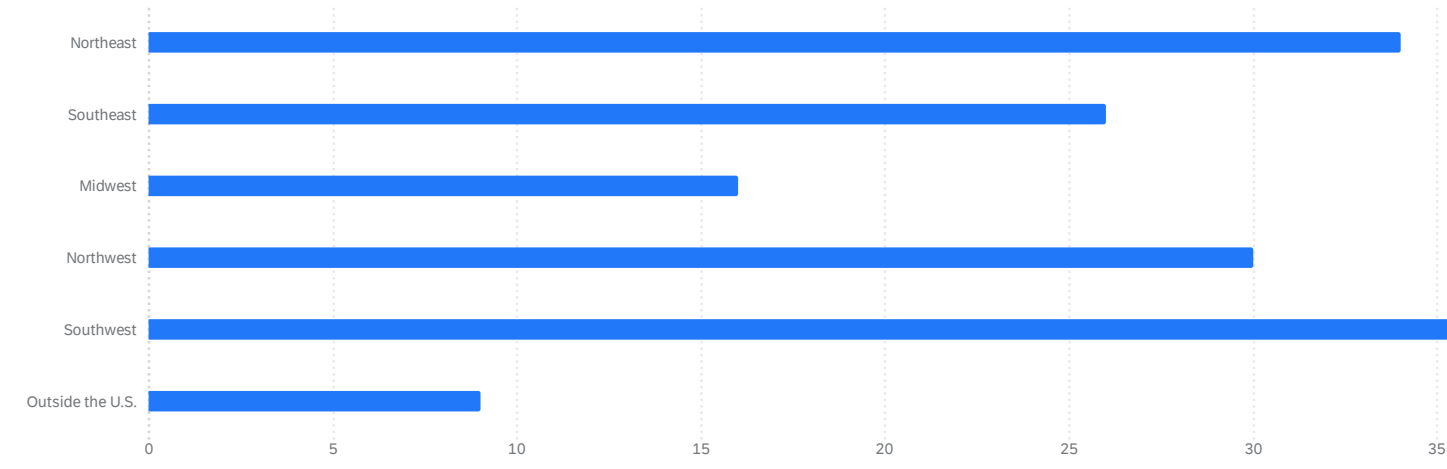
MAINTENANCE



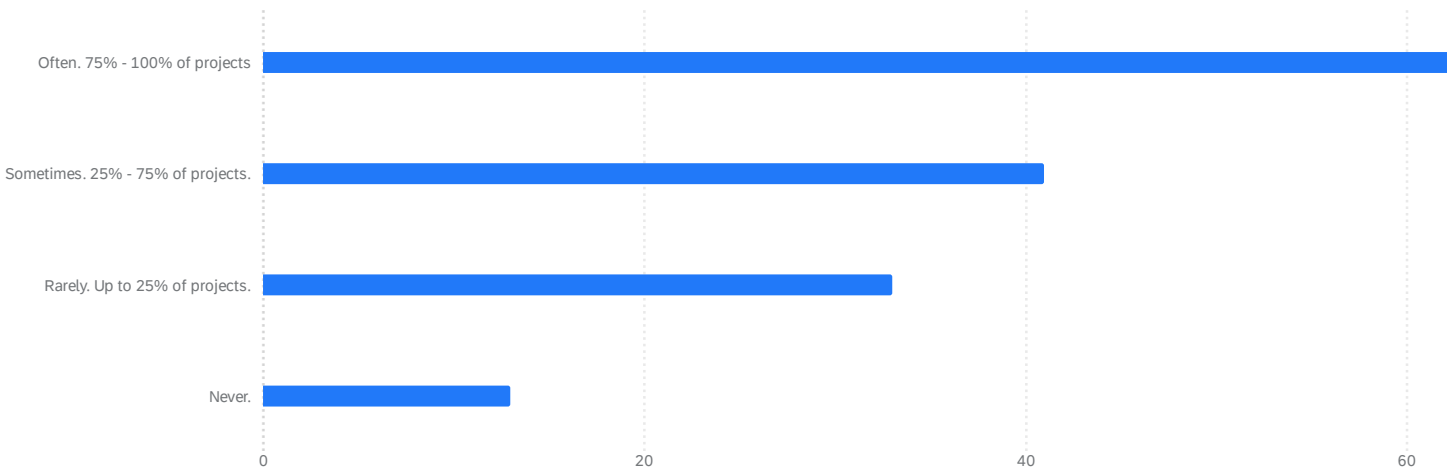
APPENDIX B: SURVEY RESULTS

DESIGN

In what region(s) of the U.S. do you primarily practice? 151 ⓘ

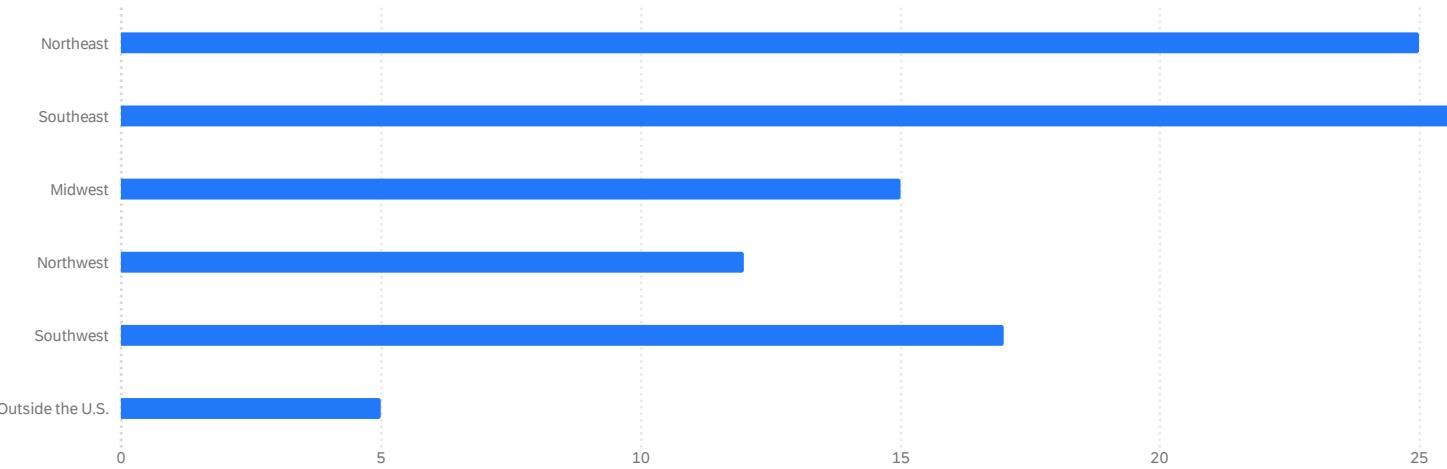


How often do you work on large-scale public landscapes such as parks, civic/institutional landscapes, or educational campuses? 151 ⓘ

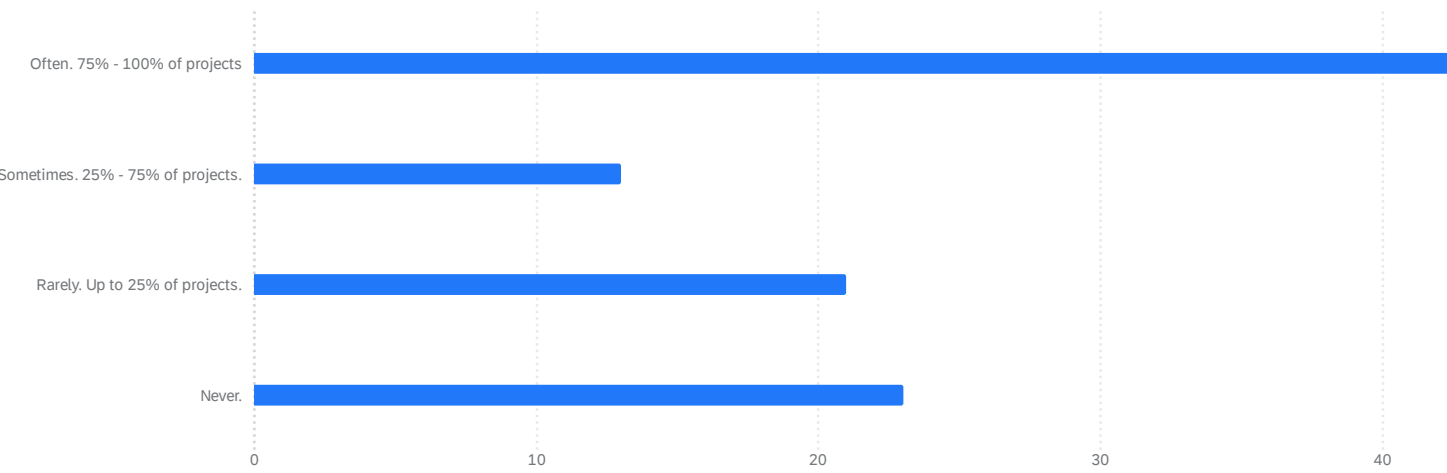


MAINTENANCE

In what region(s) of the U.S. do you primarily practice? 100 ⓘ



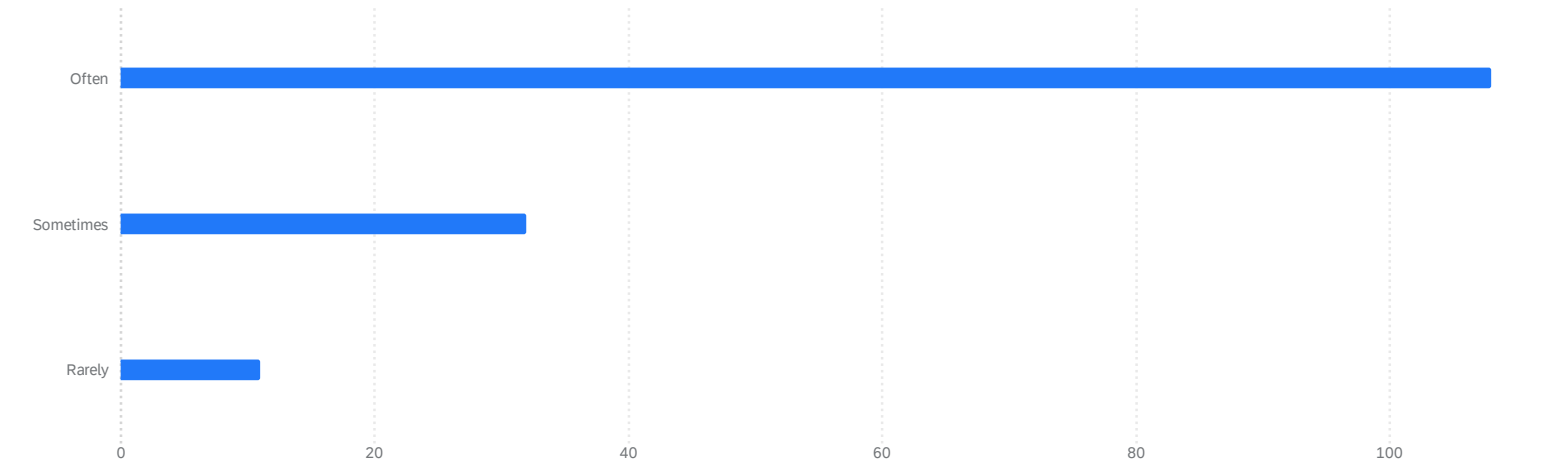
How often do you work on large-scale public landscapes such as parks, civic/institutional landscapes, or educational campuses? 100 ⓘ



