LANDSCAPE ARCHITECTURE 2040

CLIMATE & BIODIVERSITY ACTION PLAN

FOR ASLA MEMBERS

2026–2030

American Society of Landscape Architects

ASLA Fund

Our Vision for 2040 -
All landscape architecture projects will:

- Achieve zero greenhouse gas emissions and double carbon sequestration from business as usual.
- Protect, conserve, restore, enhance, and manage biodiversity
- Provide significant economic benefits in the form of measurable ecosystem services, co-benefits, and livelihoods.
- Address climate and biodiversity injustices, amplify the power of communities, and increase the equitable distribution of climate and biodiversity investments.

To continue our work to achieve this vision, we have significantly updated our first plan — the ASLA Climate Action Plan — and its companion Field Guide to Climate Action for ASLA Members, which guided our efforts from 2022-2025.

The new, updated plan — **Landscape Architecture 2040: Climate & Biodiversity Action Plan** — builds on our progress and guides our profession into the future. It has one volume for landscape architects and another for ASLA and ASLA chapters.

The plan will be accomplished over the next five years – from 2026 to 2030. It sets important new targets for realizing our 2040 vision, establishing an ambitious set of 2030 benchmarks to meet in the areas of biodiversity, greenhouse gas emission reductions, carbon sequestration, adaptation, economic benefits, and climate and biodiversity justice.

Over the past few years, we have heard from landscape architects that the climate and biodiversity crises must be considered equal priorities. Our remarkable Climate & Biodiversity Action Plan Task Force and Advisory Group identified design strategies that can address both biodiversity and climate issues together.

"Over the past few years, we heard from landscape architects that the climate and biodiversity crises must be considered equal priorities."

(Cover) Landscape architects at Hoerr Schaudt transformed an unused roof in Chicago into a biodiverse green space with 40,000 plants from 50 species that also captures stormwater, reduces heat, and sequesters carbon. Image credit: ASLA 2023 Professional General Design Honor Award. The Meadow at the Old Chicago Post Office. Chicago, Illinois. Hoerr Schaudt / Dave Burk

The Task Force and Advisory Group found that landscape architecture is a powerful tool for:

- Reducing greenhouse gas (GHG) emissions
- Increasing carbon sequestration
- Enhancing biodiversity
- Increasing resilience
- Improving equitable outcomes
- Providing real economic benefits
- And providing real economic benefits

The nature-based solutions we design have the power to achieve multiple benefits for communities at once.

Woven into the plan are new goals, objectives, actions, and success indicators. They are meant to help us all achieve our collective climate and biodiversity goals faster. The new plan also encourages us to work more effectively as a community — with clients, product manufacturers, and allied professionals — to make more rapid change.

We have made remarkable advances over the past three years, thanks to the work of the landscape architecture community.

We want to acknowledge the contributions of the members of the National ASLA Climate & Biodiversity Action Committee, who have turned many of our first plan's action items into reality. They have been central to getting us to where we are.

Today, the committee is made up of more than 50 empowered volunteer leaders. They have created easy-to-use resources that now shape how we all work and interact with communities.

More signs of progress:

- Landscape architecture firms of all sizes are starting to measure the benefits and impacts of their projects. And many are creating their own action plans.
- More product manufacturers and material suppliers are starting to make their environmental product data transparent.

Kona Gray, FASLA, PLA
ASLA President

Torey Carter-Conneen, Hon. ASLA
ASLA CEO

This plan is made possible by the ASLA Fund, which supports landscape architecture's vital role in addressing climate change and biodiversity loss through research, education, and advocacy.

The mission of the ASLA Fund: Investing in global, social, and environmental change through the art and science of landscape architecture.

- Educators are partnering with ASLA to develop impactful research on the benefits of landscape architects' climate and biodiversity work.
- A majority of ASLA Chapters have started their own Climate & Biodiversity Action Committees. And they have joined forces in a network to advance these goals.

We stand on a strong foundation built by a diverse community of climate and biodiversity leaders. We can make even more progress by 2030.

We invite you to delve into this new plan, make it your own, and lead this work in your organization and community.

Together, we will continue to make positive change for our communities and planet.

This plan is dedicated to Kongjian Yu, FASLA, PhD, Founder, Turenscape and Professor and Founding Dean, College of Architecture and Landscape, Peking University.

Kongjian led the world in envisioning a more harmonious relationship between people and nature. His projects, speeches, and writings inspired tens of thousands of landscape architects worldwide and captured the public's imagination. He saw landscape architecture as a "strategic and scientific tool" for solving the climate and biodiversity crises. He was a colleague, friend, and mentor to so many in our community.

Climate change and biodiversity loss are the most urgent problems the world faces today. They threaten the planet's health, the safety of our communities, and the resilience of our economies around the world. These connected issues are causing serious environmental damage — more frequent and severe climate related disasters, changing weather patterns, disappearing habitats, and the extinction of species. The effects directly impact our health and well-being, food supply, access to clean water, and livelihoods.

Underserved, marginalized, and Indigenous communities are hit the hardest. These communities are more likely to experience flooding, drought, or extreme heat, and they may not have the resources to recover. These groups are also more affected by the loss of natural systems that provide clean air, water, and other life-supporting ecosystem services.

Immediate, coordinated action is required to address climate change and biodiversity loss. Landscape architects must prioritize climate and biodiversity action, foster resilience, generate economic value, and ensure that all people have equitable access to healthy, sustainable environments. Now is the time to act.

Landscape architects are well-positioned to respond to climate and biodiversity challenges because a key part of our mandate is to protect and enhance health, safety, and welfare. We can design regenerative landscapes that deliver net positive results. We have the expertise to create climate and biodiversity positive projects that integrate natural systems with the built environment.

Climate positive design employs:

- Local, low-carbon, resource-efficient construction materials and methods
- Energy efficient and low or zero fossil fuel maintenance practices
- Planning for sustainable, multimodal, low-carbon communities
- Increased carbon sequestration through plantings to offset embodied carbon

"Immediate, coordinated action is required to address climate change and biodiversity loss. Landscape architects must prioritize climate and biodiversity action, foster resilience, generate economic value, and ensure that all people have equitable access to healthy, sustainable environments. Now is the time to act."

- Nature-based solutions for climate resilience
- Equity and climate justice for communities and people

Biodiversity positive design protects, conserves, enhances, and restores:

- Ecosystem function and connectivity
- Habitat and habitat connectivity that support native flora and fauna
- A net positive biodiversity outcome

Both climate and biodiversity positive design must consider equity, with an inclusive design process and equitable access.

This plan, **Landscape Architecture 2040: Climate and Biodiversity Action Plan**, provides a comprehensive and accessible set of action items to help practitioners get started with this important work and ultimately achieve the Landscape Architecture 2040 vision. This plan has been expanded from the 2022 Climate Action Plan and Field Guide to encompass *both climate and biodiversity actions*. And the plan's language and actions have been simplified to make it accessible to all types of landscape architects — those at small or large firms, and in private, non-profit, or public practices.

I am confident that the landscape architecture community can use the **Landscape Architecture 2040: Climate and Biodiversity Action Plan** to achieve a more regenerative, resilient, and equitable future. Let's get to work!

Meg Calkins, FASLA, FCELA
Chair, ASLA Climate & Biodiversity Action Plan Task Force
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Michael Vergason Landscape Architects, Ltd designed the 7th Street Park and Recreation Pier at the Wharf in Washington, D.C. to be an intergenerational and equitable landscape that welcomes the city's diverse communities back to the waterfront. Image credit: ASLA 2024 Professional Urban Design Honor Award. Michael Vergason Landscape Architects, Ltd.

Equity Acknowledgement

The American Society of Landscape Architects acknowledges that the impacts of climate change, biodiversity loss, and environmental degradation have a greater impact on marginalized communities, underserved populations, and Indigenous peoples who have long been stewards of the lands and waters we all depend on. These groups have historically been excluded — and often continue to be excluded — from decision-making, and their lands and resources have been appropriated without consent.

We recognize the deep-rooted knowledge and stewardship of Indigenous peoples whose practices offer essential guidance for regenerative design and climate resilience. We stress the need for placing their voices and leadership at the center of environmental restoration and climate resilience efforts.

We commit to advancing equity for all people by advocating for inclusive, community-driven approaches that:

- Address systemic inequities
- Champion environmental justice by amplifying underrepresented voices in decision making
- Ensure that all communities have equitable access to healthy, sustainable, and thriving environments.

ASLA CLIMATE AND BIODIVERSITY ACTION PLAN TASK FORCE

Acknowledgements
ASLA is grateful for the work of the ASLA Climate & Biodiversity Action Plan Task Force, who gave freely of their time and expertise to create this plan.

We are also very thankful for the substantive input from experts in the ASLA Climate & Biodiversity Plan Advisory Group.

Lastly, we appreciate the strong foundation that Pamela Conrad, ASLA, Diane Jones Allen, FASLA, José Almiñana, FASLA, Sarah Fitzgerald, ASLA, and Vaughn Rinner, FASLA, built with the 2022 Climate Action Plan and Field Guide.

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INTRODUCTION

Landscape architects have knowledge, skills, and abilities that make them uniquely qualified to address the urgent imperatives of climate change and biodiversity loss. They can do this by planning and designing equitable, regenerative places. This important work aligns with our professional mandate to protect the health, safety, and welfare of people and communities.

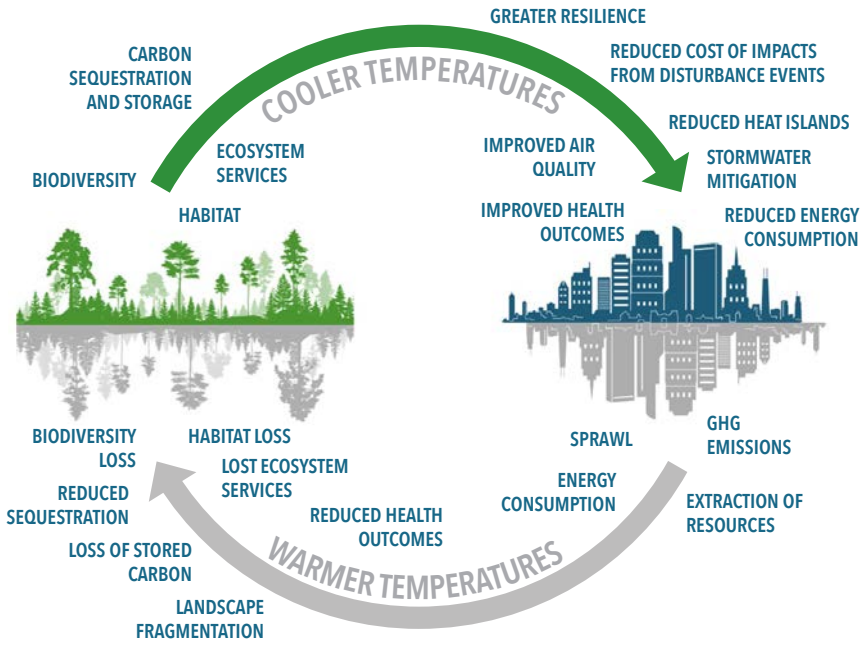
To support this work, ASLA has established a vision for 2040. All landscape architecture projects will:

- Achieve zero greenhouse gas emissions and double carbon sequestration from business as usual.
- Protect, conserve, restore, enhance, and manage biodiversity.
- Provide significant economic benefits in the form of measurable ecosystem services, co-benefits, and livelihoods.
- Address climate and biodiversity injustices, amplify the power of communities, and increase the equitable distribution of climate and biodiversity investments.

Nelson Byrd Woltz Landscape Architects collaborated with several Virginia Algonquian Tribes and archaeologists to design Machicomoco, a new state park in Virginia that reveals and honors Indigenous histories. Image credit: ASLA 2024 Professional Communications Honor Award. Connecting to Our Indigenous Histories at Machicomoco State Park. Gloucester Point, Virginia. Nelson Byrd Woltz Landscape Architects / Nick Hubbard

To realize this vision, there are benchmarks that must be achieved over the next five years. **All landscape architecture projects will:**

- Achieve a 50-65 percent reduction in greenhouse emissions and double carbon sequestration from business as usual.
- Increase biodiversity through protection, conservation, restoration, enhancement, and management strategies, supporting goals of protecting 30 percent of existing ecosystemsand restoring 30 percent of degraded ecosystems.
- Provide significant economic benefits in the form of measurable ecosystem services, cobenefits, and livelihoods.
- Address climate and biodiversity inequities by amplifying the power of communities, supporting local leadership, and increasing the equitable distribution of climate and biodiversity investments.



Biodiversity is connected to the climate, creating a circular relationship that both exacerbates and improves environmental and human health impacts. The top half of the circle illustrates the positive impacts that biodiversity has on the built environment, while the bottom half illustrates the negative impacts that urbanization and industry have on biodiversity. Image credit: Meg Calkins

The relationships between biodiversity loss and climate change require integrated efforts to address both issues at the same time. Protecting and restoring biodiversity can help mitigate climate impacts, while reducing greenhouse gas emissions can support ecosystem resilience and foster biodiversity.

Goals, objectives, and actions in this plan reflect the integrated approach required to address climate change and biodiversity. Many interventions

THE RELATIONSHIP BETWEEN CLIMATE CHANGE AND BIODIVERSITY

Biodiversity loss is closely intertwined with climate change, creating a feedback loop that exacerbates environmental and human health impacts. As global temperatures rise due to increased greenhouse gas emissions, wildlife health is affected by habitat destruction, altered migration patterns, and disrupted breeding cycles. Plants struggle to adapt to shifting climate zones, resulting in reduced growth, greater competition from invasive species, and loss of native plant communities. These challenges disrupt ecosystems, reducing their capacity to sequester carbon and regulate climate, further accelerating climate change.

OUR COLLABORATORS

Collaboration with allied disciplines, scientists, product manufacturers and material suppliers, community members, and traditional knowledge bearers is key to the success of the actions in this plan. Annotations indicate which collaborators are needed to achieve the actions outlined.

AR	Architects
CE	Civil engineers
CG	Community groups
CHP	ASLA Chapters
CL	Client, owner
CM	Community members, citizen scientists

have multiple co-benefits. For example, designing a site with non-invasive, naturalized plant communities can contribute to plant biodiversity and habitat. At the same time, these plants will moderate climate by sequestering carbon, conserving water use, and reducing stormwater runoff — all of which offer economic and environmental benefits

The ASLA Climate & Biodiversity Task Force and Advisory Group have created an action plan in two volumes:

Landscape Architecture 2040: Climate & Biodiversity Action Plan For ASLA Members

This volume is intended for ASLA Members to use individually and in their firms, public institutions, non-profit organizations, and community groups. This is an updated and expanded version of the 2022 Field Guide. This plan offers actions for equitable, climate and biodiversity positive practices in projects and business operations.

Landscape Architecture 2040: Climate & Biodiversity Action Plan For ASLA and ASLA Chapters

This is written for National ASLA and its Chapters. This is an updated and expanded version of the 2022 Climate Action Plan. This plan continues a path of action for National ASLA and Chapters to support their members in equitable, climate and biodiversity positive planning and design.

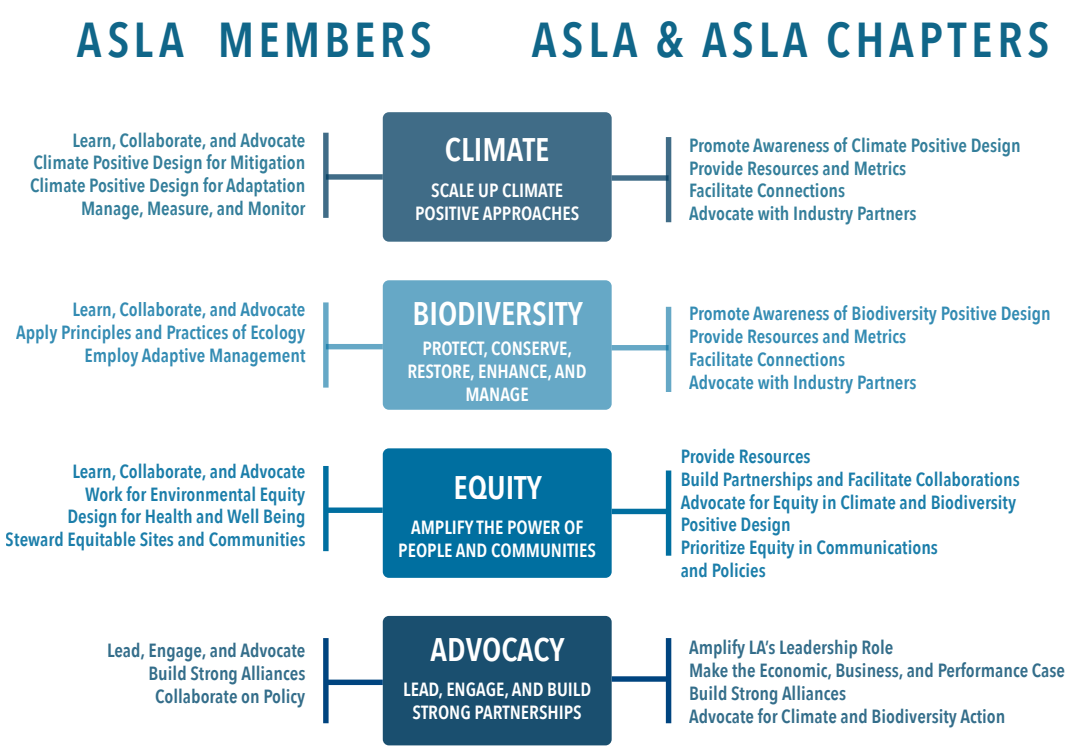
While landscape architects play a critical role in addressing the climate and biodiversity crises, we cannot engage these imperatives alone. Collaboration with allied disciplines, scientists, policymakers, developers, product manufacturers, community members, and traditional knowledge bearers is key to success. This plan uses annotations to indicate which collaborators are needed to achieve the actions outlined (see sidebar).

These volumes have been developed to support global initiatives aimed at enhancing climate resilience and protecting biodiversity. In the field of landscape architecture, this plan aligns with the Climate Action Commitment set forth by the International Federation of Landscape Architects (IFLA). It also aligns with broader international frameworks, including the United Nations Sustainable Development Goals, the Kunming-Montreal Global Biodiversity Framework's goals, and the Architecture 2030 Commitment Challenge.

OUR COLLABORATORS (CONTINUED)

CN	Contractors
COE	Coastal engineers
DE	Developers
EC	Economists, economic benefit analysts
ECO	Ecologists, natural resource scientists, biologists
ENV	Environmental Engineers
GE	Geotechnical Engineers
GOV	Governments
HI	Historians, archaeologists
HO	Horticulture and Nursery Industry
HQ	ASLA National
INS	Insurers
INV	Investors
LA	Landscape architects
LCA	Life cycle analysts
MFR	Manufacturers
NGO	Non-governmental and non-profit organizations
NN	Native Nations
PL	Planners
PRO	Professional organizations
PUB	General public
RE	Non-academic researchers
SE	Structural Engineers
SM	Site managers
STU	Students
SUP	Material suppliers and vendors
TE	Transportation Engineers
TKB	Traditional knowledge bearers, Indigenous peoples
UNI	Academic institutions

FRAMEWORK



Landscape Architecture 2040: Climate & Biodiversity Action Plan volumes are organized around four key goals addressing Climate, Biodiversity, Equity and Advocacy. The goals are the same for both volumes, but the objectives differ. Image credit: Meg Calkins.

The Climate and Biodiversity Action Plan is composed of four goals that are the same for both volumes:

- Climate: Scale up climate positive approaches
- Biodiversity: Protect, conserve, restore, enhance and manage
- Equity: Amplify the power of people and communities
- Advocacy: Advance climate and biodiversity action through leadership and engagement

Objectives, actions, and success measures vary by volume.

This document, which is for ASLA Members, offers a comprehensive set of goals, objectives, actions, and success measures for climate and biodiversity positive projects, equitable landscapes and communities, and advocacy efforts.

Each goal includes specific objectives and numerous actions tailored to different practice settings, regions, and project types. We recognize that not all actions are universally applicable. The plan highlights regional priorities while emphasizing the most impactful strategies.

The plan cannot provide detailed and comprehensive information for each action. Many are supported by links to additional resources – including relevant national and international standards – to guide implementation and further learning.

GOAL 1
CLIMATE

Scale up climate positive approaches for mitigation and adaptation. Reduce greenhouse gas (GHG) emissions by 50-65% by 2030 and achieve zero emissions by 2040. Double carbon sequestration from business as usual.

OBJECTIVES	ACTIONS
OBJECTIVE 1.1 Learn about, collaborate on, and advocate for climate positive design.	**ACTION 1.1.1** Engage a diverse group of experts and knowledge bearers in addressing climate positive goals, actions, and metrics appropriate to the region and site.
	ACTION 1.1.2 Pursue knowledge about the actions, resources, and tools available for climate mitigation and adaptation.
	ACTION 1.1.3 Advocate amongst peers, clients, stakeholders, suppliers and allied professionals for climate action on projects.
OBJECTIVE 1.2 Mitigate greenhouse gas emissions in site design and community planning. Reduce project GHG emissions by 50-65% by 2030 with zero emissions by 2040; double sequestration from business as usual.	**ACTION 1.2.1** Plan and design sustainable, multimodal, low carbon communities.
	ACTION 1.2.2 Reduce embodied carbon emissions through reuse of onsite structures, right sizing hardscape and site structures, and selecting locally produced, low-carbon materials and products.
	ACTION 1.2.3 Design for reduced operational carbon emissions by minimizing fossil fuel-powered maintenance equipment, designing for reduced energy and water usage, supporting building energy efficiency, and producing renewable energy onsite.

OBJECTIVES	ACTIONS
OBJECTIVE 1.2 (continued)	**ACTION 1.2.4** Maximize carbon sequestration and storage potential throughout the project life cycle by protecting existing vegetation and soils, restoring ecosystems, and building soil carbon.
OBJECTIVE 1.3 Employ nature-based solutions for climate adaptation.	**ACTION 1.3.1** Develop climate adaptation strategies in collaboration with project team and other experts, assessing risks and using forecast models.
	ACTION 1.3.2 Design landscapes to minimize heat islands and related impacts.
	ACTION 1.3.3 Design landscapes to maximize water conservation.
	ACTION 1.3.4 Design for increased storm events and risk of flooding using nature-based solutions.
	ACTION 1.3.5 Design for sea level rise using nature-based solutions.
	ACTION 1.3.6 Implement fire safe design strategies.
OBJECTIVE 1.4 Manage, measure, and monitor for climate positive sites and practices.	**ACTION 1.4.1** Measure greenhouse gas emissions using industry standard tools, and then share the data through established and accessible reporting formats.
	ACTION 1.4.2 Engage in maintenance and adaptive management techniques specific to the site design and develop performance measures to meet climate positive goals.
	ACTION 1.4.3 Pursue sustainability certifications for projects and professionals.
	ACTION 1.4.4 Develop a firmwide climate and biodiversity action plan.
	ACTION 1.4.5 Participate in the forthcoming Landscape Architecture 2040 commitment program.

GOAL 2
BIODIVERSITY

Protect, conserve, restore, enhance, and manage for biodiversity. Support the global goals of protecting 30% of existing ecosystems and restoring 30% of degraded ecosystems by 2030, with a goal of protecting and enhancing biodiversity on each project.

OBJECTIVES	ACTIONS
OBJECTIVE 2.1 Engage in learning, collaboration, and advocacy for biodiversity.	ACTION 2.1.1 Engage with a diverse group of experts and knowledge-bearers in learning and collaboration to establish a deeper understanding of biodiversity needs, goals, actions, and metrics appropriate to a region and site.
	ACTION 2.1.2 Advocate among peers, clients, suppliers, and allied professionals to protect and enhance biodiversity.
OBJECTIVE 2.2 Apply principles and practices of ecology to support site, regional, and global biodiversity goals.	ACTION 2.2.1 In the initial discovery phase, deepen the collective understanding of the site and region through the lens of biodiversity and landscape ecology.
	ACTION 2.2.2 Establish goals for biodiversity protection, conservation, restoration, enhancement, and management; then develop biodiversity baselines for the site.
	ACTION 2.2.3 Engage in biodiversity positive design for the project that supports rewilding, increases habitat connectivity, and enhances provision of ecosystem services.
	ACTION 2.2.4 Require protection of flora, fauna, soils, water, habitat, and air quality during design and construction.

OBJECTIVES	ACTIONS
OBJECTIVE 2.3 Employ an Adaptive Management Framework that encompasses maintenance, monitoring, evaluation, decision-making, and interventions to achieve biodiversity goals.	**ACTION 2.3.1** Set monitoring protocols during the design process to measure progress toward biodiversity goals.
	ACTION 2.3.2 Monitor biodiversity at regular intervals over the life of the landscape.
	ACTION 2.3.3 Prepare an Adaptive Management Plan that includes monitoring, maintenance, and management protocols.
	ACTION 2.3.4 Share knowledge and data to broaden understanding of our individual and collective roles in addressing the biodiversity crisis.

GOAL 3
EQUITY

Amplify the power of plural and diverse communities and people to achieve equitable climate and biodiversity positive design.

OBJECTIVES	ACTIONS
OBJECTIVE 3.1 Learn about, communicate, and advocate for human health and social well-being	**ACTION 3.1.1** Engage in deep listening to community members, users, and decision makers to understand the past and present factors related to the project that have or could contribute to inequities.
OBJECTIVE 3.2 Work toward environmental equity by putting the voices, needs, and knowledge of communities at the center of all aspects of a project.	**ACTION 3.2.1** Build the power of communities through inclusive engagement, community-led goal-setting, and participatory design.
	ACTION 3.2.2 Advocate for the equitable distribution of projects and assets with municipal decision makers, community groups and other policymakers.
OBJECTIVE 3.3 Design for the health and well-being of communities and people.	**ACTION 3.3.1** Understand and address environmental injustices in collaboration with allied professions, community groups, and policymakers.
	ACTION 3.3.2 Prioritize cultural inclusion and commemoration using participatory processes and by engaging community knowledge.
	ACTION 3.3.3 Use construction materials and methods that support human and environmental health.
OBJECTIVE 3.4 Steward equitable sites and communities.	**ACTION 3.4.1** Collaborate to establish methods of community stewardship of projects early in the project process.

GOAL 4
ADVOCACY

Advance climate and biodiversity action through leadership and engagement

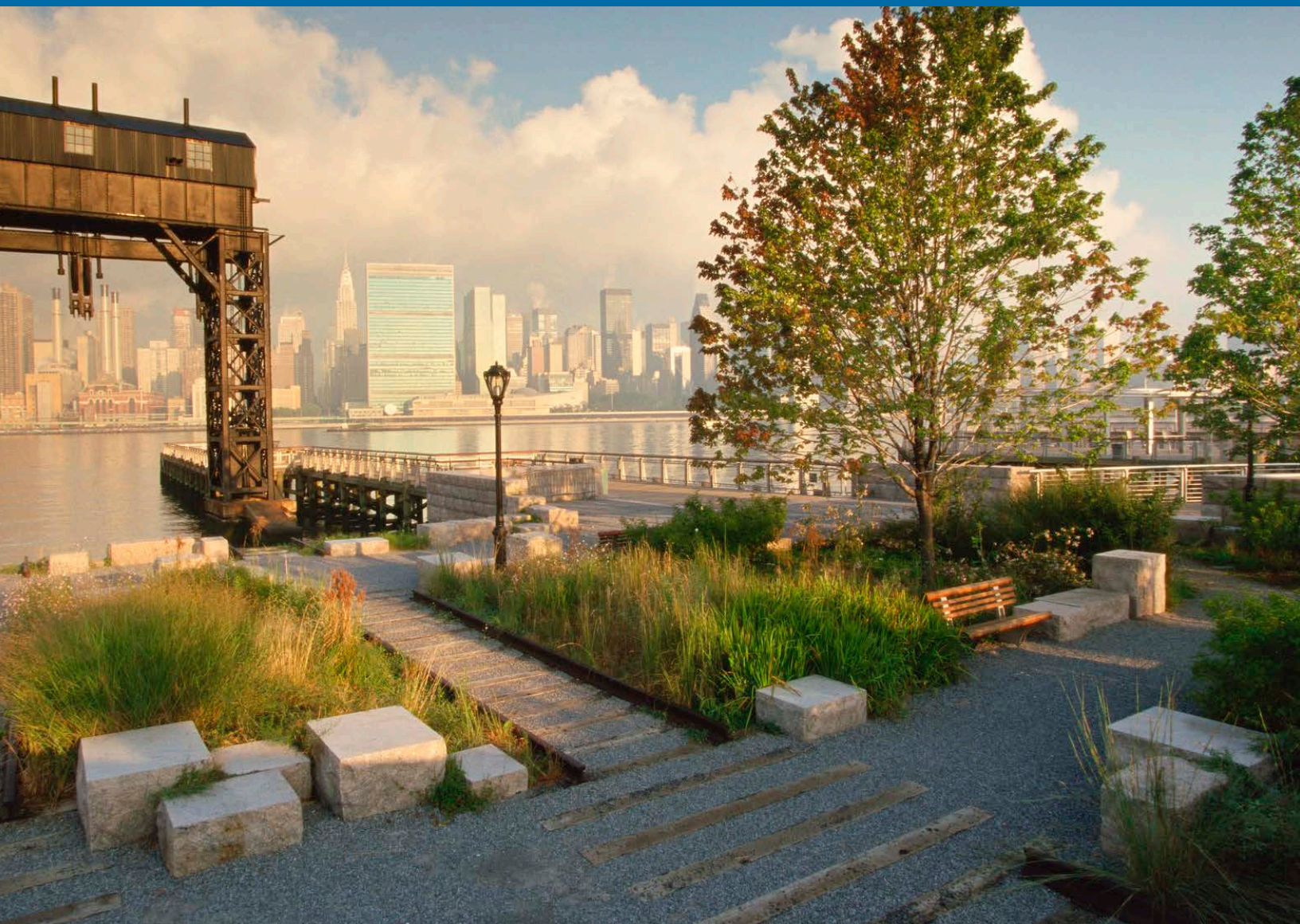
OBJECTIVES	ACTIONS
OBJECTIVE 4.1 Lead, engage in, and advocate for equitable climate and biodiversity positive design.	ACTION 4.1.1 Champion climate and biodiversity positive design within your organization.
	ACTION 4.1.2 Communicate your organization's climate and biodiversity impact.
	ACTION 4.1.3 Engage and educate clients, collaborators, developers, contractors and site managers.
	ACTION 4.1.4 Educate and engage the public about the benefits of climate and biodiversity positive design.
	ACTION 4.1.5 Engage manufacturers and suppliers by sharing your climate and biodiversity goals, communicating product performance expectations, and preferences for climate and biodiversity positive attributes in specifications.
OBJECTIVE 4.2 Build strong alliances.	ACTION 4.2.1 Engage a broad network of allied professionals and organizations to maximize collective impact in climate resilience and biodiversity.
	ACTION 4.2.2 Strengthen ties with scientists and academics through collaboration on projects and research.

OBJECTIVES	ACTIONS
OBJECTIVE 4.2 (continued)	**ACTION 4.2.3** Engage with global alliances and initiatives to support their goals for climate mitigation, adaptation , biodiversity, and equity.
OBJECTIVE 4.3 Collaborate on climate and biodiversity policy with policymakers and elected officials.	**ACTION 4.3.1** Work with elected officials to guide policies for climate and biodiversity positive design and planning.
	ACTION 4.3.2 Collaborate with public agencies and clients to establish or strengthen climate and biodiversity positive design and development standards.

GOAL 1
CLIMATE

Scale up climate positive approaches for mitigation and adaptation. Reduce greenhouse gas (GHG) emissions by 50-65% by 2030 and achieve zero emissions by 2040. Double carbon sequestration from business as usual.

At Gantry Plaza State Park, Thomas Balsley Associates, now SWA/ Balsley, restored gantries to frame city views and reference the working waterfront past. Other deconstructed materials were used as edging and in paving. Image credit: SWA/Balsley



INTRODUCTION

In 2015, nearly 200 countries signed the Paris Agreement to "pursue efforts to limit the global temperature increase to 1.5° Celsius (2.7° Fahrenheit) above pre-industrial levels to avoid the most severe impacts of climate change." But over the past six years, global temperatures have increased by 1.4°C (2.5°F) and in 2024, global temperatures averaged more than 1.5°C above pre-industrial levels for the first time. Actions must be immediately intensified to *mitigate* greenhouse gas emissions and *adapt* the built environment to reduce risk from climate impacts, such as extreme heat, flooding, and severe storms.