APPENDIX B: SURVEY RESULTS

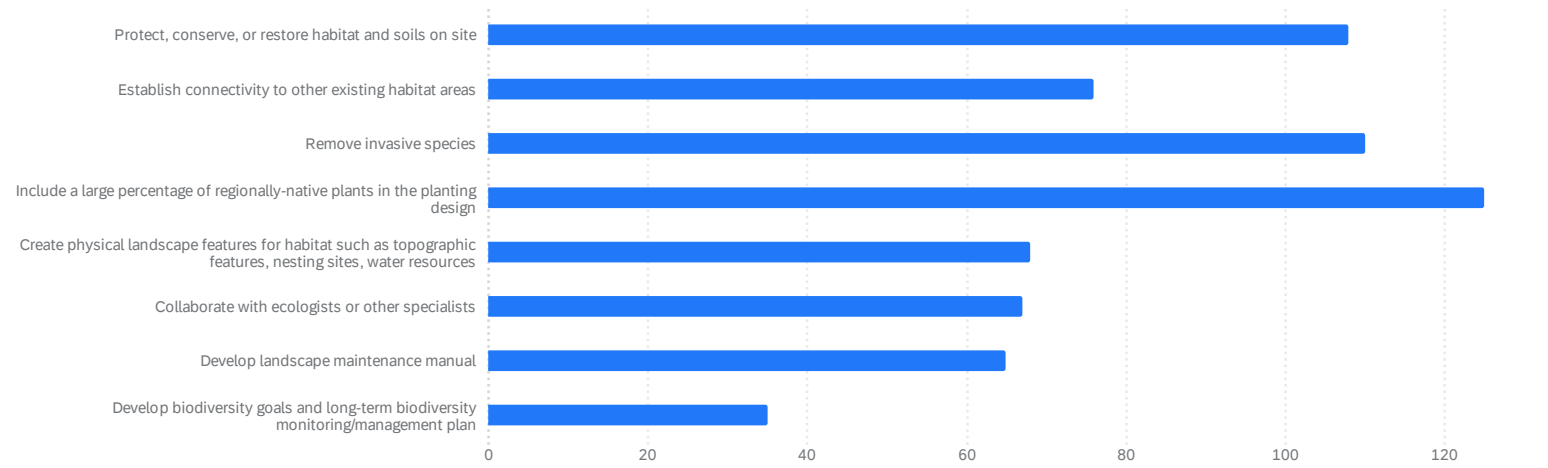
DESIGN

How often have your projects in the past five years included naturalistic or biodiverse plantings? 151 ⓘ



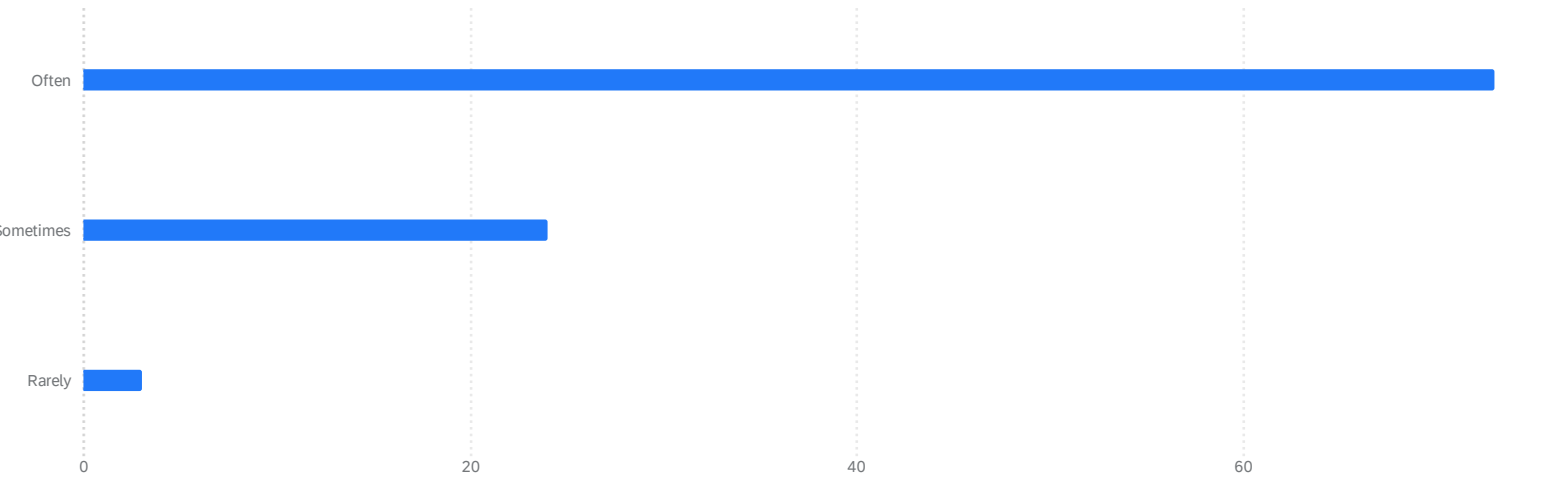
Biodiverse Landscapes

Which of the following practices do you implement to support biodiversity during the design phase? (Check all that apply) 134 ⓘ

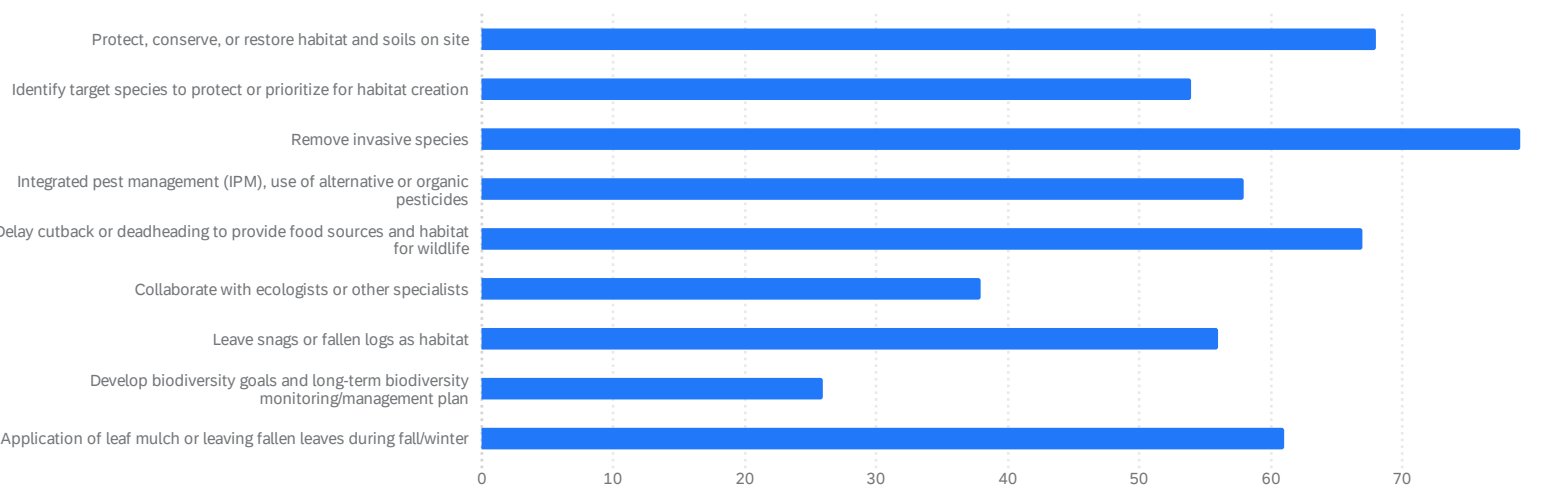


MAINTENANCE

How often have your projects in the past five years included naturalistic or biodiverse plantings? 100 ⓘ

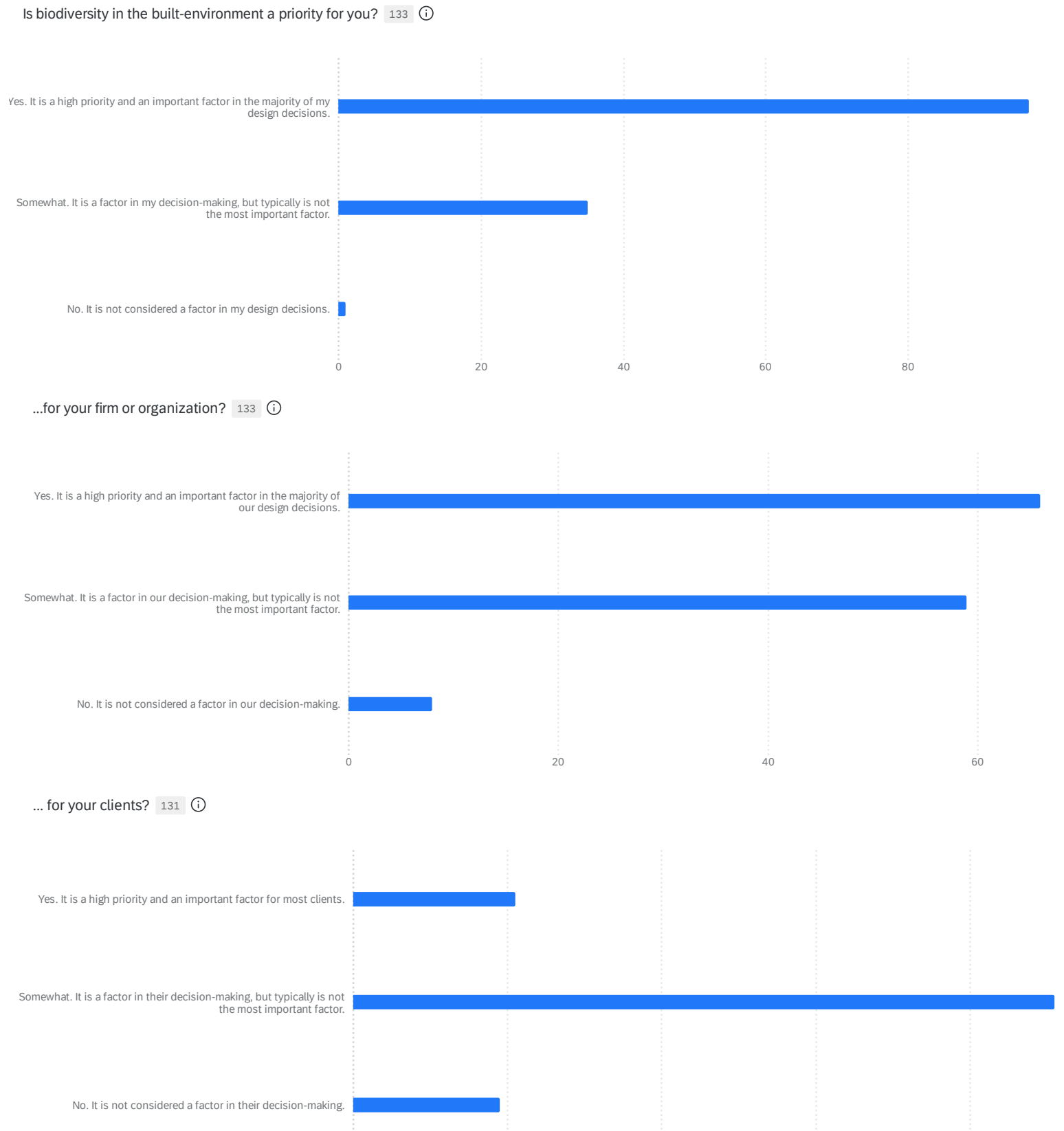


Which of the following practices do you implement to support biodiversity? (Check all that apply) 84 ⓘ

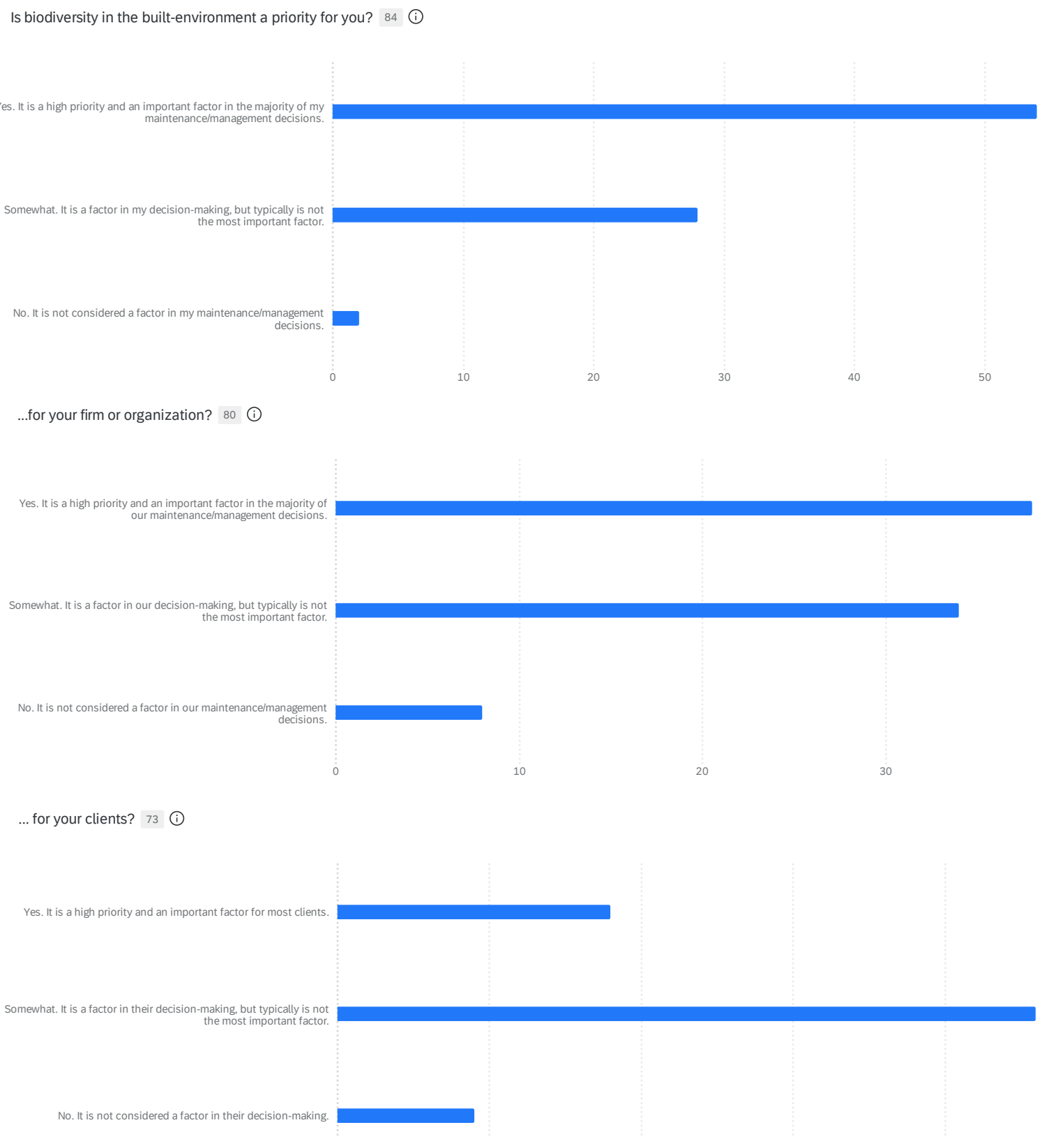


APPENDIX B: SURVEY RESULTS

DESIGN



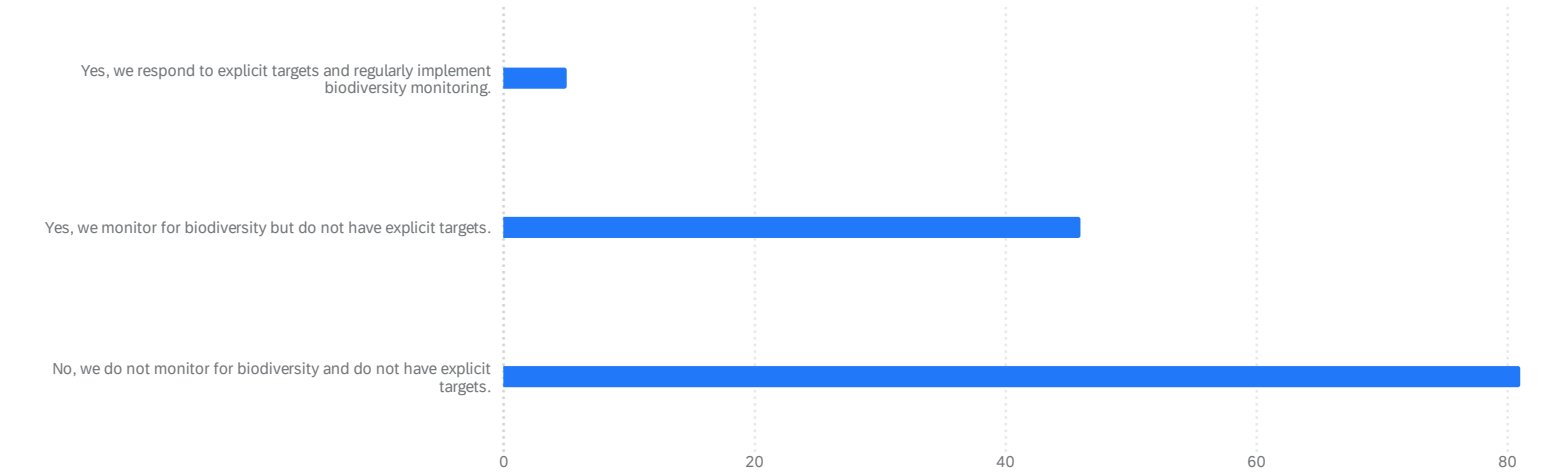
MAINTENANCE



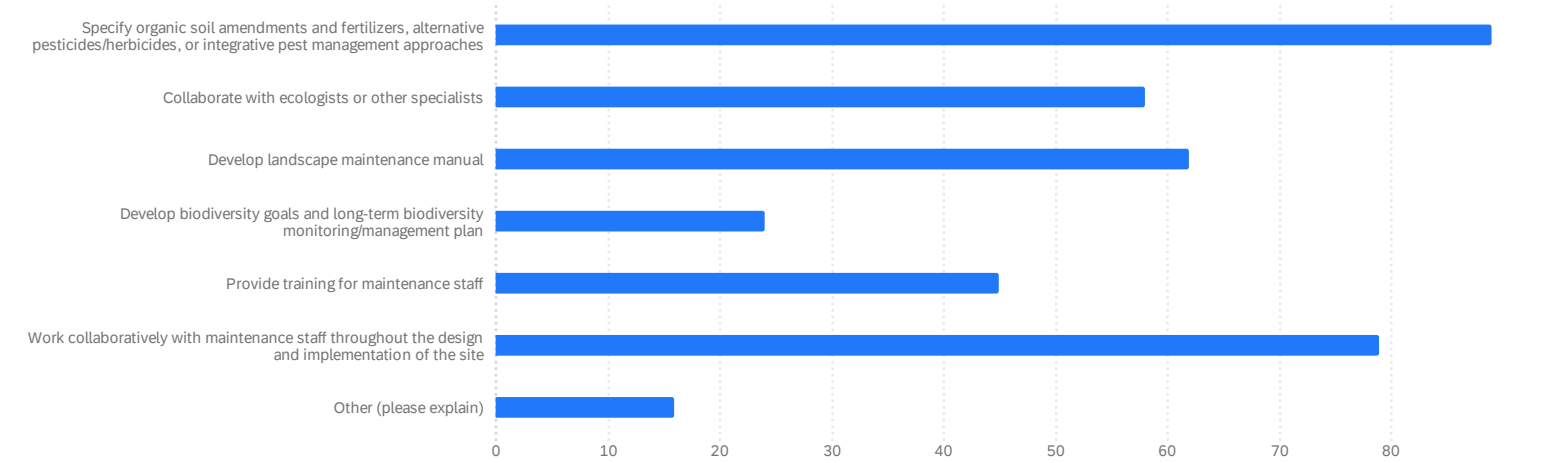
APPENDIX B: SURVEY RESULTS

DESIGN

Does your organization have explicit biodiversity targets or metrics? 132 ⓘ

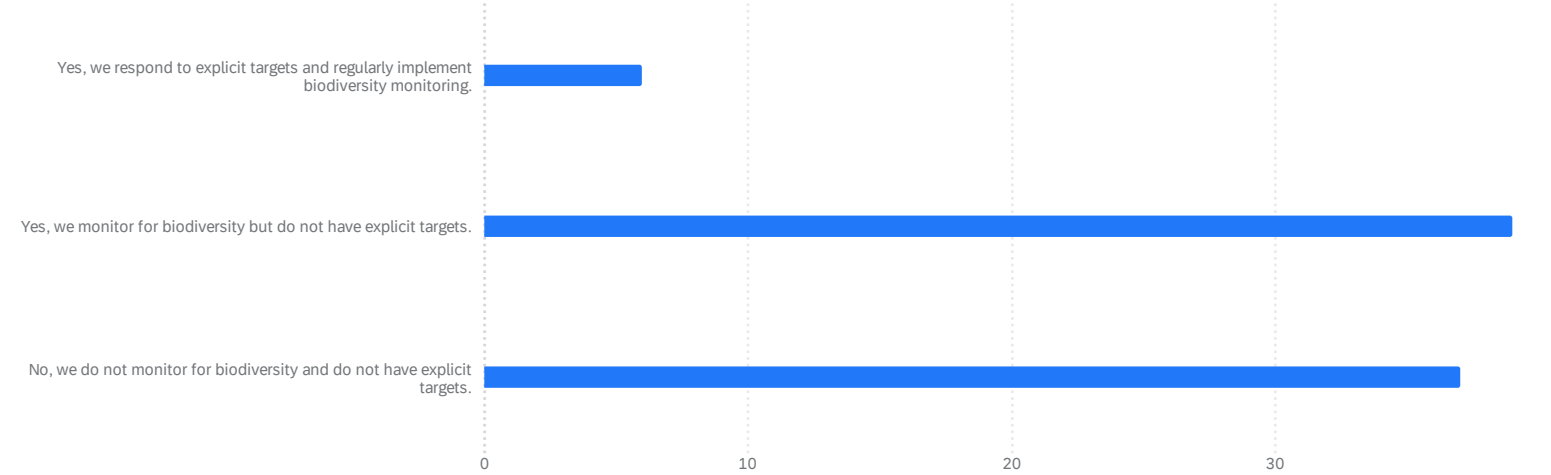


What do you do to promote the long term management and ongoing maintenance... 123 ⓘ