Climate mitigation refers to the urgent challenge of *slowing climate change* by reducing the emission of new greenhouse gases (GHGs) into the atmosphere, while simultaneously increasing carbon sinks or sequestration. The goal of climate mitigation is to stabilize greenhouse gas (GHG) levels and remain below key thresholds for global warming.

Climate adaptation refers to the ability *to adapt to life in a changing climate* by responding to current and projected climate conditions. These strategies moderate, avoid harm or exploit beneficial opportunities. Many climate adaptation strategies employed by landscape architects are nature-based solutions.

Climate resilience refers to the ability to reduce risk and increase the capacity of communities to withstand both climate shocks and ongoing stressors. Both climate mitigation and climate adaptation strategies work toward this overarching goal.

Landscape architects are in a strong position to address climate mitigation and adaptation to achieve resilience in our projects and the communities in which we practice. Our work — at the scales of planning and site design — can deliver resilient, climate positive landscapes while also generating a range of co-benefits. The climate positive design approach detailed in this goal offers objectives and actions for landscape architects to integrate into their practice.

A climate positive design outcome fundamentally means achieving:

- A net gain in carbon sequestration over a project's life cycle
- Reducing emissions from construction materials, construction activities, maintenance, and site operations.
- Resilient sites to withstand climate stressors and shocks.

In addition to environmental and cultural gains—such as increased biodiversity, equity, and resilience—climate positive landscapes can yield significant economic benefits. These include minimized damage from extreme weather events, reduced long-term maintenance costs, and improved human health and well-being.

> **"We can't offset our way out of this"**
>
> ***—Australian Institute of Landscape Architects Climate Action Plan***

OBJECTIVE 1.1

Learn about, collaborate on, and advocate for climate positive design.

The urgency of the climate crisis requires that we learn from one another, share resources, and work together to shift the built environment toward a more resilient, lower-carbon future. Climate positive design is a rapidly evolving practice, with new and evolving information to facilitate the advancement of climate mitigation and resilience strategies.

Climate action requires collaboration among built environment professionals, the communities in which we work and live, as well as advocates and policymakers at all levels. There are lessons to be learned from and insights to provide to:

- The broader architecture, engineering, and construction (AEC) and development industry
- Community leaders and community-based organizations
- Academics and researchers
- Non-profit and public sector partners

ACTION 1.1.1

Engage a diverse group of experts and knowledge-bearers in addressing climate positive goals, actions, and metrics appropriate to the region and site. Each project may present unique challenges and opportunities. A widespread network of peers and partners will ensure that climate positive design approaches are informed by context and existing knowledge. (AR, CE, CM, CO, ECO, GOV, HI, INV, IP, LA, RE). SITES Prerequisite 2.1 Use an integrative design process; SITES Credit 2.4 Engage users and stakeholders.

- Engage with other planning, development, and design professionals on the complex and functional systems of the built environment.
- Engage with communities, project collaborators, and local community-based organizations to ensure equitable and well-informed decision making.
- Collaborate with Indigenous, traditional and local leaders, communities, and practitioners to gain insight into complex histories and ecologies, and place-based knowledge.
- Engage with scientists and data using national, regional, and local data sets to ensure healthy and resilient places.
- Engage with researchers and academics to plan for performance measurement and data collection.
- Engage with non-profits, governmental agencies, and municipalities to advocate for climate positive design and planning.
- Engage with capital and financial institutions, budget- and policymakers to ensure economically and environmentally sustainable projects.

ACTION 1.1.2

Pursue knowledge about the actions, resources, and tools available for climate positive design and resilience. Review content created by ASLA and professional organizations in the AEC industry to stay informed about the latest best practices in climate and biodiversity positive design and planning. (LA, LCA, PRO).

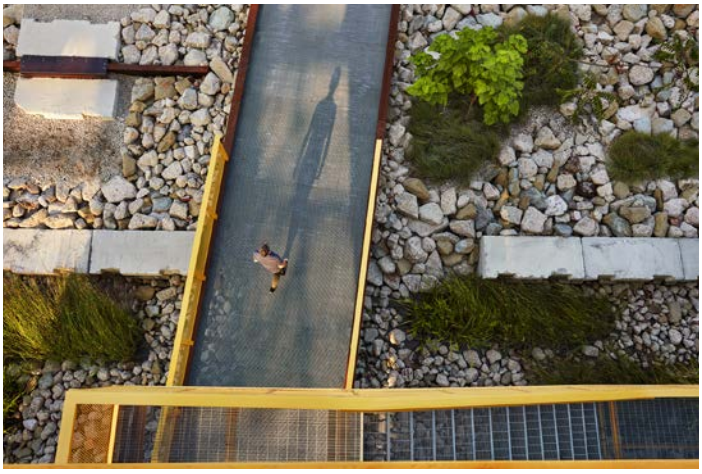
- Review existing resources (from ASLA, AIA, CLF, ECHO, ULI, Building Transparency, Architecture 2030).
- Engage with industry measurement tools and techniques: Pathfinder and Carbon Conscience are the primary tools for landscape architects conducting carbon assessment, along with iTree, Tally, CScale, and more.
- Engage in continuing education about climate mitigation and resilience.
- Consider the racial and ethnic history of communities and how that impacts mitigation and resilience benefits and burdens today.

ACTION 1.1.3

Advocate among peers, clients, stakeholders, suppliers and allied professionals for climate action on projects. Make the case for climate positive design strategies as core project goals by emphasizing co-benefits with other project and client priorities. Establish these goals at the beginning of the project with the client and all parties involved, and revisit during design. (AR, CE, COE, CL, MFR, HO, LA, GE, SE, TEA) SITES Credit 2.4: Engage users and stakeholders.

- Include climate positive approaches in proposals and develop scope language for defined services such as carbon assessments.
- Form interdisciplinary partnerships and develop a consultant team with shared values and goals, and include community liaisons who know the project context. Example: AIA Commitment Signatory Firms

- Set mitigation and resilience goals on a project-by- project basis and establish a clear strategy with the project team to define the roles and responsibilities. Building Transparency ownersCAN explains how to start.
- Hold conversations with industry partners, request Environmental Product Declarations (EPDs) for products, and use specifications to set performance standards for low-carbon materials and products, structure and materials reuse, site protection, and tree and plant sequestration.



Top: Ten x Ten used four different sizes of on-site reclaimed concrete at Mill 19 in Pittsburgh. Crushed concrete was used for some pathway surfaces, concrete slabs with flat faces were stacked for walls, larger slabs were used for pavements and stairs, and 45-centimeter concrete "rock" was used in the rubble gardens. Image credit: ASLA 2025 Professional General Design Honor Award. Mill 19: A Catalytic Postindustrial Landscape. Pittsburgh, Pennsylvania. TEN x TEN and D.I.R.T. Studio / TEN x TEN

BASELINES, BENCHMARKS, AND BUSINESS AS USUAL

What does it mean to reduce greenhouse gas (GHG) emissions and increase carbon sequestration from business as usual? How is the starting point — or baseline defined?

Within the field of landscape architecture, there is not a universal answer to this question. While allied professions, such as architecture, have sufficiently robust data on greenhouse gas emissions to determine industry baselines for business as usual, this is a new territory for landscape architects.

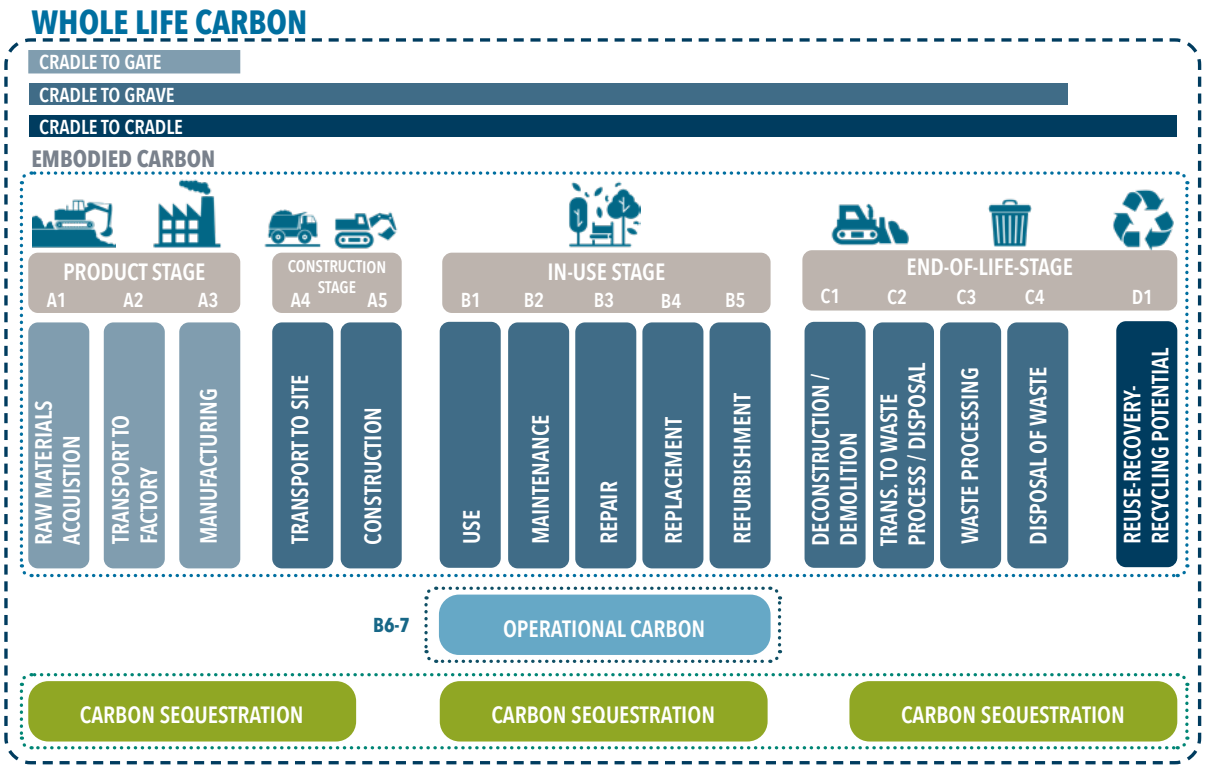
The following are a range of approaches that can be used to establish a business-as-usual baseline to compare projects:

Project Specific Baselines: Within the Pathfinder tool, users can create a Baseline Design to establish their own business-as-usual version of their project. Throughout the design process, users would then compare their Primary Design Alternative against the baseline to track Climate Positive Design changes.

Case Study Project Baselines: Rather than create a business-as-usual version of a new project, there may be opportunities to develop a baseline from similar existing case study project(s) instead. Landscape architects should select projects that are similar in location, program, and percentage planted to ensure an accurate comparison.

Firmwide Baselines: For firms that are establishing climate and biodiversity action plans with dedicated expectations for tracking emissions reduction, it may be beneficial to establish firmwide business-as-usual baselines (see Action 1.4.4). This requires conducting a benchmarking process to calculate the impact of a broader range of projects.

Industrywide Baselines: As more firms and practitioners are tracking and sharing emissions data, landscape architecture will be able to establish industrywide baselines of its own. This targeted data collection effort is discussed further in the Climate & Biodiversity Action Plan for ASLA and ASLA Chapters, and it is the next critical step for collectively measuring progress toward climate positive design.



Life cycle assessment (LCA) stages as defined by ISO 14040 and 14044. The typical LCA covers stages A1-A3, Cradle to Gate, although a more comprehensive LCA will examine impacts for all stages. Image credit: Meg Calkins and Mariana Ricker

OBJECTIVE 1.2

Mitigate greenhouse gas emissions (GHG) in site design and community planning. Reduce project emissions by 50-65% by 2030 with zero emissions by 2040; double sequestration from business as usual.

The built environment, including landscapes and infrastructure, is currently responsible for a staggering 42 percent of all global greenhouse gas emissions. Mitigating the climate crisis will require immediate collective action to reduce emissions by 50-65% by 2030, and achieve zero emissions by 2040.

The comprehensive summary of emissions associated with a specific project is defined as its Life Cycle Assessment (LCA). In the architectural world, there is frequent reference to Whole Building LCA, and this could be adapted to landscapes as a Whole Site LCA.

Consistent use of standard LCA techniques will allow landscape architects to share our emissions data with one another, our clients, and our collaborators. For more detailed LCA recommendations, see the ECHO Project, which is a convening of AEC industry partners that have produced alignment guidance on aspects, such as the 60 year Reference Study Period (RSP) and the unit of kilograms of carbon dioxide equivalents per square meter ($kgCO_2e/m^2$).

Landscape architects have two interrelated approaches to mitigate emissions in their projects. They can *reduce* emissions through design, planning, construction and maintenance decisions. But they can also sequester carbon through soil and vegetation conservation, new plantings, and biobased materials.

Approximately 80 percent of emissions across the life of a landscape result from the materials and products to construct it. Using local, low-carbon, or reused materials are key to meeting the goal of reducing emissions by 2030 and achieving zero emissions by 2040.

Sequestering twice the emissions beyond business as usual throughout the life cycle of the project will require vegetation and soil conservation, abundant new trees and plants, and use of materials that store carbon. These actions are the key to achieving climate positive design.

At the planning scale, decisions about community design and regional planning can impact emission reduction potential. Sustainable communities that are dense and

Top: The 3-acre Midtown Park in downtown Houston was designed by landscape architects at Design Workshop to be seamlessly integrated with light rail, bus routes, and bike share systems. Image credit: ASLA 2022 Professional Urban Design Honor Award. Midtown Park. Houston, Texas. Design Workshop, Inc. / Brandon Huttenlocher - Design Workshop, Inc.

Bottom: A polluted brownfield near Boston was transformed by Offshoots into a half-acre park and bike commuter hub with parking spaces for more than 270 bikes, a repair center, and restrooms. Image credit: ASLA 2023 Professional General Design Honor Award. Hood Bike Park: Pollution Purging Plants. Charlestown, Massachusetts. Offshoots, Inc. / Peter Vanderwarker Photography / Offshoots, Inc.

walkable, engage alternative transportation to cars, produce renewable energy, and minimize waste will go a long way toward reducing emissions over decades.

Decarbonization efforts should be implemented at all phases of a project design and planning process. However, the greatest impact can be made early on. For a full phase-by-phase breakdown of big ideas, strategies, and best practices, refer to the ASLA guide on Decarbonizing the Design Process.

At the old Texaco Depot, now Cosmic Saltillo in Austin Texas, Ten Eyck Landscape Architects reused structures, concrete pavement slabs, and reclaimed steel members in an overhead structure.
Image credit: Erika Rich

ACTION 1.2.1

Plan and design sustainable, multimodal, low-carbon communities. Through community planning and design, landscape architects can shift the behavior of users in the public realm. In these communities, people can safely and comfortably walk and bike to public amenities, use public transit, and minimize energy use and waste. These strategies are essential to reducing emissions and helping people lead healthier lives. **(CE, CM, CO, ECO, GOV, HI, IP, PL, TE)**. SITES Credit 1.5: Redevelop degraded sites; SITES Credit 1.6: Locate projects within existing developed areas; SITES Credit 1.7 Connect to multi-modal transit networks.; Credit 6.9 Encourage fuel efficient and multi-modal transportation; SITES Credit 8.6 Use renewable sources for landscape electricity needs.

- Encourage redevelopment of urban infill, brownfield, and previously developed sites with existing infrastructure. Minimize site development in greenfield and peri-urban sites.
- Consider the carbon impacts of land use decisions. Use Carbon Conscience.
- Plan dense, transit-oriented communities with horizontal and vertical mixed-use districts. Facilitate car-light or car-free lifestyles with frequent, reliable, affordable, and safe public transit connections between multi-modal transit networks.
- Plan and design complete streets that recognize the infrastructure needs for all applicable modes of transportation and utilities while providing environmental benefits, promoting economic vitality, and creating places for community. Refer to the NACTO Urban Street Design Guide.
  - Design for walkability with accessible, legible, safe, and comfortable streets for pedestrians.
  - Create a connected, accessible, protected, and comfortable non-motorized network.
  - Integrate street trees, understory, and stormwater management into rights of way.
  - Consider utility requirements as they may impact other uses.
- Achieve the Trust for Public Land Ten Minute Walk Score. Plan and design for every resident to have a park, public transportation, and access to a range of facilities within a 10-minute walk of their home.
- Plan for renewable energy production and district scale energy systems such as microgrids. Learn more about renewable energy landscapes.
- Advocate for policies and zoning that encourage and incentivize these planning and development patterns.