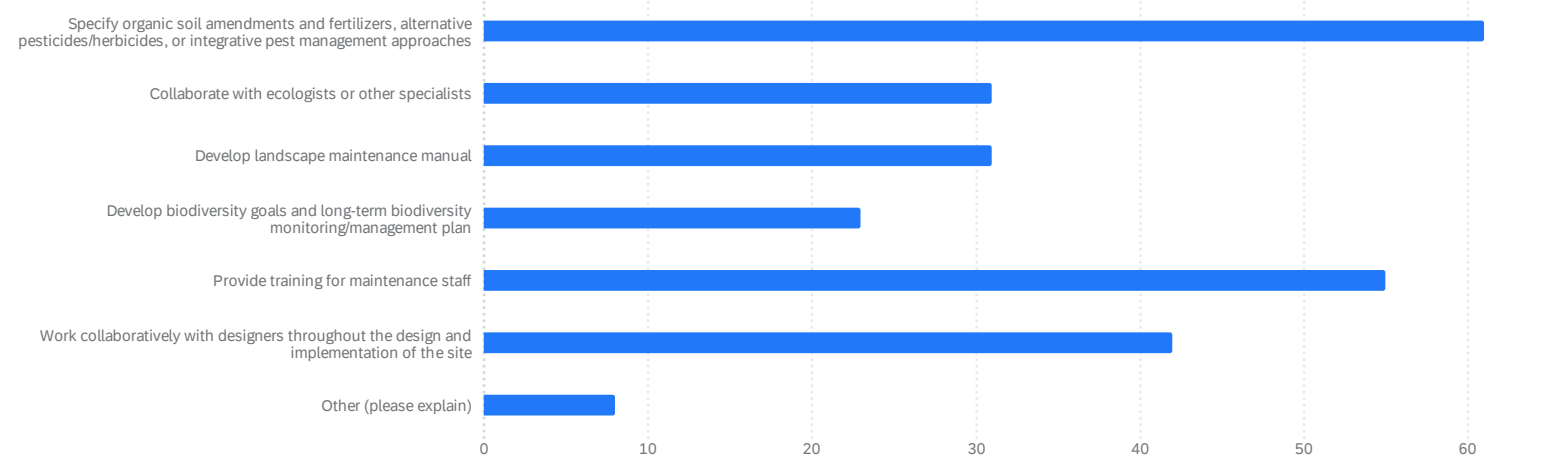


MAINTENANCE

Does your organization have explicit biodiversity targets or metrics? 82 ⓘ



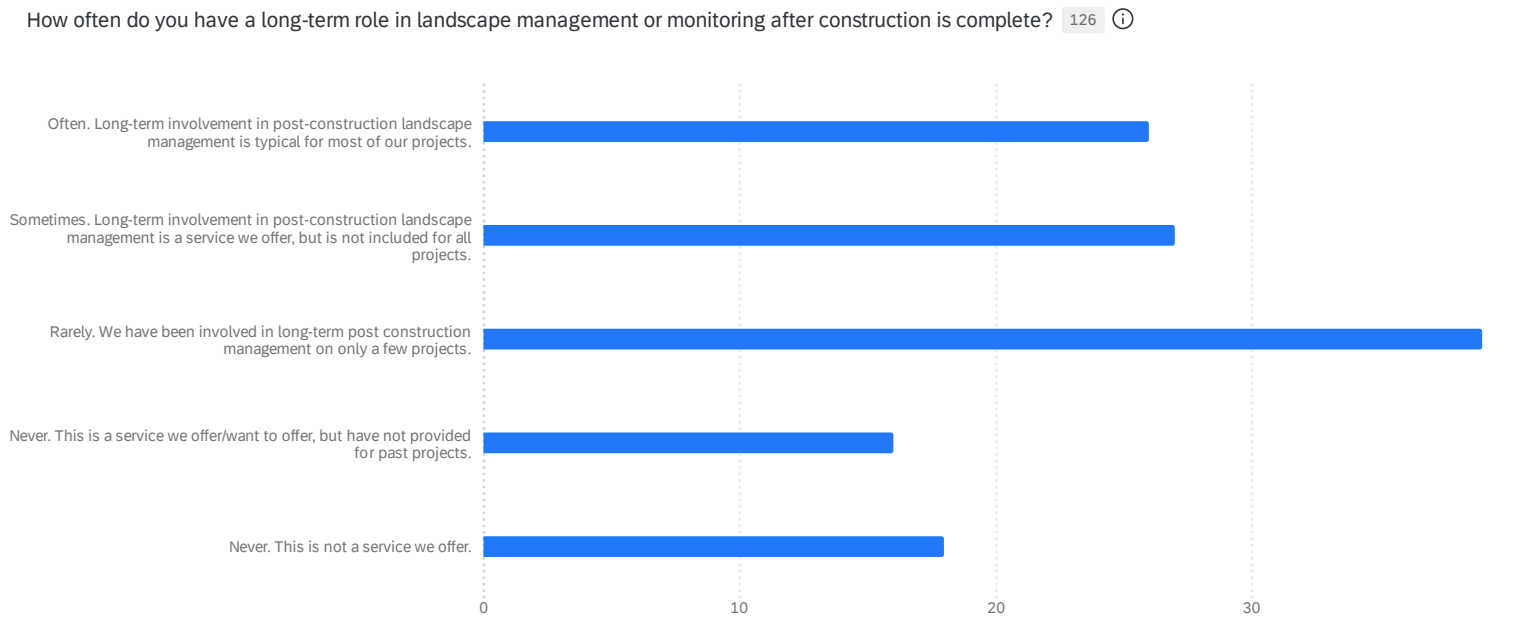
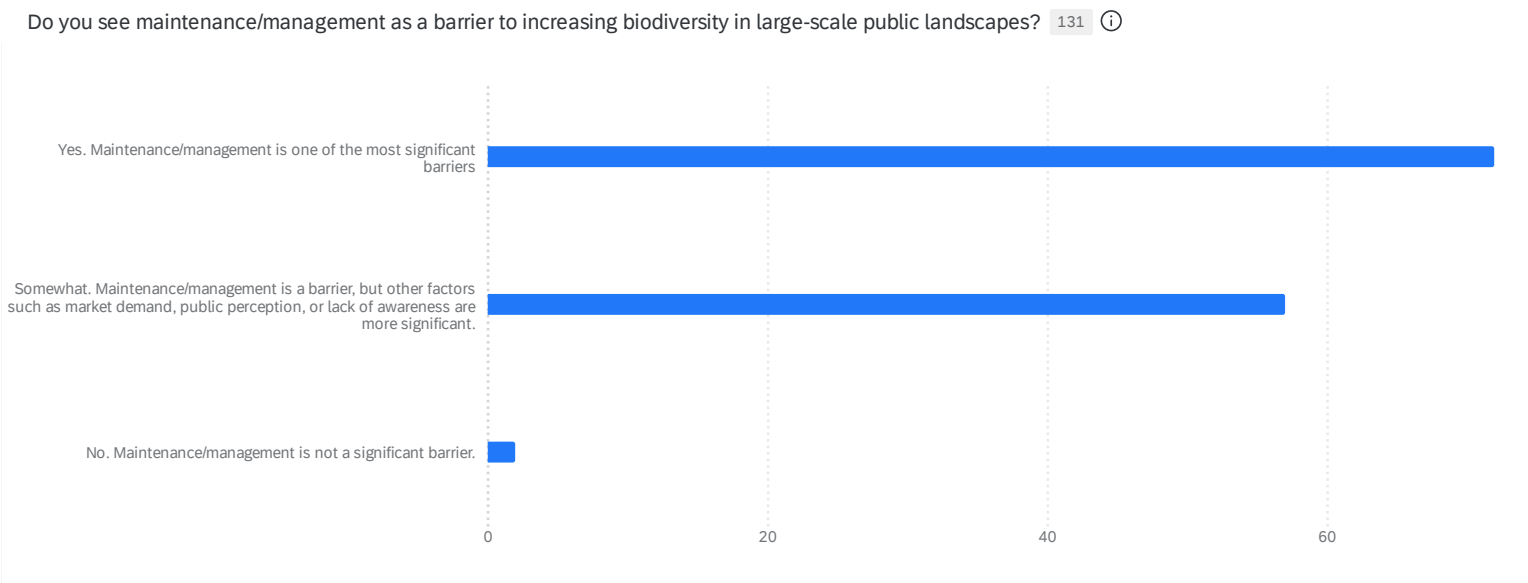
What do you do to support the long term management and ongoing maintenance... 79 ⓘ



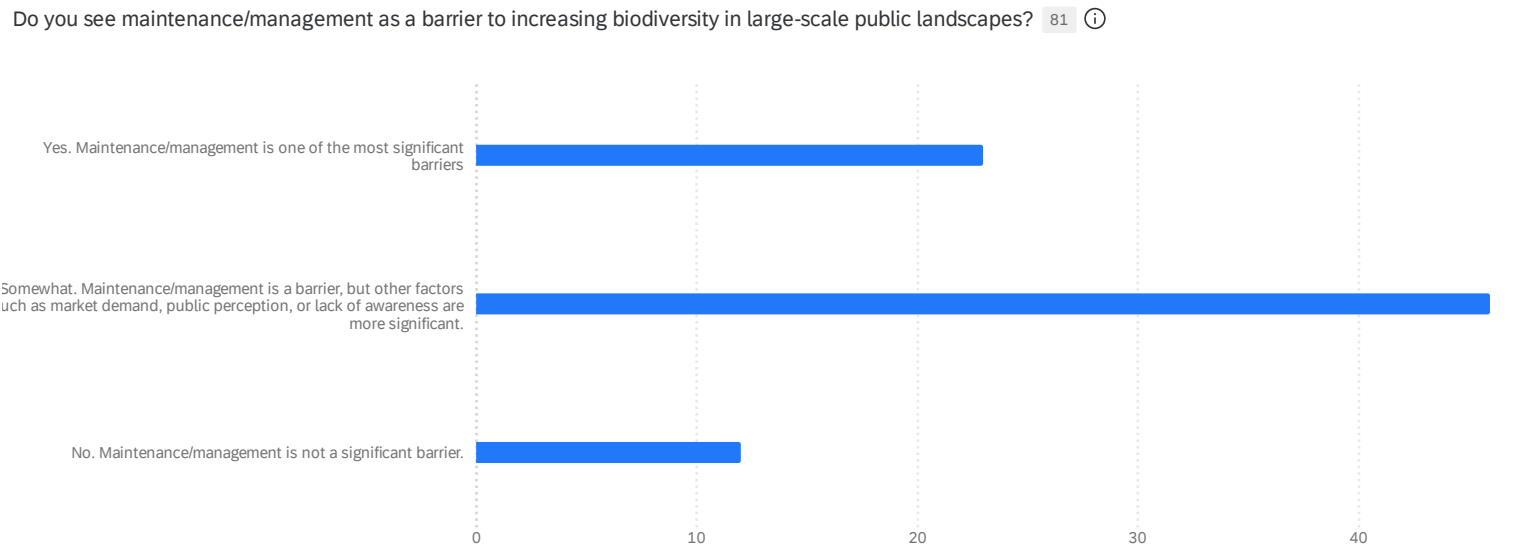
APPENDIX B: SURVEY RESULTS

Maintenance Challenges

DESIGN



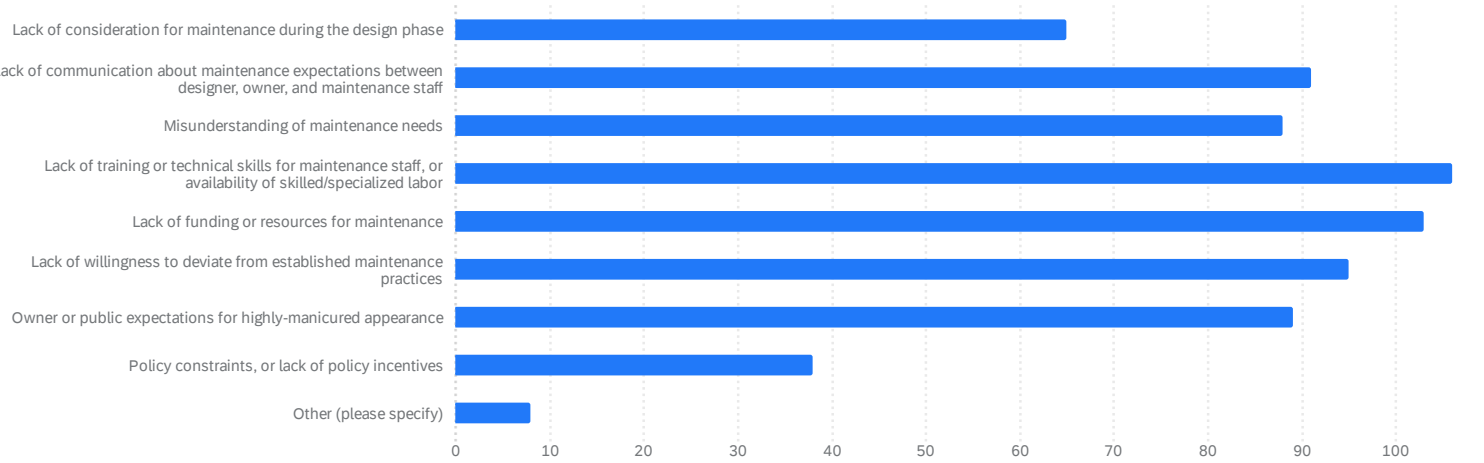
MAINTENANCE



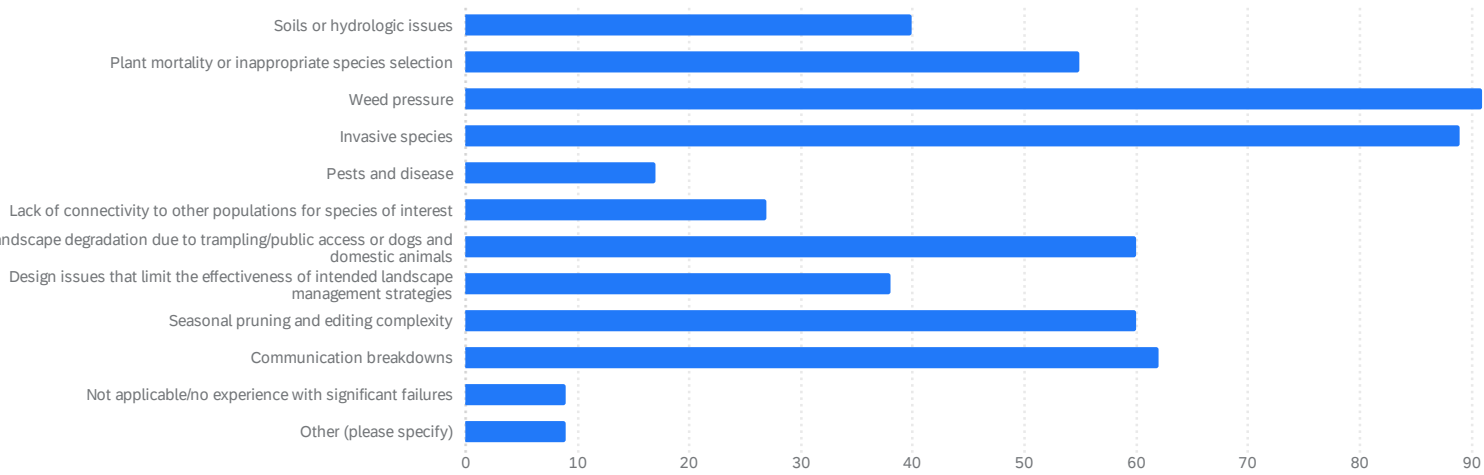
APPENDIX B: SURVEY RESULTS

DESIGN

What particular aspects of landscape maintenance do you see as barriers to increasing biodiversity? (Check all that apply) 126 ⓘ

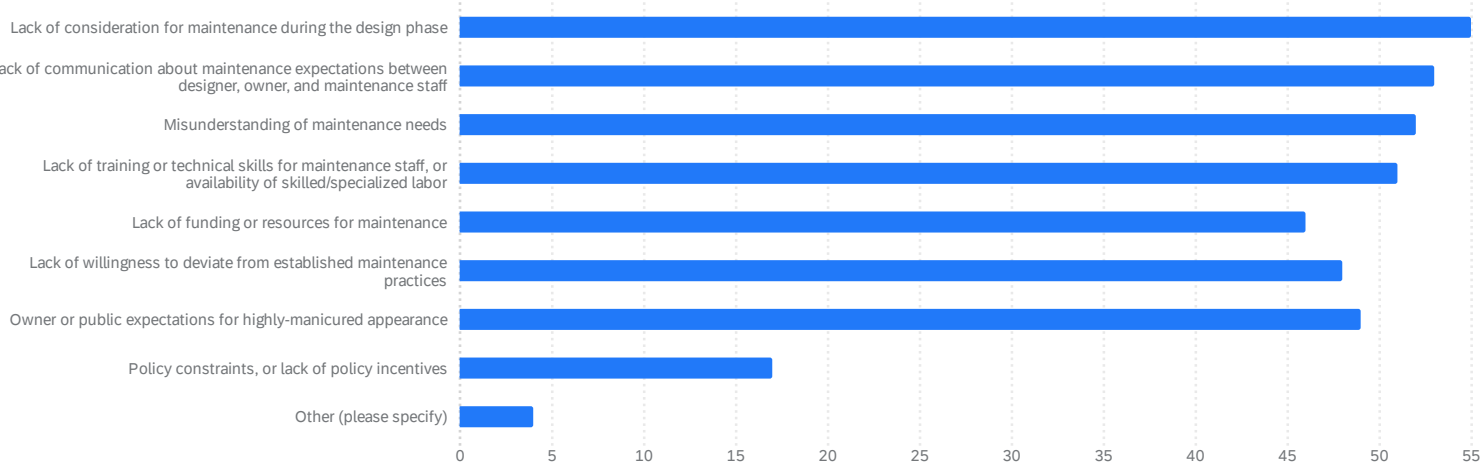


What are the most common maintenance challenges you've observed and encountered in projects that... 125 ⓘ

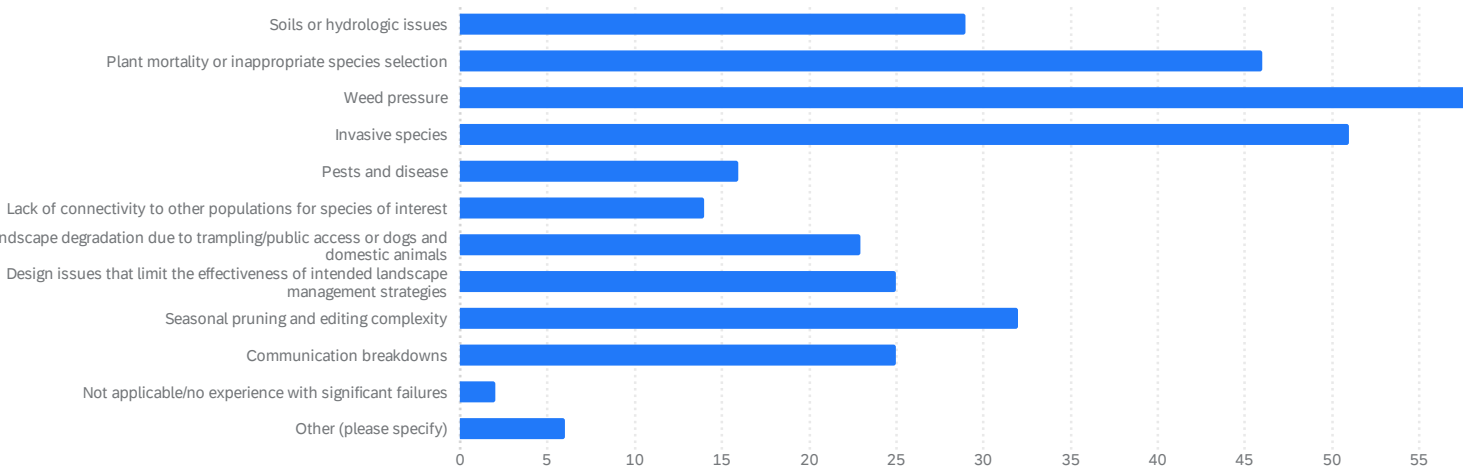


MAINTENANCE

What particular aspects of landscape maintenance do you see as barriers to increasing biodiversity? (Check all that apply) 77 ⓘ