ACTION 1.2.2

Reduce embodied carbon emissions through reuse of onsite structures, right sizing hardscape and site structures, and selecting locally produced, low-carbon materials and products. Emissions from construction materials and products primarily occur in the product stage (A1-A3) with raw material extraction, transport,and manufacturing. Transportation of heavy materials to the project site (A4) can also release substantial emissions if materials and products are imported or trucked long distances. Designers can make significant strides toward reducing embodied carbon though their decisions about materials, material mixes, and

structures. Tracking embodied carbon and sharing the data is the best way to inform our understanding of business-as-usual and carbon reduction progress. **(AR, CE, CL, CN, GEO, LCA, MFR, HO, STR, SUP, TE, SE, GE, COE)** SITES Pilot Credit 3: Assess and improve carbon performance; SITES Credit 5.2: Maintain on-site structures and paving; SITES Credit 5.3: Design for adaptability and disassembly; SITES Credit 5.4: Reuse salvaged materials and plants; SITES Credit 5.5: Use recycled content materials; SITES Credit 5.6 Use regional materials; SITES Credit 5.8: Support transparency and safer chemistry; SITES Credit 5.9: Support sustainability in materials manufacturing; SITES Credit 5.10: Support sustainability in plant production; SITES Credit 7.5: Divert construction and demolition materials from disposal; SITES Credit 7.6: Divert reusable vegetation, rocks, and soil from disposal

- Identify opportunities to reduce, reuse, recycle, and upcycle materials by minimizing demolition of existing site structures, and reusing on-site materials in new structures. This will save emissions, and likely transportation costs. It will also reduce the need for extracting, processing, and transporting new resources.
- Right-size program areas and site structures by taking care not to oversize pavements, parking lots, roads, walls and other structures. Minimize the ratio of hardscape to softscape to the extent possible. Where applicable strive for a maximum of 30 percent hardscape and minimum 70 percent softscape.
- Design durable site structures to last the expected service life of the material.
- Design structures for deconstruction with mechanical connections and no mortar or adhesives where possible.
- Prioritize living structures such as living walls, fences, pergolas, and bioengineered erosion control and embankments.
- Prioritize low carbon materials. Minimize use of high-carbon materials such as portland cement concrete, steel, aluminum, kiln-dried lumber, plastics, and galvanized products.
- Specify materials with reduced carbon mixes. Use warm-mix asphalt (WMA) with high recycled asphalt pavement (RAP) content. Reduce consumption of portland cement with use of supplementary cementitious materials (SCMs) and alternative cements.
- Maximize materials with recycled content and those that can be recycled at the end of their service life.
- Prioritize products with verified environmental product information such as Environmental Product Declarations (EPDs) and multi-attribute certifications. For more information, see the Resources section at the end of this document.
- Specify products produced with sustainable manufacturing processes.
- Select locally produced materials and products. Consider avoiding imported products unless the shipping is energy efficient. Avoid trucking heavy materials more than 50 miles.
- Reduce the use of mown lawns due to the GHG emissions from decomposing biomass.
- Pursue ethical decarbonization in material selection as defined by Design for Freedom and support disadvantaged and small businesses.
- Quantify embodied carbon assumptions with EPDs, LCA data, and/or carbon assessment tools.
- Adopt low carbon specification language in standard specifications for materials – concrete, asphalt, earth-based, biobased materials – processes, and requirements.
- Advocate for the reduction of emissions from construction equipment and processes.

ACTION 1.2.3

Design for reduced operational carbon emissions by minimizing fossil fuelpowered maintenance equipment, designing for reduced energy and water usage, supporting building energy efficiency, and producing renewable energy onsite. Through collaboration with architects, end users, developers and owners, landscape architects can facilitate the reduction of emissions during the use stage of a site **(AR, CL, IRR, LCA, SM)**. SITES Prerequisite 3.2: Reduce water use for landscape irrigation; SITES Credit 3.4 Reduce outdoor water use; SITES Credit 3.4 Reduce outdoor water use; SITES Prerequisite 8.1: Plan for sustainable site maintenance; SITES Credit 8.3: Recycle organic matter; SITES Credit 8.4 Minimize pesticide and fertilizer use; SITES Credit 8.7 Protect air quality during landscape maintenance

- Consider maintenance implications of material and plant selection. Plan for reduced use of power maintenance equipment. Eliminate the use of synthetic chemical and fossil fuel-based fertilizers, pesticides, and herbicides. Reduce or eliminate intensively managed lawns

that require regular inputs and mowing and release emissions from decomposing biomass.
- Develop maintenance and management plans that support reduced operational emissions (see Action 1.4.3).
- Specify energy-efficient and/or zero carbon powered lighting, controllers, pumps, and other equipment.
- Design closed loop waste, energy, and water systems using passive techniques when possible.
- Reduce potable water usage for on-site irrigation and water features.
- Consider green roofs and vegetation alongside buildings to improve insulation, increase shading, reduce heat islands, and reduce building energy demands..
- Integrate renewable energy sources and electric vehicle charging stations.

ACTION 1.2.4

Maximize carbon sequestration and storage potential throughout the project life cycle by protecting existing vegetation and soils, restoring ecosystems, and building soil carbon. According to a study from The Nature Conservancy, "increasing carbon sequestration in plant biomass has the greatest potential to reduce net carbon emissions and slow the effects of climate change." While the majority of these strategies address on-site design, some also consider how project decisions may impact off-site sequestration and storage (CE, CL, CL, CN, ECO, IP, LCA, SM, SUP). SITES Prerequisite 2.3: Designate Vegetation and Soil Protection Zones; SITES Prerequisite 4.1: Create and communicate a soil management plan; SITES Credit 4.4: Conserve healthy soils and appropriate vegetation; SITES Credit 4.5: Conserve special status vegetation; SITES Credit 4.6: Conserve and use native plants; SITES Credit 4.7: Conserve and restore native plant communities; SITES Credit 4.8: Optimize biomass; SITES Prerequisite 5.1: Eliminate the use of wood from threatened tree species; SITES Credit 5.7: Support responsible extraction of raw materials; SITES Prerequisite 7.3: Restore soils disturbed during construction; SITES Credit 7.4: Restore soils disturbed by previous development

- Limit the extent of site development to preserve existing vegetation and soils. Protecting native plant communities and large mature trees is important to protect their stored carbon.
- Identify vegetation and soil protection zones (VSPZ) and avoid their disturbance.
- Reduce grading, soil disturbance, and soil compaction to maintain carbon storage in topsoil and subsoil.
- Design plantings for carbon sequestration that support biodiversity through a mix of long-lived, large, and fast-growing native trees, shrubs, and plants. Select species that are low-maintenance and have a long growing season. Design multi-layered plantings with a diversity of plant species and functional types and sizes.
- Restore ecosystems and plant communities, particularly carbon-rich ones such as forests, coastal wetlands, mangroves, and seagrasses.
- Maintain landscapes to build soil carbon through diverse planting with adequate coverage and debris management. On-site compost can be further supplemented with amendments like biochar or compost.
- Consider off-site impacts to carbon sequestration through material specification. Specify sustainably harvested wood (non-tropical hardwoods) and avoid materials that are mined from natural ecosystems, particularly peat moss, virgin topsoil, and river gravel.
- Consider partnerships for carbon sequestration and storage. Landscape architecture projects can be used to develop carbon credits. Owners and developers can purchase credits from other carbon credit developments to augment onsite carbon sequestration and storage.

OBJECTIVE 1.3

Employ nature-based solutions for climate adaptation.

As climate change causes more intense weather events, extreme temperatures, flooding, and wildfires, we must design landscapes, communities, and cities for future resilience.

The following actions describe planning and design strategies landscape architects can apply to address a range of climate stressors. Many are nature-based solutions that offer additional co-benefits such as biodiversity, carbon sequestration, and improved health and wellness for communities. In addition to built work, landscape architects can also work with community members and government agencies to develop local and regional climate resilience and recovery plans.

Wild Mile is a 17-acre floating eco-park that transforms an industrial stretch of the north branch of the Chicago River into a thriving wildlife corridor. The design team incorporated over 10,000 native plants representing 50 wetland species in 11,716 square feet of floating habitat. Image credit: ASLA 2024 Professional Urban Design Honor Award. Wild Mile: Transforming an Urban River into a Floating. Chicago, Illinois. Greenprint Partners, Skidmore, Owings & Merrill /Scott Shigley

ACTION 1.3.1

Develop climate adaptation strategies in collaboration with project teams and other knowledge bearers, assessing site and region specific risks and using forecast models. Adaptation efforts must consider a range of future global warming level (GWL) scenarios to ensure long-term climate resilience. There is tremendous variability in the type and severity of climate risks depending on project location and context of climate risks. **(CL, CM, GOV, PL, RE TKB, NN)**. SITES Prerequisite 2.1 Use an integrative design process

- In collaboration with experts, employ climate change projections for future local and regional conditions to identify both site and regional hazards related to temperature, wildfire, water availability, and severe storms. Use locally available data, or national forecast tools such as Climate Central Tools; National Center for Environmental Information (NOAA) Climate Monitoring; NOAA One Stop Data Search; IPCC WGI Interactive Climate Atlas; US Climate Resilience Toolkit.
  - In collaboration with experts, the client, and the project team, assess the severity and likelihood of risks based on the agreed upon future scenario and time horizon (ex. 2050 vs. 2100).
  - Discuss risk tolerance with the client and where applicable, the public.
  - Acknowledge and address the disproportionate risks of climate stresses that underserved and historically marginalized communities often experience .

ACTION 1.3.2

Design landscapes to minimize heat islands and related impacts. Extreme heat events are becoming more frequent due to climate change. These events disproportionately impact older adults, children, people experiencing homelessness, and underserved and historically marginalized communities. One of the most effective strategies to reduce heat is to design a publicly accessible network of cool, green spaces that provide refuge for communities. Explore ASLA's research on extreme heat for more detailed site design recommendations such as the following. **(AR, CM, ECO, GOV, LA, PL, PUB, RE, SM)**. SITES Credit 4.9 Reduce urban heat island effects.

- Increase the urban tree canopy to reduce air temperatures and increase thermal comfort. Advocate for equitable distribution of green space and tree canopy to support at-risk populations. Consider arrangement and

spacing of trees through simulation software such as ENVI-met.
- Provide shade on hardscapes, which decreases solar radiation, reduces local temperatures and increases thermal comfort. Consider cooling features such as splash pads and misters.
- Reduce hardscapes and use plant material and water features to improve local cooling benefits. Use plant species that will provide shade quickly.
- Design public spaces to be used in the evenings when it is cooler. Add safety features such as increased lighting, multiple entrances, and street visibility.
- Site and orient buildings and structures to minimize heat canyons and shade pavements and capture prevailing winds.
- Use pavements with a minimum solar reflectance value of 0.33
- Use open grid pavement systems that are at least 50 percent unbound.

ACTION 1.3.3

Design landscapes to maximize water conservation. Water conservation strategies are most urgent in arid climates, but water scarcity is an expanding risk for all regions. Drought conditions are increasing and water resources - aquifers, groundwater, reservoirs, snowpack – are becoming depleted. Water-wise design employs strategies that reduce overall use, enhance efficiency, and shift to alternative water sources (CE, CL, ECO, GOV, IRR, RE, SM). SITES Prerequisite 3.2: Reduce water use for landscape irrigation; SITES Credit 3.4 Reduce outdoor water use.

- Select native and drought-tolerant trees and plants that require minimal or no irrigation after establishment. Use databases such as "What to Plant" from the EPA's WaterSense, WUCOLS or SelecTree to determine drought tolerant plants and water needs. Where irrigation must be used, incorporate sensors and other equipment to maximize efficiency.
- Reduce or eliminate use of water-intensive lawns.
- Reduce potable water use in water features. Harvest roof rainwater and/or use other sources of reclaimed water. In arid regions, design water features to minimize evaporation by reducing surface area and waterfall heights.
- Capture and reuse rainwater and greywater and store for reuse in water features, irrigation, and building uses such as toilet flushing and fire suppression. When using reclaimed water for irrigation, select plants that can succeed with the qualities of the recycled water such as salinity or nutrients.

ACTION 1.3.4

Design for increased storm events and risk of flooding using nature-based solutions. Climate change is leading to more intense and prolonged storms. Designed landscapes must now accommodate increasing amounts of water, often within a shorter period of time. Nature-based solutions can help manage flood risks through increased permeability, evapotranspiration, and other drainage system enhancements. Collaboration with engineers can result in a holistic approach to nature-based solutions and stormwater control measures (AR, CE, COE, CL, ECO, GEO, GOV, IP, RE, SM, UNI). SITES Prerequisite 1.2: Protect floodplain functions; SITES Prerequisite 3.1: Manage precipitation on site; SITES Credit 3.3: Manage precipitation beyond baseline; SITES Credit 3.5 Design functional stormwater features as amenities.

- Increase permeable surfaces and minimize impervious surfaces.
- Design stormwater control measures that infiltrate or evapotranspirate as much stormwater as possible. Understand sites' soil infiltration capacities and other conditions that can impact infiltration measures. Coordinate with civil engineers to understand their performance and sizing for a variety of storm intensities. Appropriate stormwater control measure types will vary by site type, uses, and climate. Some typical measures include bioretention areas, bioswales, green roofs, constructed wetlands, permeable and suspended pavement systems.
- Use bioretention areas, bioswales, and other vegetated stormwater measures along roadways and parking lots to divert rainwater from storm sewer systems, capture pollutants, and encourage infiltration into urban soils.
- Work with maintenance teams to ensure long-term function of permeable pavements and stormwater control measures.
- Restore natural drainage systems.
- Prevent erosion and landslides through proper site selection, designing with existing topography, and erosion control measures. Use bioengineered embankments

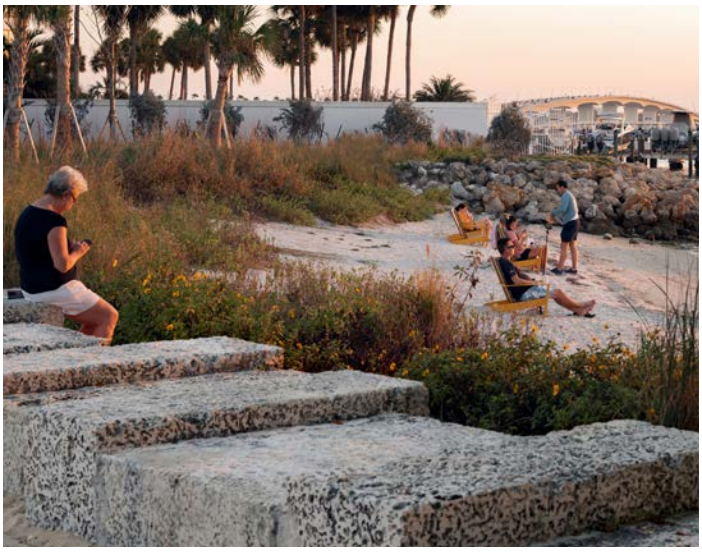
instead of retaining walls.
- In floodplains, limit development to floodable infrastructure such as parks and open spaces.

For this residence in Seattle, Washington, landscape architects with Broadhurst + Associates replaced a concrete bulkhead and lawn with a living shoreline and habitat for a range of species. Image credit: ASLA 2020 Professional Residential Design Honor Award. A Shoreline Re-Imagined. Seattle, Washington. Broadhurst + Associates / Andrew Buchanan

ACTION 1.3.5

Design for sea level rise using nature-based solutions. Coastal communities face the threat of rising sea levels, particularly during storms and king tides. In some communities, the impacts of sea level rise are already felt. Design strategies must consider three interrelated impacts of sea level rise: higher base flood elevation (BFE), storm surge above BFE, and rising groundwater impacted by saltwater intrusion (AR, CE, CL, COE, ECO, GEO, GOV, RE). SITES Prerequisite 1.2 Preserve floodplain functions

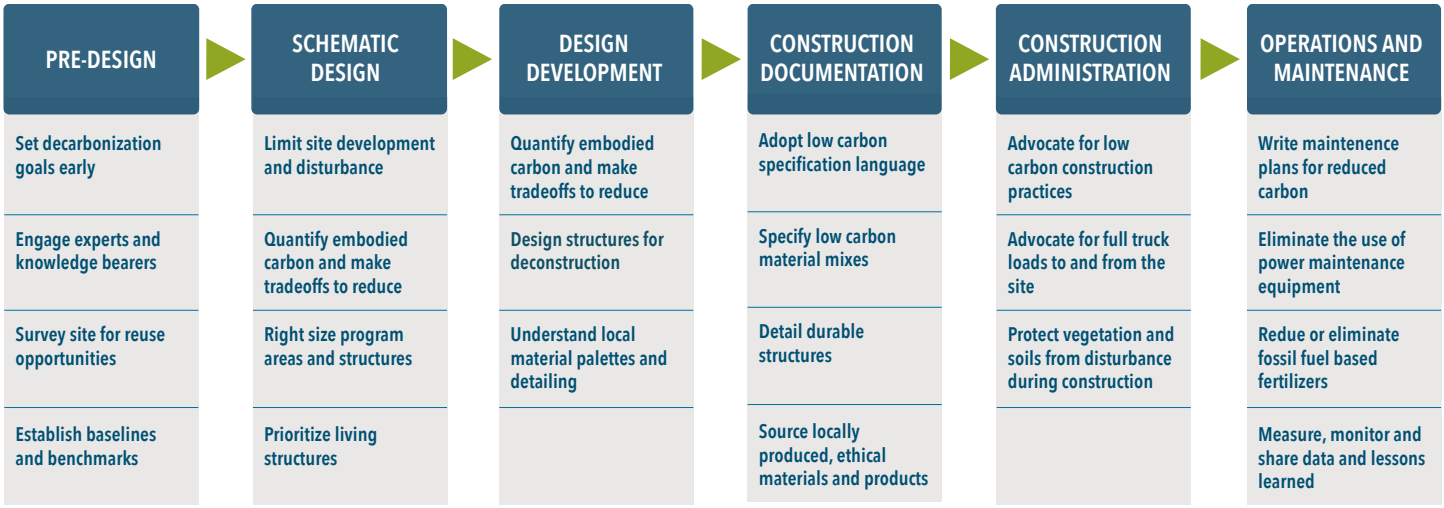
- Employ nature-based and hybrid solutions for wave attenuation. Examples include horizontal levees with wetland habitat, oyster reefs, mangroves, seagrass meadows, and shoreline stabilization methods informed by Indigenous and traditional environmental knowledge.
- Restore and adapt shoreline habitats to serve as buffers, with corridors to allow for the migration of shoreline species over time. Landforms can accommodate intertidal /subtidal living communities.
- Design for water inundation during storms. Strategies include introducing redundancy of circulation to maintain access, designing structures for durability and ease of cleaning after inundation, and planting design that can withstand flooding.
- Coordinate with architects to ensure building accessibility from the site during innundation.
- Understand groundwater levels and salinity for subsurface design and plant selection. Plan for adaptation to changing conditions over time.
- Plan for managed coastal retreat or community realignment and relocation to adapt to rising sea and groundwater levels. Involve impacted community members in meaningful and equitable decision-making processes when taking this approach.



The 10-acre Bay in Sarasota was designed by Agency Landscape + Planning to include mangroves, a resilient living shoreline, and oolite seat wall. Image credit: ASLA 2024 Professional General Design Honor Award. The Bay: "One Park for All" in Sarasota. Sarasota, Florida. Agency Landscape + Planning / HAPS Agency, Michael Todoran

ACTION 1.3.6

Implement fire safe design strategies. Climate change is causing the frequency and severity of wildfires to increase, impacting communities at the wildland-urban interface (WUI) and even within urban population centers. Fire safe design can require tradeoffs with other climate and biodiversity priorities. For example, fuel management may require sparse planting near structures, but planting dense, diverse landscapes will help shade buildings to reduce energy use as well as sequester carbon. Evaluating these types of tradeoffs and balancing priorities is key to fire safe landscapes (CL, ECO, CE, AR, BIO, PL, HI, LCA, LA, SM, RE, IP, CO,



Decarbonization measures should be implemented during all phases of a design or planning process. Image credit: Mariana Ricker and Meg Calkins

CM). SITES Credit 4.11 Reduce the risk of catastrophic wildfires.

- Identify regional and local fire risks and hazards.
- Maximize defensible space between the built environment and wildland areas. Limit encroachment into wild lands.
- Manage landscapes around buildings within the WUI using defensible space strategies. These guidelines may be specific to each region and depend on climate, vegetation types, fuel quantity, hydration conditions, topography, and wind.
- Design green open spaces as buffers to slow the spread of fire in the WUI. Factors that make an effective landscape wildfire buffer include:
  - size and dimensions of these green spaces as well as wind orientation
  - plant types, massing, and hydration strategies
  - maintenance (especially the removal of dead plants and proper fuel thinning)
- Promote the use of street trees or allees to form windbreaks and act as ember shields protecting WUI neighborhoods from wind driven embers.
- Incorporate clear evacuation routes and access for firefighting efforts into plans and designs.

OBJECTIVE 1.4

Manage, measure, and monitor for climate positive sites and practices.

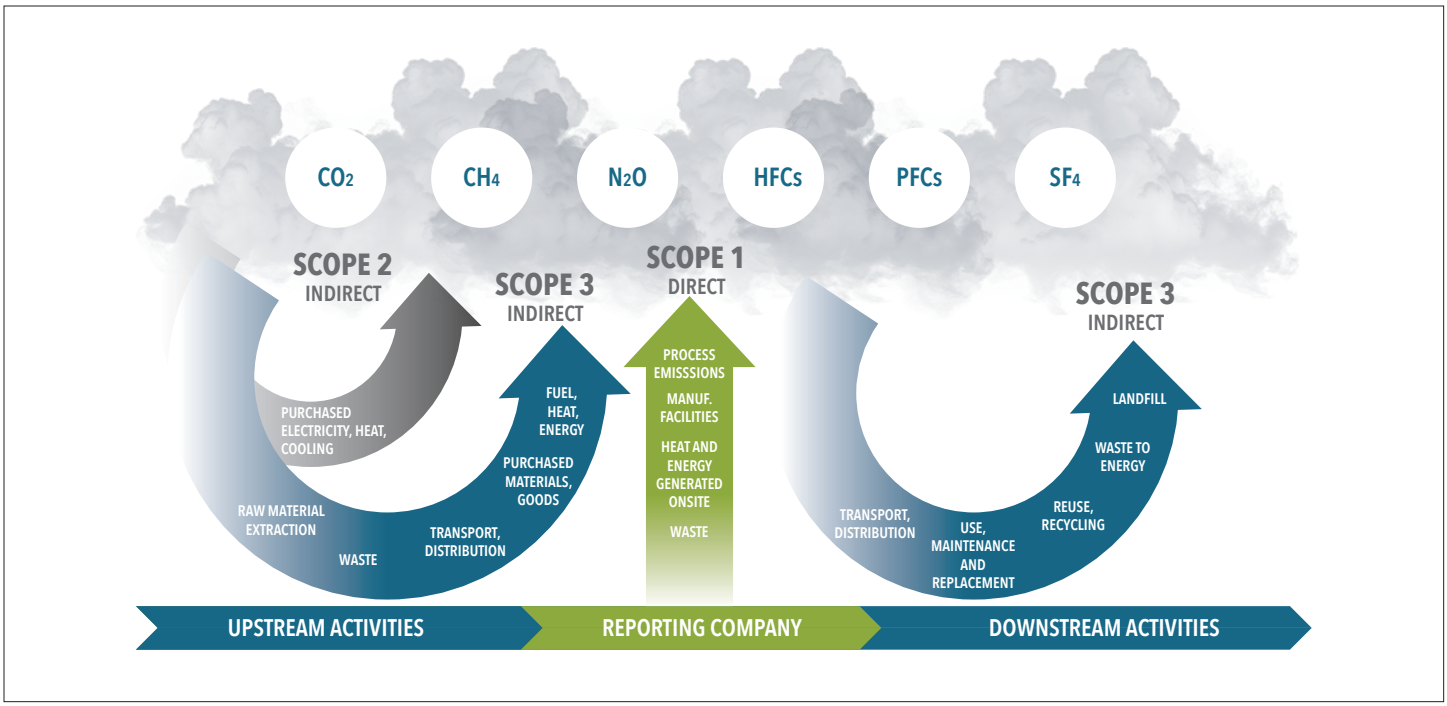
Climate mitigation and adaptation efforts require careful management to ensure successful outcomes and opportunities for knowledge sharing. Carbon assessments, a relatively new measurement technique in landscape architecture, require a clear and consistent process for measuring impacts. Established benchmarks are not widely available for most materials and products used by landscape architects. Tracking embodied carbon and sharing the data is the best way to inform our understanding of baselines and carbon reduction progress.

Similarly, for adaptation efforts, there is a need for tracking more quantifiable impacts of nature-based solutions. Monitoring can provide insights into the most successful strategies and offer lessons learned for future projects. As the climate changes, our practice must continue to adapt to meet the changing needs of our communities.

Monitoring sites will ensure function of mitigation and resilience strategies and may reveal the need for adaptive management techniques as landscapes grow and change. Maintenance and management plans can ensure performance, and sharing monitoring data in publicly accessible forums will support low carbon and resilient practices.

ACTION 1.4.1

Measure greenhouse gas emissions using industry standard tools, and then share the data through established and accessible reporting formats. Tracking embodied carbon and sharing the data is the best way to inform our understanding of business-as-usual and carbon reduction progress. Develop clear LCA boundaries for elements to be included in embodied carbon assessments (refer to Objective 1.2). Maintain a consistent approach across projects. Start early in the design process and update analyses at multiple phases of the project. The level of design



Top: Scope 1, 2 and 3 emissions are all included in a Life Cycle Assessment (LCA). They include upstream activities, downstream activities, and activities from the reporting company. Scope 1 emissions are those that a manufacturer controls directly while Scope 2 emissions, typically purchased electricity, heat or cooling, result from sources that the manufacturer does not control. Scope 3 emissions are also indirect and controlled by one or more other companies that supply resources or a service to the manufacturer of the product. Adapted from World Resources Institute (WRI) Greenhouse Gas Protocol. Image credit: Meg Calkins and Drake Bruner

Bottom: In Massachusetts, landscape architects at OJB transformed a former Ford Motor Company assembly plant into the center of a new urban corporate campus, planting more than 300 trees that sequester more than 40,000 tons of emissions annually. Image credit: ASLA 2022 Professional General Design Honor Award. From Brownfield to Green Anchor in the Assembly Square District. Somerville, Massachusetts. OJB / Kyle Caldwell

detail refinement will dictate the granularity of assessment results, so typical assumptions may be required (AR, CL, LCA, MFR, SUP, HO, PRO). SITES Prerequisite 2.1 Use an integrative design approach; SITES Pilot Credit: Assess and improve a sites carbon performance.

- Select measurement tools best suited to the scale of the project and its phase. Use Carbon Conscience for planning and early stage concept design. Use Pathfinder and Athena Pavements when material quantity takeoffs are available for the design.
- Measure and track project emissions against baselines and benchmarks. When project baselines are not available at an industry or firm level, use material baseline information from the Carbon Leadership Forum baselines, the EC3 database, industry environmental product declarations, and General Services Administration (GSA) and state baselines for concrete, asphalt, concrete masonry units and glass.
- Measure and track carbon sequestration and storage against baselines and benchmarks including a typical business as usual vegetation scenario. Use Pathfinder and i-Tree tools to understand species-specific sequestration results over time.
- Report out emissions reductions and sequestration achieved through the Climate Positive Design Challenge, organization-wide Landscape Architecture 2040 Climate & Biodiversity Action Plan progress data sharing, the Landscape Architecture Foundation (LAF)'s Landscape Performance Series and other publicly accessible databases.

ACTION 1.4.2

Engage in maintenance, monitoring, and adaptive management techniques specific to the site design and develop performance measures to meet climate positive goals. While most design contracts exclude long-term involvement following construction, landscape architects can propose preparing maintenance, monitoring, and management plans during the design phase to ensure long-term performance throughout the project life cycle. Planning for adaptive management can respond to changing site conditions, and offer operational savings that result in greater project success (CL, ECO, SM).

- Develop site operations and maintenance manuals that include use of zero-emission power sources for maintenance equipment, on-site composting of organic waste, reduced use of fossil fuel-based fertilizers, herbicides, and pesticides, integrated pest management plans, maintenance schedules for site structures to increase their service life, and maintenance techniques for plant health.
- Monitor the performance of sites to ensure climate mitigation and adaptation goals. Monitoring can provide insights into the most successful strategies and offer lessons for future projects. As the climate changes, our practices must evolve to meet the changing needs of our communities.
- Share lessons learned through case study databases such as the LAF Landscape Performance Series Case Study Briefs or other publicly available environmental and economic performance databases.

ACTION 1.4.3

Pursue sustainability certifications for projects and professionals. Many mitigation and resilience strategies overlap with the criteria required to obtain a range of sustainable project certifications. Highlighting this opportunity with clients can help to make the case for climate positive design on projects. Certifications often correlate with higher project value for the owner. Certifications can also expand climate leadership among landscape architects as we collaborate with our AEC peers (AR, CE, CL, ECO, LA, PRO).

- Sustainable Sites Initiative (SITES) - Voluntary rating system for sustainable landscapes with or without a building. Administered by the Green Business Certification Institute (GBCI).
- LEED Rating Systems - Globally recognized standards for a range of project types including buildings. Developed by the U.S. Green Building Council and administered by the GBCI.
- WELL / Fitwel - Certification standard for projects with an emphasis on healthy buildings and human health and well being. Administered by GBCI.
- Envision - Voluntary rating system for sustainable infrastructure. Administered by the Institute for Sustainable Infrastructure.
- Waterfront Edge Design Guidelines (WEDG) - A national rating system and design guidance for professionals engaging in waterfront design, administered by the Waterfront Alliance.

- Living Building Challenge (LBC) - A voluntary standard for regenerative building and landscape projects. Administered by the International Living Future Institute.
- Just Communities - Certification for equitable and regenerative community planning and design. Administered by the Partnership for Southern Equity Institute.

ACTION 1.4.4

Develop an organization-wide climate and biodiversity action plan. Coordinated action across the landscape architecture profession is required to meet climate mitigation, climate resilience and biodiversity goals. To demonstrate alignment, firms and organizations can develop plans to guide and define a clear path forward for all their projects. The scope and focus of an action plan will reflect an organization's priorities and capacity **(ECO, LCA, LA, PRO, AR)**.

- Identify Climate and Biodiversity leads and champions within firms to serve as resources and guides for climate mitigation and resilience, and biodiversity work.
- Secure support from firm leadership that includes an understanding of resource allocation to support the work.
- Develop climate goals and targets for the plan, with specific actions addressing some or all of the following:
  - Track project emissions through a clear and consistent LCA process (refer to Action 1.4.1).
  - Track business operations emissions (refer to the ASLA guide Towards Zero Emission Business Operations)
  - Track results of resilience strategies. Monitor impacts and measure successes (refer to Action 1.4.3).
  - Establish baselines for business-as-usual sequestration and track progress toward targets.
- Develop biodiversity goals and targets for the plan, with specific actions for monitoring projects for protecting and increasing biodiversity (refer to Action 2.3.1 and Action 2.3.2).
- Engage people from across the organization, including design, marketing, accounting, and leadership.
- Share resources, process, and findings at all levels of the organization.
- Share plans, progress data, and lessons learned with the broader landscape architecture community to inform the work of our peers and standardization efforts across the industry.

ACTION 1.4.5

Participate in a commitment program for landscape architects. Organizations can make a voluntary commitment to reduce greenhouse gas emissions by 50-65 percent by 2030 and achieve zero emissions while doubling sequestration by 2040. This program will align with other professional organization commitments such as Architecture 2030, SE 2050, MEP 2040, etc. Participation in the forthcoming commitment program will facilitate data collection, collaboration, and standardization across our industry **(LA, PRO)**.

GOAL 1 CLIMATE: SUCCESS MEASURES

1. Reduce project GHG emissions 50–65 percent by 2030; achieve zero project emissions and sequester twice the carbon on project sites beyond business as usual by 2040.

2. Participate in the forthcoming ASLA climate and biodiversity commitment program.

3. Achieve all SITES and LEED credit/pilot credit points for emission reductions and sequestration increases on projects.

4. For sites with or without buildings, meet SITES certification prerequisites and credits.

5. Plan and design communities where people can walk, bike, or take transit as their first choice for trips to meet their daily needs and reduce vehicle miles traveled (VMTs).