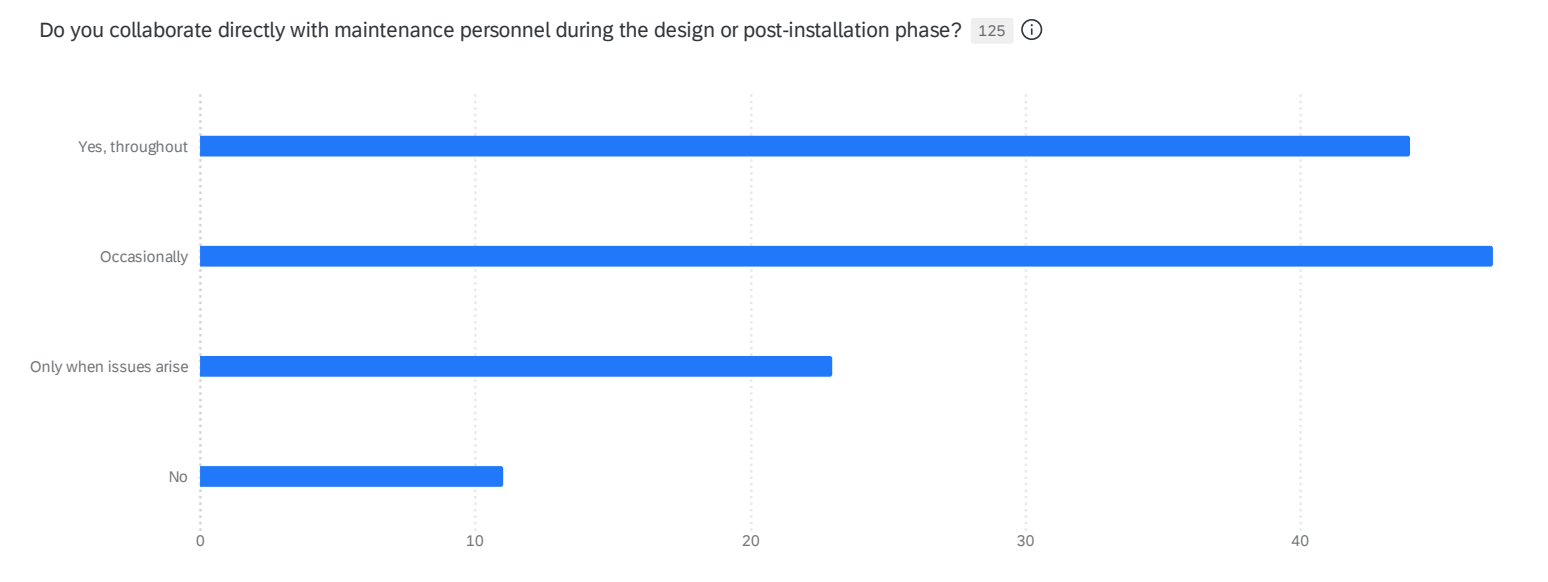
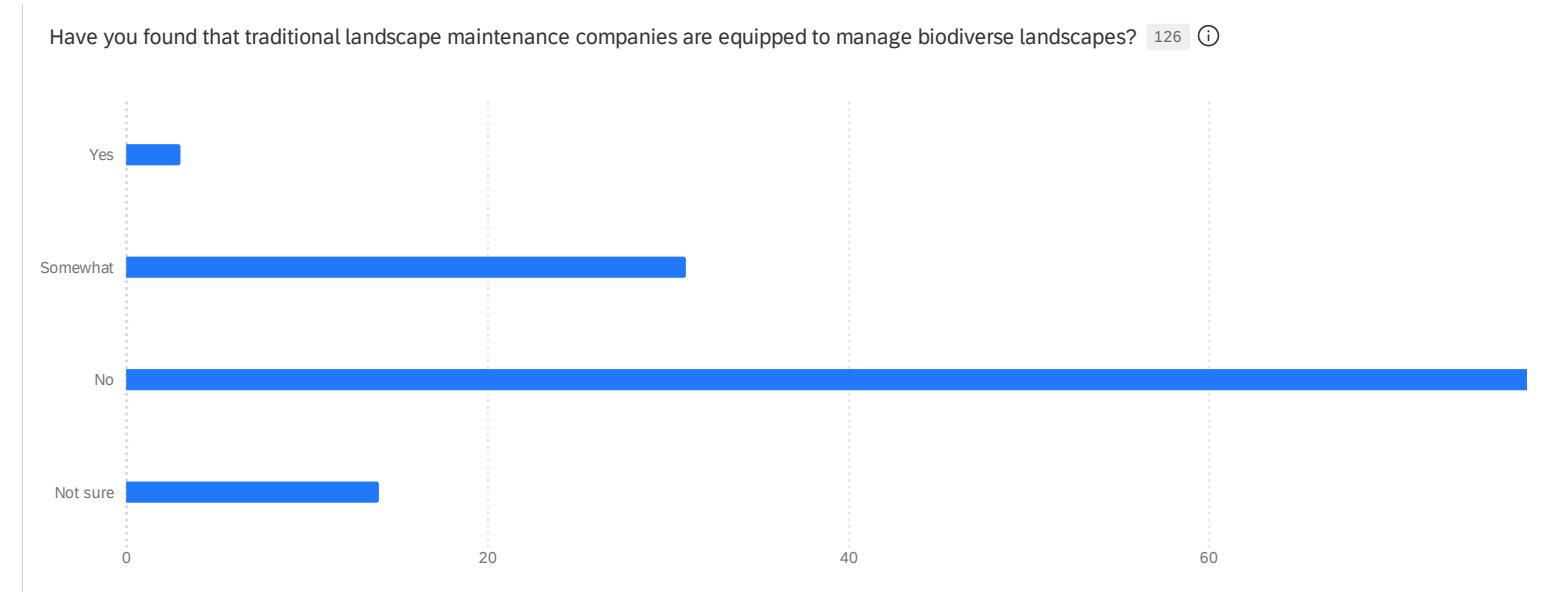


What are the most common maintenance challenges you've observed and encountered in projects that... 77 ⓘ

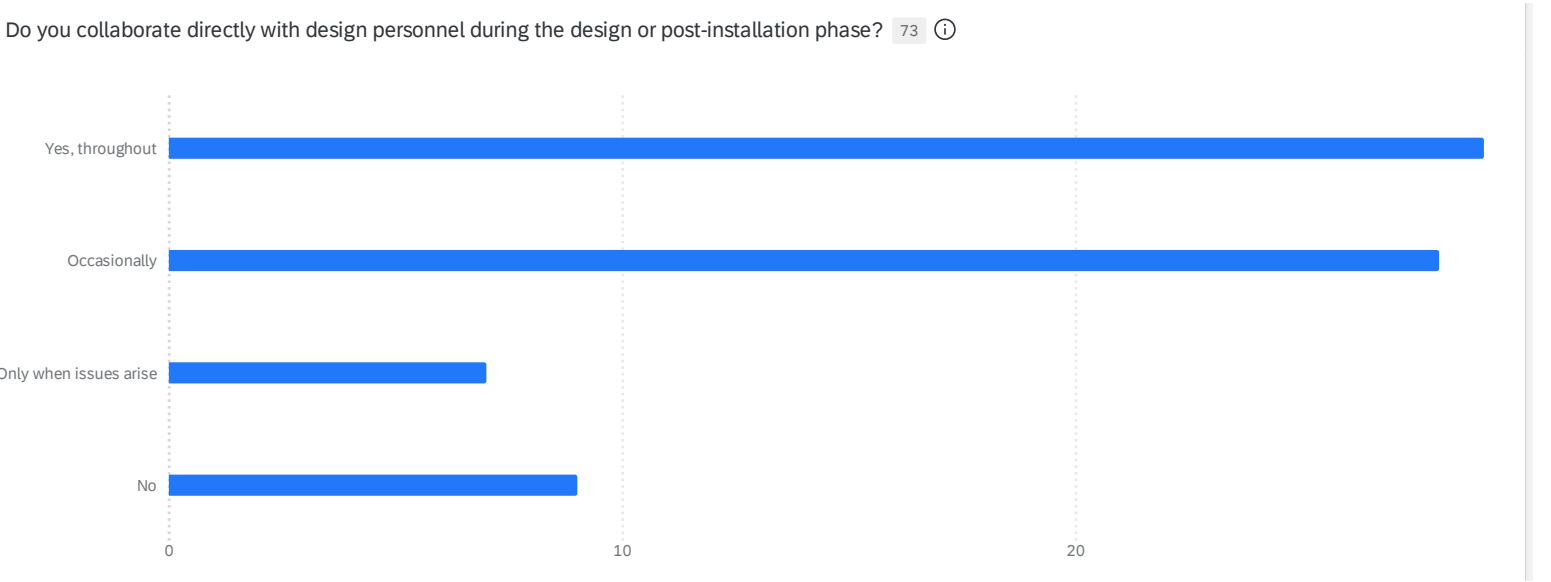
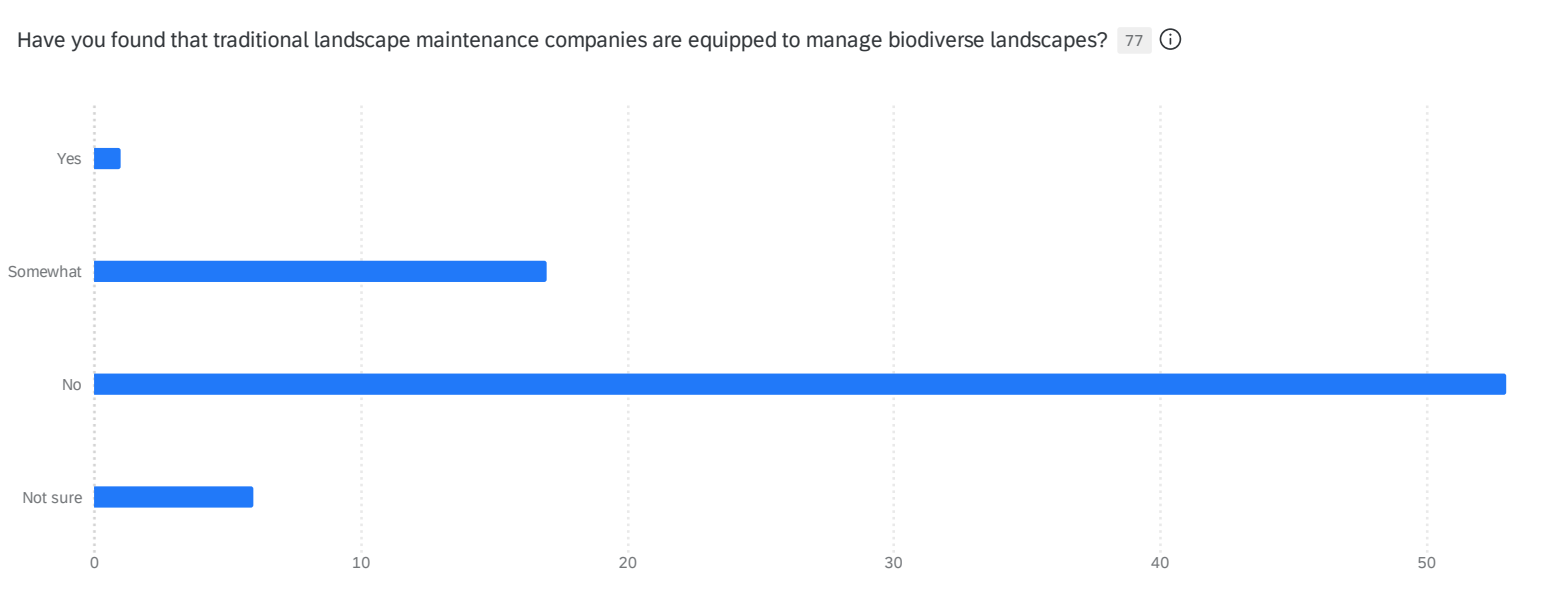