6. Achieve the Trust for Public Land Ten Minute Walk Score.

7. Meet EPA Smart Growth principles and standards using guidelines such as LEED for Neighborhood Development.

8. Meet EPA Smart Growth principles and standards using guidelines such as LEED for Neighborhood Development..

9. Achieve zero stormwater runoff for all storm events below the 95 percentile storm on all new projects.

GOAL 2
BIODIVERSITY

Protect, conserve, restore, enhance and manage for biodiversity. Support the goals of protecting 30% of existing ecosystems and restoring 30% of degraded ecosystems by 2030, with a goal of protecting and enhancing biodiversity on each project.

The 3.5-acre Native Plant Garden at the New York Botanical Garden was designed by Oehme, Van Sweden to include nearly 100,000 native trees, shrubs, wildflowers, ferns, and grasses. The garden represents over 450 taxa, 86 plant families, and 192 genera. Image credit: ASLA 2020 Professional General Design Honor Award. The Native Plant Garden at The New York Botanical Garden. Bronx, New York. OEHME, VAN SWEDEN | OvS / Ivo Vermeulen

INTRODUCTION

Global biodiversity decline has escalated to a crisis point with 73 percent of wildlife lost by 2024 and one third of all land plants threatened with extinction. In North America, a 60 percent decline in wildlife occurred in just over a generation. This loss of biodiversity creates serious economic and environmental impacts that affect public and environmental health. Most critically, it reduces our planet's ability to be resilient in the face of climate change.

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) estimates that global consumption across fossil fuel, agriculture, and fisheries has resulted in a $10-25 trillion dollar annual impact on biodiversity, water, and health. Our lives are dependent on the world's biodiversity – from our access to food and medicines to the health and stability of our communities (United Nations 2025).

Landscape architects are uniquely positioned to have a significant impact on biodiversity in every project we are involved in. We have a skillset that allows us to work across a variety of scales, facilitating connections between our communities and nature. We interpret a wide swath of data and information, allowing us to coordinate and integrate knowledge from scientists as well as cultural and community-based knowledge bearers. And we have the opportunity to affect change in the landscape, through stewardship practices and policies that affect the environment and the way we practice.

This biodiversity goal lays out a relational, process-based approach as a framework for integrating biodiversity net positive design considerations in all phases of planning, design, implementation and management. Action items are based on the Kunming-Montreal Global Biodiversity Framework, which sets clear goals and 23 action-oriented global targets. Three key goals from the Framework are:

- Halt global biodiversity loss by 2030
- Protect 30 percent of land, freshwater, and marine areas in a natural or semi natural state
- Restore 30 percent of degraded land, freshwater, and marine areas by 2030

ASLA's Biodiversity Primer from the ASLA Climate & Biodiversity Committee, Subcommittee on Biodiversity provides more information on the biodiversity crisis and engaging in net positive biodiversity design.

Because biodiversity is specific to a place and its ecosystems' characteristics, this plan cannot provide detailed recommendations for every project location. Instead, these objectives and action items provide guidance on how landscape architects can:

- First protect, then conserve, restore, enhance, and manage for biodiversity on every project.
- Promote net positive biodiversity impacts.
- Collaborate with experts: ecologists, biologists, geomorphologists, foresters, soil scientists, traditional knowledge bearers, and community members to understand the nuances of each unique place.

> **"The Earth is our home. Unless we preserve the rest of life, as a sacred duty, we will be endangering ourselves by destroying the home in which we evolved, and on which we completely depend"** — E.O. Wilson

OBJECTIVE 2.1

Engage in learning, collaboration, and advocacy for biodiversity.

Biodiversity protection, conservation, restoration, enhancement, and management begins by examining and documenting the conditions of the landscape and engaging in dialogue with those connected to the land. We can listen and respond to the land as well as to the communities who inhabit these places. Where applicable, this work should begin with traditional knowledge bearers and Indigenous peoples who have for generations stewarded and engaged with the land.

If this dialogue happens in the earliest stages of design and planning, a deeper understanding of biodiversity can be achieved along with an increased capacity for engagement. By facilitating dialogue around biodiversity, landscape architects increase awareness among collaborators and clients, acknowledge responsibilities to steward and protect nature from further degradation, and invoke a land ethic that speaks to the uniqueness of place.

ACTION 2.1.1

Engage with a diverse group of experts and knowledge bearers in learning and collaboration to establish a deeper understanding of biodiversity needs, goals, actions, and metrics appropriate to the region and site. This important initial step includes engaging scientists who may spend an entire career studying and understanding the unique characteristics of an ecosystem and community members and Indigenous peoples who hold ancestral memories of the land, lives, and waters that animate a place. Both groups provide key baseline understanding and data to inform planning,design and stewardship approaches.(LA, TKB, ECO, HI, CM, RE, NN, NGO, POL, CL) SITES Prerequisite 2.1 Use an integrative design approach; SITES Credit 2.4: Engage users and stakeholders.

- Engage with traditional Indigenous and historical knowledge holders to identify past, present, and possible future ecological conditions and community-environment relationships.
- Engage with scientists (ecologists, biologists, geomorphologists, foresters, soil scientists, etc.) who are developing more detailed national, regional, and local data

FIVE BIODIVERSITY PRIORITIES

Landscape architects can support each of the five biodiversity risk priorities identified by the UN's Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). These priorities shape the biodiversity goal, objectives, and actions in this plan. They can be measured and addressed by a design team, key collaborators, community members, and clients from the earliest project discovery phase, to planning and design and through construction and management phases.

Protect diverse and connected ecosystems, promoting enhancement of remnant ecosystems through restoration and conservation strategies. Habitat destruction and degradation is the most significant threat to biodiversity, impacting 89 percent of threatened birds, 83 percent of all threatened mammals, and 91 percent of all plants. Avoid fragmenting regional habitat corridors, reducing viable habitat patch sizes, and other areas that are critical for the long-term survival of endemic species. Respond to systemic impacts at the site and regional scale. Promoting and protecting ecosystem and landscape connectivity is crucial to the conservation of biodiversity, especially in fragmented landscapes.

Stop the over- exploitation of nature by eliminating use of materials that are unsustainably mined, specification of trees and plants that are unsustainably harvested, and freshwater that is unsustainably appropriated for landscape projects.

Avoid introducing non-native invasive species to a project and manage existing invasive species to achieve biodiversity goals. The Invasive Alien Species Report states that the introduction of nonnative invasive species has significantly contributed to 60 percent of all species extinction and cost the global economy over US$400 billion. Specify native species and avoid use of non-native species that currently are or could become invasive in the future.

sets that can inform the specific needs and context at the site and regional scales.
- Engage with citizen scientists and other community knowledge bearers.
- Engage with local non-profits and academics for biodiversity. These could include native seedbanks, native plant nurseries, native plant organizations, wildlife conservation groups, pollinator conservation programs, etc.
- Engage and advocate with local municipalities and policymakers.
- Develop and collaborate with a diverse interdisciplinary team in the planning and design processes.

ACTION 2.1.2

Advocate among peers, clients, suppliers, and allied professionals to protect and enhance biodiversity. Landscape architects can influence biodiversity goals from the earliest proposal stages to the long term management of a built site. We have the potential to influence the market by seeking specific plant communities and specifying materials that do not harm, but rather support the landscape and its long-term health **(LA, AR, CE, ECO, RE, UNI, CL, CN, SUP)**. SITES Prerequisite 2.1 Use an integrative design approach; SITES Prerequisite 2.3 Designate and communicate VSPZs; SITES Credit 5.10: Support sustainability in plant production

- Advocate for biodiversity goals with clients, landowners, and communities.
- Advocate for the inclusion of net positive biodiversity goals in project Request for Proposals (RFPs), proposals, and project scopes.
- Form transdisciplinary partnerships and consultant teams, including ecologists, natural resource scientists, and other professionals who have deep knowledge and experience in ecological restoration, biodiversity, and stewardship.
- Advocate for native plants (non-cultivar; local genotypes) and vegetation communities endemic to the local ecosystem.
- Identify soil conditioning that advances subsurface biodiversity and microhabitats. Conserve onsite topsoil and avoid importing topsoil. Avoid using sphagnum peat moss for any purposes.
- Advocate for local sourcing of plants to minimize greenhouse gas emissions from transport.
- Engage with clients/owners and contractors to restore

FIVE BIODIVERSITY PRIORITIES (CONTINUED)

Avoid polluting impacts to air, water, and soil from pesticides, plastics, untreated runoff and other pollutants that harm or kill wildlife, disrupt ecological processes, or impact biodiversity. Avoid ILFI Red Listed Chemicals . Use organically-based pesticides and fertilizers. Source plant and soil materials locally, reducing emissions in transport.

Scale up climate and net biodiversity positive approaches to support the health and stability of global biodiversity and mitigate climate change (See Climate Action Goal 1).

TRADITIONAL ECOLOGICAL KNOWLEDGE

Traditional Ecological Knowledge (TEK), also called Indigenous Traditional Ecological Knowledge (ITEK) is a cumulative and evolving body of knowledge, acknowledging the deep reciprocal relationship between living beings and their environment. This knowledge, accumulated over generations, emphasizes the interconnectedness of all living things with the environment, and the importance of maintaining ecological balance.

TEK informs a holistic and relational approach to net positive biodiversity, when used with deep respect and understanding, and in dialogue with the community. Taking a relational versus transactional approach to net positive biodiversity allows for increased reciprocity with nature in the practice of landscape architecture and planning. Legal efforts to define and defend environmental personhood take cues from Indigenous peoples' understanding of the natural environment as kin, furthering the relational understanding of natural systems as holders of inviolable rights.

the physical, chemical, and biological components of the soil, including soil horizons, to closely match undisturbed reference conditions for the local ecosystem.

Landscape architects with Scott Lewis Landscape Architecture worked with the horticulturalist-owner of this residence in Portola Valley, California to design native plant gardens, green roof, permeable surfaces, and a rainwater harvesting and greywater irrigation system. Image credit: ASLA 2022 Professional Residential Design Honor Award. Coast Ridge Residence. Portola Valley, California. Scott Lewis Landscape Architecture / Marion Brenner

OBJECTIVE 2.2

Apply principles and practices of ecology to support site, regional, and global biodiversity goals.

Multiple dimensions of biodiversity should be addressed at each phase of the design process. Support global goals of protecting 30 percent of existing ecosystems and restoring 30 percent of degraded ecosystems by 2030, with a goal of net positive biodiversity impact on each project. A goal of 10 percent biodiversity net gain along with protection and conservation, is currently being used in the United Kingdom, but the specific percent gain may not be applicable on every site. In some cases, a more holistic net biodiversity positive impact may be a more appropriate goal, ensuring protection of existing biodiversity, avoidance and reduction of impacts and restoring ecological function, as appropriate to the specific conditions.

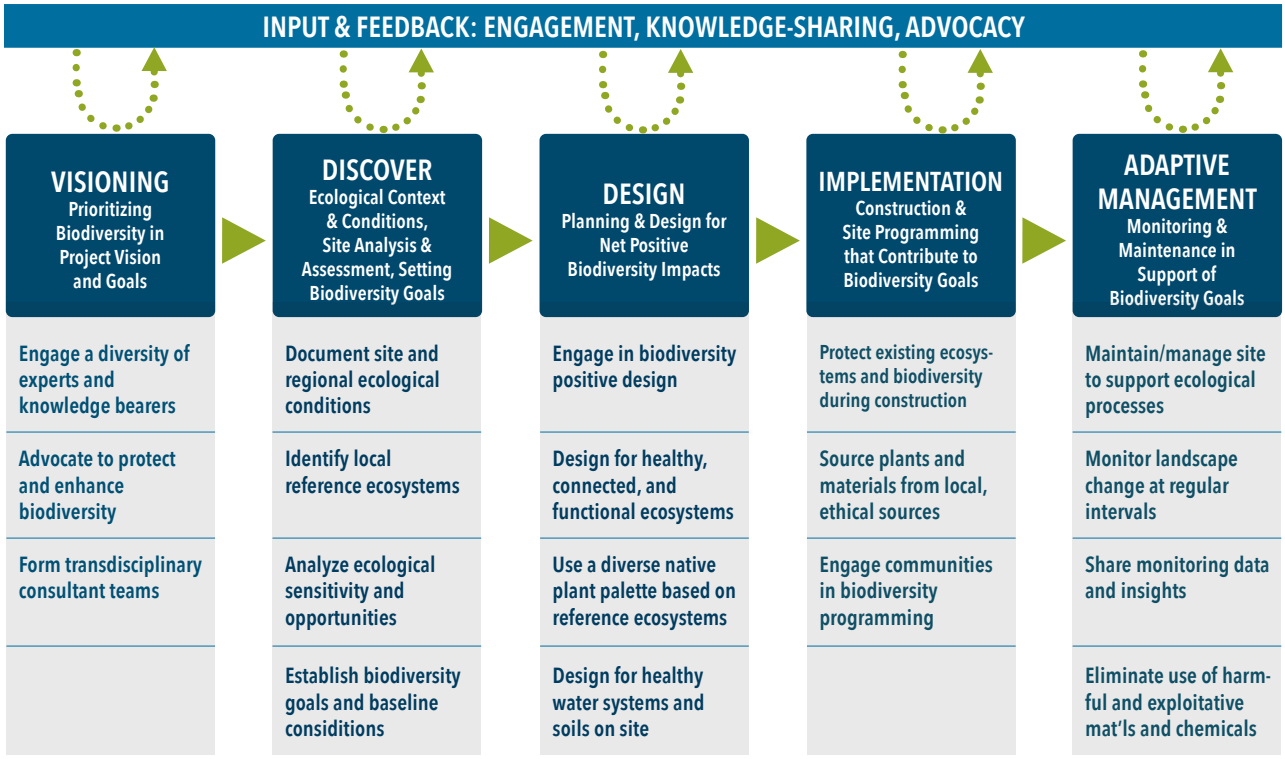
Biodiversity must be considered in all phases of a project from early site investigations through post-occupancy management. The initial project phase, composed of learning, engagement, advocacy, and in-depth discovery, will inform activities of goal setting, design, and measurement and management protocols. Key to this process is applying the lens of landscape ecology, which involves understanding the environmental processes and patterns influencing habitats and species beyond the site scale.

Even when biodiversity is not explicitly noted as a goal for a project, landscape architects have the responsibility to view each site as a potential part of the solution to respond to this crisis. With net positive biodiversity as the goal, almost all projects can find a way to be part of the global solution.

ACTION 2.2.1

In the initial discovery phase, deepen the collective understanding of the site and region through the lens of biodiversity and landscape ecology (LA, CL,TKB,HI, ECO, NN, CM, RE, NGO). SITES Prerequisite 2.2 Conduct a pre-design site assessment; LBC Core Imperative 01 Ecology of Place

- Identify landscape structure and spatial attributes (Landscape Ecology), biodiversity conservation attributes (Conservation), and ecological function and processes (both). Include:
  - Native flora and fauna communities
  - Native fungi
  - Rare, threatened and endangered species of concern
  - Invasive species, pest, and disease threats
  - Local and regional conservation initiatives
  - Biodiversity trends
  - Resident and migratory species (all wildlife types that are relevant to the site and regional context)
  - Unique habitat patches and corridors; the broader landscape mosaic within which the site exists
  - Fragmentation threats
  - Pollution vulnerability (soil contamination, water quality, sound and light pollution, etc)
  - Potential shifts in hydrologic and nutrient flows
- Summarize conditions of relevant reference ecosystems. A reference ecosystem is typically an intact ecosystem with the same geological, soil, climate, and ecoregional context used to establish restoration targets on a site. This involves describing the specific compositional, structural, and functional ecosystem attributes requiring restoration to meet a desired restoration outcome.



A biodiversity-positive planning and design process is iterative and integrative during all phases. Image credit: Jennifer Dowdell, Biohabitats, and Meg Calkins.

  - Include conditions of the current and future watershed
  - Investigate development pressures of the area
- Determine the *genius loci* (spirit of place) of the site by examining and framing the site's ecological condition through data review and in-person site assessments. Identify and examine:
  - Ecological history, legacy of geological and soils formations impacts on ecosystems and habitats, and the interface with today's and predicted future conditions
  - Ecosystem services and functions on the site: past, present and potential future
  - Anticipated climate impacts
  - Past and current ecosystems services and functions via datasets and geospatial analysis
- Develop ecological site suitability and sensitivity composite analysis maps to guide the planning and design process.
- Perform ground-truthing of data analysis on the site and at reference sites. Identify a single focal species or guild of species to guide biodiversity net positive design.
- Explore strategies as an additive or alternative to the primary biodiversity strategy, including biomimicry, biophilic design, and ecological democracy, and rights of nature, etc.

ACTION 2.2.2

Establish goals for biodiversity protection, conservation, restoration, enhancement, and management; then develop a biodiversity baseline for the site. Information obtained from the engagement, inventory and analysis phases informs biodiversity goals for the project.

The primary goal for a site design should be to have a net positive biodiversity impact. The exact approach will vary widely by type of site, location, program, measurement criteria, and other factors. All design proposals should support global efforts to protect 30 percent of existing ecosystems by 2030 (30x30). When developing biodiversity baselines, consider the variety of ways that biodiversity may be measured. This includes ecosystem diversity, taxonomic diversity, functional diversity (inclusive of species richness, species diversity, genetic diversity, behavioral diversity), and soil health. (LA, CL, TKB, HI, ECO, NN, CM, RE, NGO). SITES

Prerequisite 2.1 Use an integrative design approach; SITES Prerequisite 2.3 Designate and communicate VSPZs.

- Identify and map site design to address regional fragmentation, patch and corridor connectivity and other regional landscape ecology and ecosystem services needs (ecosystem diversity). Examine:
  - Relationships with wildlands, conservation lands, easements, and protected lands.
  - Habitat needs for migratory species that may only require the site habitat at specific times of year but are critical for long migrations.
  - Relationships with productive landscapes such as forestry, resilient food systems, regenerative agriculture, and alternative farming approaches.
  - Relationships with rural, suburban, peri-urban, and urban lands.
- Identify how site enhancements may *protect* native flora and fauna including keystone species and potential current and projected risks and threats (taxonomic diversity, functional diversity)
- Identify how site enhancements may *conserve* native flora and fauna including keystone species and potential current and projected risks and threats (taxonomic diversity, functional diversity)
- Identify how site enhancements may *restore* native flora and fauna including keystone species and potential current and projected risks and threats (taxonomic diversity, functional diversity)
- Identify how site enhancements may *enhance* native flora and fauna including keystone species and potential current and projected risks and threats (taxonomic diversity, functional diversity)
- Identify soils for protection, re-use, and conditioning. Consider current and projected risks and threats to healthy soils.
- Set project biodiversity goals based on the ecological context, program, and users needs with the project team and client early in the planning and design process.
- Develop a biodiversity baseline for the site: consider the aspects of the site's current biodiversity condition that can and should be measured and monitored.

ACTION 2.2.3

Engage in biodiversity positive design, supporting rewilding, increasing habitat connectivity, and enhancing ecosystem services. The prior actions in engagement, analysis,

KEY BIODIVERSITY DEFINITIONS

Net Positive Impact on Biodiversity is the suggested approach, in which the impacts on biodiversity caused by the project (or previous disturbance) are outweighed by the actions taken to first avoid and reduce impacts, then rehabilitate affected landscapes and species. This approach is grounded in the mitigation hierarchy — protect, conserve, enhance, restore, and manage for biodiversity — to pursue impact avoidance and reduction.

Biodiversity Positive Design prioritizes biodiversity by protecting or conserving biodiverse sites, or by increasing the biodiversity of flora and fauna on degraded sites through a unique combination of protection, conservation, restoration, enhancement, and management.

Nature Positive is a global goal to "halt and reverse nature loss by 2030 on a 2020 baseline and achieve full recovery by 2050," requiring measurable net positive biodiversity outcomes through improvement of abundance, diversity, integrity, and resilience of species.

Species richness is the number of distinct species (variety) that characterize an ecosystem.

Species evenness is a measure of how evenly individuals are distributed among the species in a community .

Species diversity is both the richness and the evenness of biodiversity.

Ecosystem biodiversity is the variety and spatial arrangement of different ecosystem types, their extent, and the size of their patches within a landscape.

Taxonomic biodiversity is measured by species richness, evenness, and abundance.

Functional biodiversity is measured by functional richness and diversity reflective of naturally occurring ecosystems.

and goal setting will inform design strategies that support programmatic and functional goals while prioritizing biodiversity (LA, ECO, CL). SITES Prerequisite 2.3 Designate and communicate VSPZs; SITES Credit 4.4: Conserve healthy soils and appropriate vegetation; SITES Credit 4.5: Conserve special status vegetation; SITES Credit 4.6: Conserve and use native plants; SITES Credit 4.7: Conserve and restore native plant communities; SITES Prerequisite 3.1 Manage precipitation on site; SITES Credit 3.3 Manage precipitation beyond a baseline; SITES Credit 6.8 Reduce light pollution; LBC Core Imperative 01 Ecology of Place

- Design to support healthy and functional ecosystems using the Society of Ecological Restoration (SER) Principles of Ecosystem Restoration.
  - Expand the area and maximize the quality of existing habitats supporting native wildlife, including charismatic species and species of conservation concern.
  - Promote ecological connectivity by restoring gaps in ecological corridors. Counter isolation while avoiding risks of harmful vectors for species mortality, such as inviting bird species into zones where buildings may cause bird hits.
  - Consider weighting species richness based on the threat category of the species.
- Design with a diverse native plant palette based on native ecosystems and reference sites.
  - Specify plant communities that support native wildlife.
  - Do not use invasive species or those projected to become invasive.
  - Design for vegetation complexity appropriate to the local endemic ecosystem.
  - Do not plant monocultures.
- Design for healthy, functional, and regenerative soils.
  - Optimize the use of native soils, including topsoil.
  - Support beneficial microbial communities.
  - Avoid practices that lead to compaction, erosion, or contamination.
  - Restore soil structure, organic matter, and nutrient content commensurate with local undisturbed reference soils to support endemic plant communities; improve soil function through appropriate amendment and decompaction techniques.
  - Avoid use of plastic-based weed fabric and erosion control netting.

KEY BIODIVERSITY DEFINITIONS (CONTINUED)

Phylogenetic biodiversity is measured by the extent of species from distinct branches of the evolutionary tree.

Genetic biodiversity is measured by the gene flow across a population that provides genetic diversity within species.

Note: Additional terms are defined in the Definitions section at the end of this plan.

- Design with embodied biodiversity impacts in mind.
  - Specify and source materials considering the embodied biodiversity impacts of every project's material and plant palette.
  - Choose biodegradable alternatives when possible and limit any petrochemical input (e.g. no artificial turf).
  - Eliminate weed fabric where possible or use biodegradable alternatives to plastics.
- Design for healthy, functional, and integrated water systems.
  - Design water systems to reflect and connect to the natural hydrologic cycle.
  - Mimic natural hydrologic flow patterns, groundwater recharge and water quality parameters through site-specific stormwater management best practices.
  - Protect, conserve, restore and enhance aquatic ecosystems.
- Design for the long arc of landscape maturation and adaptive management, rather than static conditions and immediate visual outcomes.
  - Anticipate how the landscape may evolve over time.
  - Take an adaptive management approach that explicitly acknowledges uncertainty and incorporates learning from ongoing monitoring and evaluation to inform maintenance midcourse interventions.
- Design to avoid impacts to adjacent or onsite ecosystems.
  - Minimize light pollution and light trespass into natural areas using Dark Skies Lighting Recommendations.

- Minimize noise impacts to resident or migratory wildlife species.
- Minimize water quality impacts downstream.
- Minimize other biotic and landform impacts.

ACTION 2.2.4

Require protection of flora, fauna, soils, water, habitat, and air quality during design and construction. Risks to biodiversity during site preparation and construction include the introduction of plant or animal pests embedded in materials, the disturbance of intact soils, and the unnecessary destruction of existing habitat or ecosystems. Protecting existing natural systems and native plant communities is nearly always a better option than mitigating their loss after disruption. (LA, ECO, CL, CN, SUP). SITES Prerequisite 2.3 Designate and communicate VSPZs; SITES Credit 4.4: Conserve healthy soils and appropriate vegetation; SITES Credit 4.5: Conserve special status vegetation; SITES Credit 4.6: Conserve and use native plants; SITES Credit 4.7: Conserve and restore native plant communities

Teaneck Creek Park Wetland Restoration restores ecological function and safe public use in this county park. With collaboration of Bergen County Parks, Teaneck Creek Conservancy and Rutgers' Center for Urban Environmental Sustainability. Image credit: Biohabitats Inc. © David Ike Photography

- Source plants and materials based on production practices that protect and conserve biodiversity.
- Minimize construction impacts to undisturbed natural soils and plant communities on and adjacent to the project site by:
  - Designating Vegetation and Soil Protection Zones (VSPZ) on site. Avoiding placement of construction site ingress and egress and stockpile areas under existing tree canopies or on undisturbed natural soils.
- Avoid introducing invasive species, disease vectors, or pests during construction.

Adaptive Management is a structured, cyclical approach to natural systems management where a degree of uncertainty is accepted. Data collected during monitoring is used to actively test assumptions. Monitoring biodiversity and ecosystem data tracks relevant conditions over time and measures management effectiveness. It encourages learning, acknowledges uncertainty, is action oriented, and promotes transparency.

Adaptive management is often misunderstood to be a trial-and-error approach to improve management outcomes rather than a structured approach focused on learning. Adaptive management includes carefully stated goals, objectives, and hypotheses of causation, as well as procedures for data collection followed by analysis, decisionmaking, and reiteration of the process. Monitoring data tracks relevant conditions over time, measures management effectiveness, and allows for revisiting goals. It emphasizes learning and iterative adaptation of management based on that learning, and thus reduces uncertainty with increased understanding of the system. (Allen & Garmestani (2013) and USDA Forest Service).

OBJECTIVE 2.3

Employ an Adaptive Management Framework that encompasses maintenance, monitoring, evaluation, decision making, and interventions to achieve biodiversity goals.

Initiatives to restore and enhance biodiversity should be monitored for a period of time commensurate with achieving project goals. Encourage owners to adopt an Adaptive Management Plan detailing monitoring protocols, evaluation criteria, and maintenance activities to achieve biodiversity goals.

As noted in the Kunming-Montreal Global Biodiversity Framework, conserving existing critical habitat and

biodiversity when it is under threat from disturbance may be even more valuable than "increasing" biodiversity. Biodiversity Net Positive impact in design targets:

- Avoiding and reducing impacts
- Initiating conservation strategies that protect and then rehabilitate affected species, habitats, or landscapes
- Ensuring outcomes where negative impacts are outweighed by the positive

By monitoring ecosystem performance and following an Adaptive Management approach, the owner can adjust maintenance methods to ensure biodiversity is maintained and supported into the future. Monitoring activities can be undertaken in collaboration with scientists, researchers, local community members or citizen scientists, the owner, and/or a trained maintenance team. Share information that is gathered and assessed with the landscape architecture community to promote best practices in biodiversity design, implementation, and management. This can broaden the collective understanding of biodiversity and contribute to an ever-growing reserve of biodiversity data.

ACTION 2.3.1

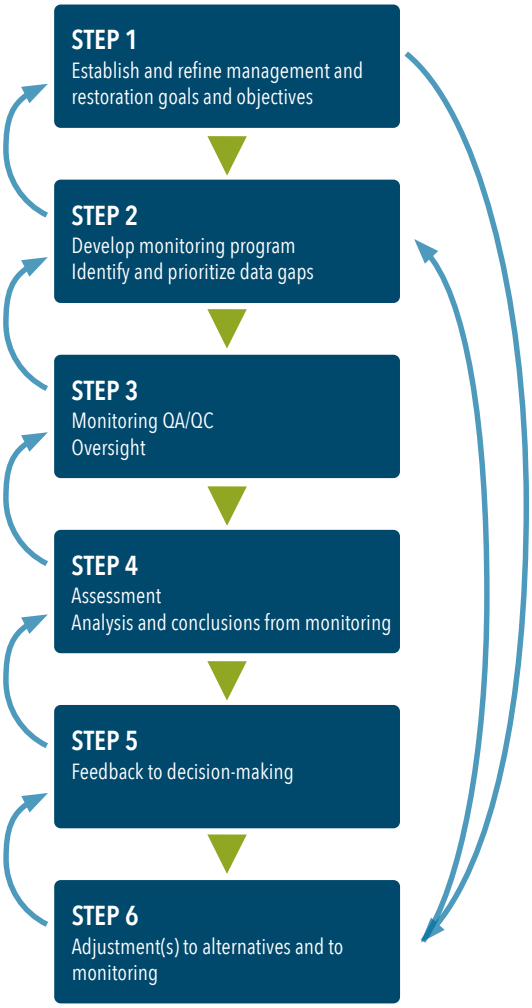
Set monitoring protocols during the design process based on biodiversity goals. Monitoring protocols can be developed in collaboration with scientists, researchers, the owner, and the maintenance team. The Global Biodiversity Standard and other national models offer reference for potential protocols for monitoring biodiversity (LA, CL, SM, ECO, RE, UNI, NGO). SITES Credit C9.3 Plan to monitor and report site performance

- Establish monitoring protocols to reflect unique baseline conditions and biodiversity goals for the site. Identify appropriate flora, fauna, and other ecosystem services as indicators specific to the site and the regional context.
- Work with the client to identify those responsible for monitoring the site and storing the data. It could be a local partner organization or institution, a citizen science group, a local specialist, university researchers, or a consultant.

ACTION 2.3.2

Monitor landscape change at regular intervals over the service life of the site. To track ecosystem performance and progress toward biodiversity goals, undertake monitoring tailored to achieving the specific site design and regional ecosystems. While landscape architects may not be responsible for the monitoring and tracking, it is necessary for this to be woven into the design to ensure the owner knows appropriate procedures (LA, CL, ECO, RE, UNI, NGO). SITES Credit 9.1 Promote sustainability awareness and education; SITES Credit 9.2 Develop and communicate a case study; SITES Credit Credit 9.3 Plan to monitor and report site performance.

- Use appropriate and consistent monitoring techniques for biodiversity goals .
- Maintain records of survey data and share progress toward biodiversity goals in open access forums.
- Monitor a site until biodiversity goals have been



An adaptive management approach incorporates feedback loops that are responsive to the land, evolving over time. Image credit: Biohabitats Inc. Jennifer Dowdell, and Meg Calkins

achieved and there are no foreseeable threats to the stability and integrity of the site.

ACTION 2.3.3

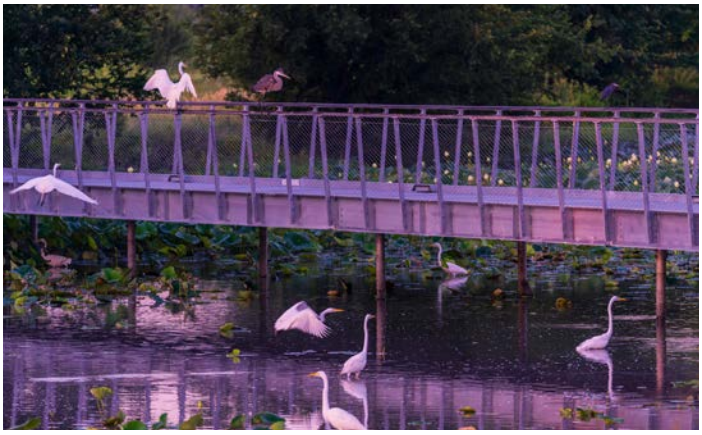
Prepare an Adaptive Management Plan that includes monitoring, maintenance, and management protocols. Management approaches should anticipate changes including emergence, complexity, function, or regeneration in unexpected forms. Plans should also anticipate enhanced gene flows, trophic chains, increased complexity, and thriving ecosystems and ecosystem services. Design may include passive restoration that allows for the dormant seeds or seed banks to re-establish on a site or native host species that may migrate into the site, while active restoration focuses on planting and seeding a site. Adaptive management can then be used to monitor and evaluate the efficacy of these approaches, recommending mid-course corrections to achieve restoration goals. **(LA, CL, CM, SM).** SITES Prerequisite 8.1 Plan for sustainable site maintenance; SITES Credit 8.3 Recycle organic matter; SITES Credit 8.4 Minimize pesticide and fertilizer use; SITES Credit8.7 Protect air quality during landscape maintenance; SITES Credit Credit 9.3 Plan to monitor and report site performance.