APPENDIX B: SURVEY RESULTS

DESIGN

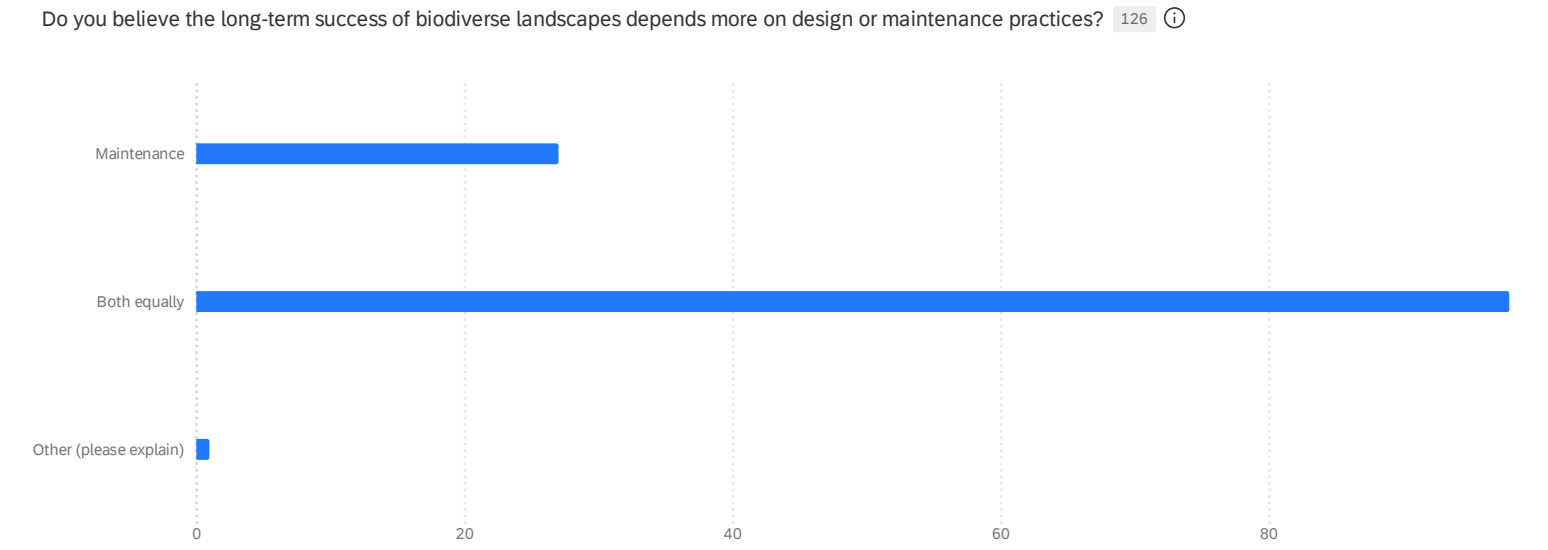


MAINTENANCE



APPENDIX B: SURVEY RESULTS

DESIGN



Open-Ended Questions

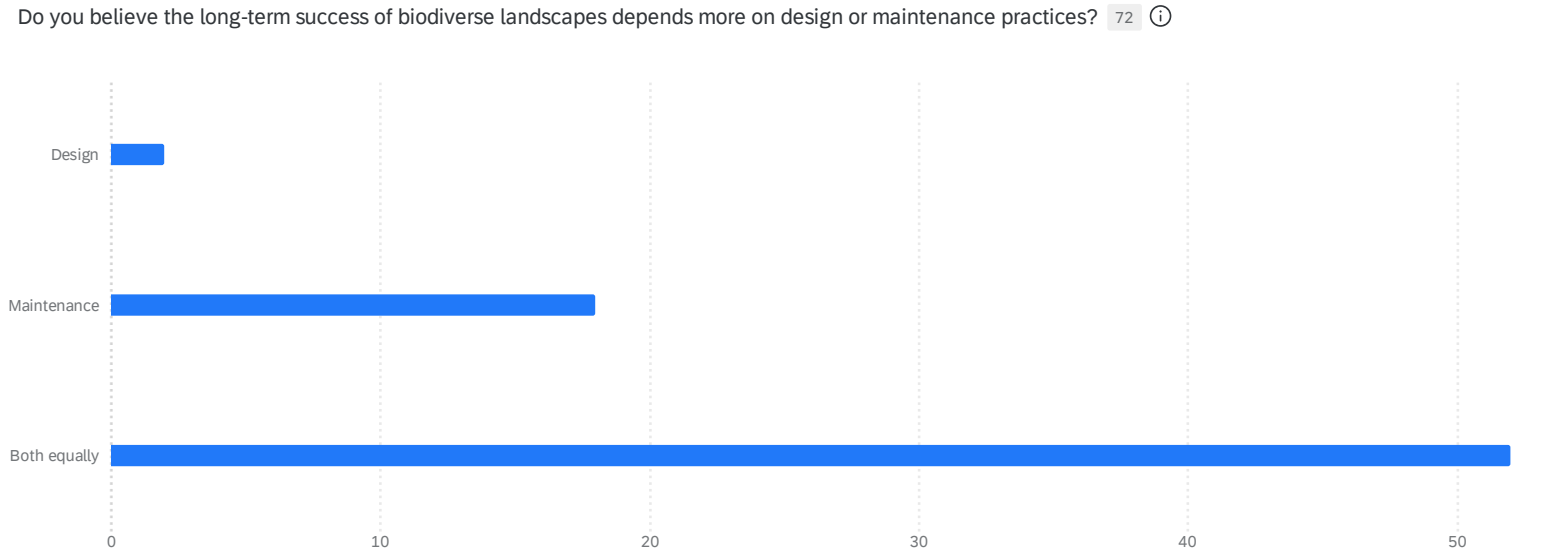
In your experience, what specific maintenance tasks are most often neglected or done improperly in these types of landscapes?

Task	Number of mentions	
	DESIGN	MAINTENANCE
Weed control	25	12
Pruning, cutback, or deadheading, especially shearing shrubs into shapes	24	8
Irrigation problems, especially during establishment	16	4
General lack of horticultural knowledge, or lack of skilled/specialized maintenance staff	12	5
Removal of desired species, mistaking them for weeds	11	1
Timing of mowing or pruning	9	7

In your opinion, what is the biggest misconception clients or property managers have about maintaining biodiverse landscapes?

Misconception	Number of mentions	
	DESIGN	MAINTENANCE
That biodiverse landscapes are low or no maintenance	30	17
That biodiverse landscapes are high maintenance or more difficult than conventional landscapes	18	3
That the landscape will look unacceptably messy, or create pest issues	35	6
That conventional maintenance practices will work	17	2

MAINTENANCE



What tools, resources, or practices have helped improve maintenance on your projects?

Tools/Resources/Practices	Number of mentions	
	DESIGN	MAINTENANCE
Communication with maintenance staff, training, buy-in	35	16
Communication with client, client education, buy-in	18	5
Regular/ongoing maintenance visits by designers	9	3
Maintenance manuals	8	1

What kinds of support, training, or institutional change do you believe would most improve maintenance outcomes in these types of landscapes?

Support/Training/Institutional Change	Number of mentions	
	DESIGN	MAINTENANCE
Training maintenance staff, especially hands-on training	31	13
Funding for maintenance, especially to fund adequate pay for skilled maintenance staff	15	6
Design with maintenance in mind, in alignment with available resources	-	6

APPENDIX C: CASE STUDY LINKS

REPUBLIC SQUARE	CleanScapes. (n.d.). Republic Square Park. Retrieved January 30, 2026, from https://cleanscapes.net/commercial-landscaping/republic-square-park/ Nudge Design. (n.d.). Republic Square. Retrieved January 30, 2026, from https://www.nudgedesign.com/projects/republic-square/ Design Workshop. (n.d.). Republic Square. Retrieved January 30, 2026, from https://www.designworkshop.com/projects/republic-square.html
OUDOLF GARDEN	Meristem Horticulture. (n.d.). Oudolf Garden Detroit. Retrieved January 30, 2026, from https://meristemhorticulture.com/planted/oudolf-garden-detroit Oudolf Garden Detroit. (n.d.). Home. Retrieved January 30, 2026, from https://oudolfgardendetroit.org Brown, J., Baldwin, L., & Choe, J. (2019, April 16). How landscape designer Piet Oudolf captures nature’s emotion. PBS NewsHour. Retrieved January 30, 2026, from https://www.pbs.org/newshour/show/how-landscape-designer-piet-oudolf-captures-natures-emotion Oudolf Garden Detroit opens at Belle Isle Park. (2021, November). The Architect’s Newspaper. Retrieved January 30, 2026, from https://www.archpaper.com/2021/11/oudolf-garden-detroit-opens-at-belle-isle-park/ Kisner, K. (2022, September 28). The Oudolf Garden Detroit represents resilience and connection to Detroit’s natural future. Detroitisit. Retrieved January 30, 2026, from https://detroitisit.com/the-oudolf-garden-detroit-represents-resilience-tenacity-connection-to-detroits-natural-future/ Freep Staff. (2022, August 19). Piet Oudolf’s Belle Isle Detroit gardens. Detroit Free Press. Retrieved January 30, 2026, from https://www.freep.com/story/news/local/michigan/detroit/2022/08/19/piet-oudolf-belle-isle-detroit-gardens/7836199001/
UNDER THE K BRIDGE PARK	NBK Parks / North Brooklyn Parks Alliance. (n.d.-a). Native nursery open hours. Retrieved January 30, 2026, from https://support.nbkparks.org/event/native-nursery-open-hours/e720940 NBK Parks / North Brooklyn Parks Alliance. (2025). McGolrick Park GCEF comprehensive plan [PDF]. Retrieved January 30, 2026, from https://nbkparks.org/wp-content/uploads/2025/05/REPORT_McGolrick-Park_GCEF_Comprehensive-Plan_Final_2025-05-30.pdf NBK Parks / North Brooklyn Parks Alliance. (2025). Job description: UTK gardener [PDF]. Retrieved January 30, 2026, from https://nbkparks.org/wp-content/uploads/2025/01/2025_Job-Description-UTK-Gardener.pdf PUBLIC WORK / Under the K Bridge Park. (n.d.). Under the K Bridge Park. Retrieved January 30, 2026, from https://underthebridge.org/ Public Work. (n.d.). Under the K – Brooklyn [Project]. Retrieved January 30, 2026, from https://publicwork.ca/projects/under-the-k-brooklyn?category=all New York State Senate. (2023, October 11). Senate Deputy Leader Gianaris, community leaders laud completion of Maspeth Park under K-Bridge [Press release]. Retrieved January 30, 2026, from https://www.nysenate.gov/newsroom/press-releases/2023/michael-gianaris/senate-deputy-leader-gianaris-community-leaders-laud Gothamist. (n.d.). In a filthy corner of North Brooklyn, a plant nursery thrives. Retrieved January 30, 2026, from https://gothamist.com/arts-entertainment/in-a-filthy-corner-of-north-brooklyn-a-plant-nursery-thrives
THE RAMBLE	City of Fayetteville, Arkansas. (n.d.). The Ramble master plan document. Retrieved January 30, 2026, from https://www.fayetteville-ar.gov/ImageRepository/Document?documentId=21581 Nelson Byrd Woltz Landscape Architects. (n.d.). The Ramble. Retrieved January 30, 2026, from https://nbwla.com/work/the-ramble Sustainable Sites Initiative. (n.d.). Cultural Arts Corridor: The Lower Ramble. Retrieved January 30, 2026, from https://www.sustainablesites.org/node/8505 Olsson. (n.d.). Creating a cultural arts corridor – The Ramble project. Retrieved January 30, 2026, from https://www.olsson.com/projects/creating-a
PRESIDIO TUNNEL TOPS	American Society of Landscape Architects Northern California Chapter. (n.d.). Presidio Tunnel Tops. Retrieved January 30, 2026, from https://www.asla-ncc.org/award/presidio-tunnel-tops/ Field Operations. (n.d.). Presidio Tunnel Tops. Retrieved January 30, 2026, from https://www.fieldoperations.net/project-details/project/presidio-tunnel-tops.html Golden Gate National Parks Conservancy. (n.d.-a). Presidio San Francisco. Retrieved January 30, 2026, from https://www.parksconservancy.org/parks/presidio-san-francisco Golden Gate National Parks Conservancy. (n.d.-b). Presidio Tunnel Tops. Retrieved January 30, 2026, from https://www.parksconservancy.org/location/presidio-tunnel-tops Presidio Trust & National Park Service. (n.d.). Presidio Tunnel Tops [Attraction page]. Retrieved January 30, 2026, from https://presidio.gov/explore/attractions/presidio-tunnel-tops Presidio Tunnel Tops Planting Fact Sheet. (n.d.). Planting Fast Facts. Retrieved January 30, 2026, from https://stpresidioweb001.blob.core.windows.net/tunneltops/Fact%20Sheets/presidio-tunnel-tops-planting-fast-facts.pdf

APPENDIX C: CASE STUDY LINKS

GOWANUS CANAL	Gowanus Canal Conservancy. (n.d.-a). Gowanus Canal Conservancy. Retrieved January 30, 2026, from https://gowanuscanalconservancy.org/ Gowanus Canal Conservancy. (2017). Draft Gowanus Lowlands Master Plan. Retrieved January 30, 2026, from https://gowanuscanalconservancy.org/wp-content/uploads/2017/11/191219_Draft-Gowanus-Lowlands-Master-Plan.pdf Gowanus Canal Conservancy. (2020). Gowanus ecosystems report draft. Retrieved January 30, 2026, from https://gowanuscanalconservancy.org/wp-content/uploads/2020/04/2021-Gowanus-Ecosystems-Report-Draft-210611-optimized.pdf Gowanus Canal Conservancy. (2025). 2024 annual report. Retrieved January 30, 2026, from https://gowanuscanalconservancy.org/wp-content/uploads/2025/05/2024-Annual-Report_Web.pdf Rain Coalition. (n.d.). Rain Coalition. Retrieved January 30, 2026, from https://www.raincoalition.org/ Scape Studio. (n.d.). The Gowanus Lowlands. Retrieved January 30, 2026, from https://www.scapestudio.com/projects/the-gowanus-lowlands/ University of Texas at Austin, School of Architecture. (n.d.). Support transgressive practices: Cultivating new landscape imaginaries. Retrieved January 30, 2026, from https://soa.utexas.edu/news/support-transgressive-practices-cultivating-new-landscape-imaginaries
STORY MILL PARK	City of Bozeman, Department of Utilities. (n.d.). Outdoor efficiency. Retrieved January 30, 2026, from https://www.bozeman.net/departments/utilities/water-conservation/do-your-part-water-smart-resources/outdoor-efficiency Design Workshop. (n.d.). Story Mill Community Park. Retrieved January 30, 2026, from https://www.designworkshop.com/projects/story-mill.html Landscape Performance Series. (n.d.). Story Mill Community Park. Landscape Performance Institute. Retrieved January 30, 2026, from https://www.landscapperformance.org/case-study-briefs/story-mill U.S. Environmental Protection Agency. (2025, November 10). The story of Story Mill — A Montana community working to restore wetlands. Retrieved January 30, 2026, from https://www.epa.gov/wetlands/story-story-mill-montana-community-working-restore-wetlands
THE GATHERING PLACE	Brown, P. L. (2018, August 10). With Tulsa’s \$465 million park, a star designer and a powerful philanthropist challenge what an urban park can be. The New York Times. Retrieved January 30, 2026, from https://www.nytimes.com/2018/08/10/arts/design/tulsa-park-gathering-place.html George Kaiser Family Foundation. (n.d.). The Gathering Place. Retrieved January 30, 2026, from https://www.gkff.org/program/the-gathering-place Gathering Place. (n.d.). Retrieved January 30, 2026, from https://www.gatheringplace.org/ Michael Van Valkenburgh Associates Inc. (n.d.). Gathering Place. Retrieved January 30, 2026, from https://www.mvvainc.com/projects/gathering-place Susaneck, A. P. (2019, November). Tulsa’s Gathering Place aims for reconciliation. The Architect’s Newspaper. Retrieved January 30, 2026, from https://www.archpaper.com/2019/11/tulsa-gathering-place-feature/

APPENDIX C: CASE STUDY LINKS

GEORGE W. BUSH LIBRARY	Michael Van Valkenburgh Associates Inc. (n.d.). George W. Bush Presidential Center. Retrieved January 30, 2026, from https://www.mvvainc.com/projects/george-w-bush-presidential-center Shearer, A. W., & Tierney, N. (2015). The George W. Bush Presidential Center. Landscape Performance Series. Landscape Architecture Foundation. Retrieved January 30, 2026, from https://www.landscapeperformance.org/case-study-briefs/bush-presidential-center Lady Bird Johnson Wildflower Center. (n.d.). George W. Bush Presidential Center. Retrieved January 30, 2026, from https://www.wildflower.org/project/george-w-bush-presidential-center Rodriguez, B. (2013, April 15). Living urban legend. Wildflower magazine. Lady Bird Johnson Wildflower Center. Retrieved January 30, 2026, from https://www.wildflower.org/magazine/landscapes/living-urban-legend Southern Botanical. (n.d.). George W. Bush Presidential Center. Retrieved January 30, 2026, from https://southernbotanical.com/project-posts/george-w-bush-presidential-center/ “The Landscapes of the George W. Bush Presidential Center” Commemorative Book, Michael Van Valkenburgh Associates, Inc., [not published]
DELL MEDICAL DISTRICT CAMPUS	Daily Texan Staff. (2018, August 29). UT’s main campus landscaping is nearly all organically maintained. The Daily Texan. Retrieved January 30, 2026, from https://thedailytexan.com/2018/08/29/uts-main-campus-landscaping-is-nearly-all-organically-maintained/ Damer, D. (n.d.). Sasaki sets a new standard for sustainable site development on the UT Austin campus. World Landscape Architect. Retrieved January 30, 2026, from https://worldlandscapearchitect.com/sasaki-sets-a-new-standard-for-sustainable-site-development-on-the-ut-austin-campus/?v=0b3b97fa6688 Sasaki. (n.d.). Dell Medical District landscape. Retrieved January 30, 2026, from https://www.sasaki.com/projects/dell-medical-district-landscape/ Sustainable Sites Initiative. (n.d.). Dell Medical District, University of Texas at Austin. Retrieved January 30, 2026, from https://www.sustainablesites.org/dell-medical-district-university-texas-austin University of Texas at Austin, Operations. (n.d.). Landscape maintenance. Retrieved January 30, 2026, from https://operations.utexas.edu/departments/grounds-and-landscape/landscape-maintenance University of Texas at Austin, Sustainability. (n.d.). Landscape stewardship. Retrieved January 30, 2026, from https://sustainability.utexas.edu/stewardship/landscape
UCLA LANDSCAPE PLAN	UCLA. (n.d.). Landscape and biodiversity. UCLA Sustainability. Retrieved January 30, 2026, from https://sustain.ucla.edu/landscape-and-biodiversity/ UCLA. (2025, February 7). UCLA becomes first California campus awarded a Green Grounds Certification. UCLA Newsroom. Retrieved January 30, 2026, from https://newsroom.ucla.edu/releases/ucla-becomes-first-california-campus-awarded-a-green-grounds-certification UCLA. (n.d.). UCLA Landscape Plan, box.com file. Retrieved January 30, 2026, from https://ucla.app.box.com/s/sdappkqh4uinmid8kctxsyt3x9sdzax9 UCLA. (n.d.). UCLA Sustainability Plan appendices [Box file]. Retrieved January 30, 2026, from https://ucla.app.box.com/s/yrgkynvpj03ytlnio5jaimfqucrfnshl
PENN STATE SUSTAINABLE LANDSCAPE IMPLEMENTATION PLAN	Penn State, Office of Physical Plant. (2024). Sustainable Landscape Implementation Plan. The Pennsylvania State University. Retrieved January 30, 2026, from https://www.opp.psu.edu/sites/opp/files/2024-04/sustainable-landscape-implementation-plan.pdf Penn State University. (2025, August 18). University Park Sustainable Landscape Initiative accelerates with donor support. Penn State News. Retrieved January 30, 2026, from https://www.psu.edu/news/office-physical-plant/story/university-park-sustainable-landscape-initiative-accelerates-donor
UC DAVIS CAMPUS	Arboretum and Public Garden at UC Davis. (n.d.). Arboretum and Public Garden. Retrieved January 30, 2026, from https://arboretum.ucdavis.edu/ SheepMowers. (n.d.). Home. Retrieved January 30, 2026, from https://www.sheepmowers.org/ University of California, Davis, Office of Sustainability. (n.d.). Davis sustainability. Retrieved January 30, 2026, from https://sustainability.ucdavis.edu/davis-sustainability

Keeping Up Maintaining Biodiversity in Public Landscapes

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