- Develop an adaptive management plan for the site detailing monitoring protocols, maintenance practices, and approaches to respond to the site evolution and desired biodiversity goals.
- Maintain a site to support ecological processes and functions, while minimizing any impacts to ecological integrity. Schedule landscape management actions to avoid impacting habitat seasonality, such as wildlife nesting, breeding, or other sensitive periods.
  - Remove and manage non-native invasive species as part of an ongoing management approach.
  - Minimize use of chemical pesticides and herbicides.
  - Minimize use of chemical fertilizers. Instead consider mycorrhizal fungi and other natural soil-building approaches when appropriate. Avoid glyphosates or other noxious chemicals such as neonicotinoids that are absorbed by plants, making them toxic to bees and other pollinators, as well as people.
  - Plan for prescribed burns where appropriate and beneficial.

ACTION 2.3.4

Share knowledge and data to broaden understanding of our individual and collective roles in addressing the biodiversity crisis. Sharing information on the ecological function and the biodiversity of a site with a broad audience creates a universal understanding of the ecological goals and underpinnings for the site design. This offers the potential for biodiversity to become embedded in a community's identity and may result in broader stewardship of the site **(LA, CL, TKB, CM, ECO, NN, RE, UNI, SM, CO, SUP).** SITES Credit 9.2 Develop and communicate a case study

- Support public engagement and storytelling. Develop signage, curricula, and other educational tools to connect people with nature
- Support engagement with local schools and their curriculum, building a sense of land stewardship as part of citizenship.
- Share performance data, case studies, and lessons learned through dashboards, papers, presentations, and awards submissions.
- Coordinate with allied professionals on events that celebrate design and planning projects where biodiversity goals are being tracked and met.



RDG envisioned the preserved wetlands at the Pracht Wetlands Park in Wichita, Kansas as a sensory and tactile experience. Bridges span over the wetlands allowing for unique views of the water and aquatic birds. Image credit: Kun Zhang

GOAL 2: BIODIVERSITY SUCCESS MEASURES

1. Increase interdisciplinary collaboration and engagement of the scientific community, traditional knowledge bearers, and community members in all projects.

2. Aim for net biodiversity positive design in support of the UN Decade of Ecosystem Restoration.

3. Contribute to advancing the global movement to protect at least 30 percent of terrestrial, coastal, and ocean ecosystems by 2030 (30x30).

4. Consistently integrate ecology principles to inform biodiversity goals.

5. Contribute to the continually growing database of landscape architecture and planning approaches that successfully protect, conserve, restore, and enhance biodiversity to achieve project goals.

6. Consistently apply the Society of Ecological Restoration's Ecological Principles as appropriate to achieve biodiversity goals.

7. Achieve all SITES and LEED credit points for biodiversity and ecosystem health.

GOAL 3
EQUITY

Amplify the power of plural and diverse communities and people to achieve equitable climate and biodiversity positive design. Support local priorities and community leaders working for climate resilience and biodiversity. Recognize power inherent in communities, acknowledge the work a community may already have underway, and work to address past inequities.

An "explicitly inclusive" community engagement process was used by landscape architects at Colwell Shelor to include the Onk Akimel O'odham (Pima) and Xalychidom Piipaash (Maricopa) tribal communities in the planning and design of a new business school and Indigenous Culture Center on Native American land. Image credit: ASLA 2023 Professional General Design Honor Award. Cloud Song: SCC Business School + Indigenous Culture Center. Scottsdale, Arizona. Colwell Shelor Landscape Architecture / Dror Baldinger, FAIA

INTRODUCTION

Underserved, marginalized, and Indigenous communities are hit the hardest by climate change and biodiversity loss. Due to structural racism in the built environment, these communities are more likely to experience flooding, drought, or extreme heat and do not typically have the resources to recover.

These groups are also more affected by the loss of natural systems that provide clean air, clean water, and other life-supporting benefits.

Climate and biodiversity positive design must also focus on equitable outcomes supporting community needs and providing access to all members.

Putting equity into practice requires methods that draw on reciprocal and egalitarian relationships. This approach rejects abstraction, control, and commodification in favor of immersion, shared knowledge, and common benefit.

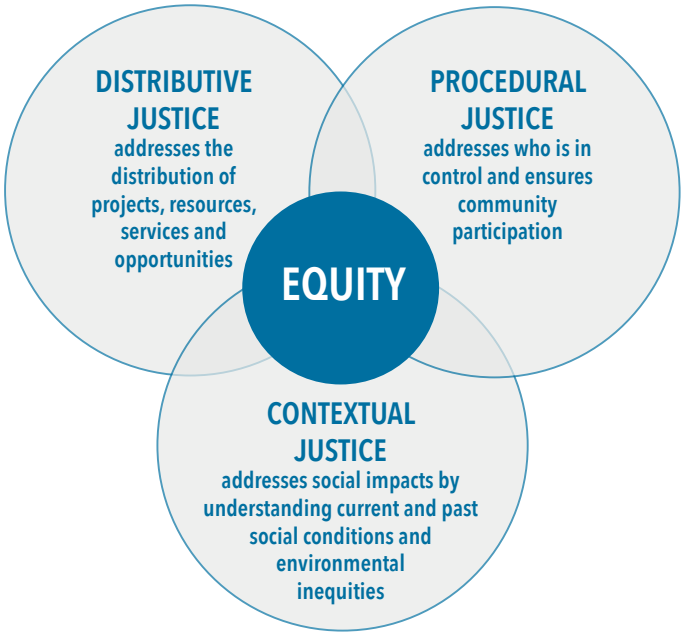
The concept of equity is quite different from equality, which is to treat everyone the same. Equity treats each individual and community differently and recognizes that different people need different types of support, even when addressing the same need. This is important when focusing on climate and biodiversity issues. Providing equal resources does not ensure that everyone achieves equal or desired outcomes. Equity seeks to effectively address a community's unique climate and biodiversity related issues.

When addressing equity in climate and biodiversity positive design apply three forms of justice (see Equity Goal Definitions at the end of this document):

- Distributive justice
- Procedural justice
- Contextual justice

These three approaches to justice address:

- Where and how projects are located.
- Who is included in the decision making for the project process, and who is in control of the projects.
- The outcomes of the projects in relation to the community being impacted.



This framework for equity identifies the three forms of justice that can contribute to equity. Image credit: Diane Jones Allen and Meg Calkins

Equity must be considered through all phases of climate and biodiversity positive design. It ensures that the development, delivery, and management of projects have the desired impact, amplifies the power of communities, and puts community health and social well being at the forefront. This approach makes sure that projects are guided by local knowledge, reflect community priorities, and build collective ownership and resilience.

Landscape architects are uniquely positioned to advance an equitable response to the climate and biodiversity crisis. Through increased communication and collaboration, we can showcase how landscape architects are mitigating carbon, increasing biodiversity, and adapting to climate change through equitable methods. By amplifying our collective voice, we can build momentum toward elevating the role of landscape architects into higher levels of decision making.

OBJECTIVE 3.1

Learn about, communicate, and advocate for health and well-being.

The health and well-being of people and communities should be an outcome of environmental equity. Distributive justice encompasses the allocation of materials and goods, includes environmental quality, and generally conceives social justice and distribution as equivalent concepts. Under the distributive justice framework, costs and benefits may be unequally distributed among individuals for the sake of net gain for the entire population.

ACTION 3.1.1

Engage in deep listening with community members, users, collaborators, and decision makers to understand the past and present factors related to the project that have or could contribute to inequities (CL, CM, CO, ECO, HI, NGO, PL, TKB, NN). SITES Credit 2.4: Engage users and stakeholders.

- Understand the site and community histories, traditions, and diversity of knowledge.
- Understand past environmental and human health injustices.
- Work with community leaders and members to identify current community needs and priorities, including those of underrepresented populations in the community.
- Engage community leaders and community members in inventory and analysis activities, project goal setting, and project design.
- Identify interventions the community has already made towards climate and biodiversity positive design.
- Share and disseminate disciplinary and professional knowledge, methods, and techniques with communities and community organizations.

OBJECTIVE 3.2

Work toward environmental equity by putting the voices, needs, and knowledge of communities at the center of all aspects of a project.

Create a continuous learning environment that supports mutual understanding between professionals and local

EQUITY DEFINITIONS

Equity ensures fair and just access to public spaces, green spaces, and environmental resources. Equity offers protection from environmental hazards for all people, regardless of their socio-economic, racial, cultural or gender identity. It involves addressing systemic inequalities in the distribution of environmental benefits and burdens.

Equality focuses on providing the same level of benefits and addressing the same level of burdens for everyone.

Distributive justice addresses the distribution of projects, resources, services, and opportunities in addressing climate and biodiversity issues, and recognizes the social, economic, and environmental diversity and complexity in impacted communities.

Procedural justice addresses who is in control and leading the process and ensures community participation is substantial and real.

Contextual justice addresses the social impact of climate and biodiversity projects through understanding the current and past social conditions and origins of any existing environmental inequities. Generational justice, which ensures that today's decisions protect the rights of future generations, is a part of contextual justice.

Note: Additional terms are found in the Definitions section at the end of this document.

residents — one that supports community-defined priorities such as climate resilience, access to nature, and biodiversity. Proactive and restorative processes must include citizen learning, knowledge, and decision-making activities. This will result in faster recovery from climaticevents and increased resilience, preparing residents for future impacts. This participatory approach enhances local capacity, trust, and collective action.

A community archeological dig in Edgard Louisiana, was undertaken as part of the Liberation Labyrinth, a wetland and Mississippi River adjacent project that was conceived by the Descendents Project. It was designed by DesignJones LLC and funded by the Monuments Lab. Image Credit: Diane Jones Allen

ACTION 3.2.1

Build the power of communities through inclusive engagement, community-led goal-setting, and participatory design. Work to strengthen the capacity and agency of communities by putting the knowledge and leadership of local residents at the center — particularly those who have been historically excluded from decision making processes. This work should be pursued throughout all phases of the project process in partnership with a wide range of collaborators, including grassroots organizations, cultural leaders, local institutions, educators, designers, planners, and other allied professionals. Respectfully recognize that some communities may decline to participate due to capacity, interest, lack of trust, or prior experience. **(CL, CM, CO, HI, NGO, PL, TKB, NN).** SITES Credit 2.4: Engage users and stakeholders.

- Establish a foundation of trust with community members and groups, particularly among those who have been marginalized. Trust can be cultivated through a consistent presence, active listening, mutual respect, transparency, and follow through. This could include participation in community events or cultural ceremonies, learning traditional place-names, and other activities.
- Build community through the use of community-based knowledge and outreach. In outreach efforts, meet people where they are—linguistically, culturally, and geographically—and encourage broad participation and shared learning.
- Engage in community-led processes for information gathering, priority setting, design and, where applicable, long term stewardship of the site (Action 3.4.1).
- Use multiple communication tools and community engagement techniques that provide equal participation and ownership of the processes and outcomes. Techniques include:
  - Public meetings that are transparent and welcoming spaces for open dialogue
  - Surveys to gather input from a large and diverse population
  - Focus groups that enable deeper discussion among specific groups
  - Workshops that facilitate hand-on learning, co-design, and consensus building
  - Community events and celebrations that foster relationships and shared purpose
  - Digital engagement tools to increase accessibility and ongoing participation
  - Translators that have relevant technical background or have been briefed on the technical meaning in order to help convey information.
- Encourage transparency through clear and honest communication about goals, limitations, timelines, and decision-making processes. Acknowledge uncertainty when it exists and provide regular updates that demonstrate how community input is shaping outcomes.
- Identify barriers and opportunities for community and justice-based climate and biodiversity work.

ACTION 3.2.2

Advocate for the equitable distribution of projects and assets with municipal decision makers, community groups, and other policymakers. Work with city planners, community organizers, and others to influence policymaking. Collaborate with allied professions and policymakers to influence parks departments, community development departments, and public works departments to consider equitable distribution in their expansion and management of green space, green networks and infrastructure projects **(CL, CM, CO, GOV, INV, NGO, PL, TKB, NN).** SITES Credit 2.4: Engage users and stakeholders.

The Joe Louis Greenway is a planned 27.5-mile trail and linear park in Detroit that is reclaiming vacant industrial spaces. Landscape architects at SmithGroup established a "community-authored planning process" to build trust. Image credit: ASLA 2023 Professional Analysis and Planning Honor Award. Joe Louis Greenway Framework Plan. Detroit, Michigan. SmithGroup / SmithGroup

- Advocate for the benefits of a project to be allocated for the social net gain of the entire community.
- Undertake needs assessments that account for impacts on the greater community.
- Thoroughly assess impacts to the most vulnerable community members. Conduct regular reviews throughout the project to align with community priorities identified by the impacted residents, community leaders, and organizations.

OBJECTIVE 3.3

Design for the health and well-being of communities and people.

The social impacts of climate change and biodiversity loss can only be addressed by understanding existing and past social conditions and environmental inequities. This will facilitate climate and biodiversity positive design that heals old wounds, avoids past mistakes, and helps to improve community health and well-being.

ACTION 3.3.1

Understand and address environmental injustices in collaboration with allied professions, community groups, and policymakers **(CL, CM, CO, GOV, HI, NGO, PL, PUB, TKB, NN).**

- Understand community histories and cultures through engagement (discussed in Action 3.1.1), and how they are showing up in the community today. Recognize how these histories continue to influence the community's identity, spatial patterns, land use, and social dynamics, and ensure these lived experiences are meaningfully reflected in planning and design processes.
- Identify and address current and past inequities that have led to social, environmental, and economic disparities within the community. Use inclusive research methods and community engagement to identify affected populations, and implement targeted strategies to redress harms and redistribute resources, access, and opportunities in equitable ways.
- Identify potential future inequities and take steps to avoid them. Engage in planning, inclusive forecasting, and community co-design to identify at-risk populations and design interventions that prevent displacement, exclusion, or unequal impacts. Where possible, build long term community engagement and participation into the project so potential future inequities are prevented (see Objective 3.4).

ACTION 3.3.2

Prioritize cultural inclusion and commemoration using participatory processes and by engaging community

knowledge. Use participatory processes to address the causes and correct any unfair distributional outcomes. Community participation is vital to fair restoration processes, shaping how and by whom these processes are undertaken. Inclusive participation should incorporate community knowledge in all aspects of the process, including the techniques used and the locations where design intervention occurs **(CL, CM, CO, GOV, NGO, PL, PUB, TKB, NN).** SITES Credit 2.4: Engage users and stakeholders.

- Learn from Indigenous and immigrant communities through deep listening and collaboration. Seek out Traditional Ecological Knowledge (TEK) also known as Indigenous Traditional Ecological Knowledge (ITEK) (refer to Action 3.1.1).
- Acknowledge the Indigenous territories on which you practice. Land acknowledgements must be crafted and agreed upon with the communities being acknowledged.
- Seek the input of Indigenous communities about additional strategies to support and commemorate their community.
- Plan and design project work with Indigenous, native, and immigrant peoples.

ACTION 3.3.3

Use construction materials and methods that support community and environmental health. Avoid specifying construction and plant materials that pose community and environmental health risks or inequities at any point along their supply chain. Understanding their chain of custody can ensure healthy and equitably sourced materials **(AR, CE, CN, LA, LCA, MFR, HO, SM, SUP).** SITES Prerequisite 5.1: Eliminate the use of wood from threatened tree species; SITES Credit 5.6 Use regional materials; SITES Credit 5.7: Support responsible extraction of raw materials; SITES Credit 5.8: Support transparency and safer chemistry; SITES Credit 5.9: Support sustainability in materials manufacturing; SITES Credit 5.10: Support sustainability in plant production.

- Specify construction materials that are equitably sourced and produced. Select materials with supply chains that uphold fair labor practices, environmental responsibility, and transparency, ensuring that extraction, production, and transport do not harm marginalized communities.
- Encourage construction processes and techniques that leverage local expertise. Incorporate construction methods that center local labor, craftsmanship, and knowledge systems, building local capacity, and fostering economic resilience through just and place-based practices.
- Specify healthy construction materials. Prioritize the selection of materials that support human health and ecological integrity by minimizing the use of toxic substances and off-gassing chemicals. Use materials that are low-emission, non-toxic, biodegradable or recyclable.

OBJECTIVE 3.4

Steward equitable sites and communities. Stewardship involves longterm, adaptive care that sustains the social, cultural, environmental, and economic benefits of climate resilience and biodiversity projects. True stewardship ensures that those most impacted by an intervention are empowered to guide, manage, and sustain its outcomes over time.

Effective stewardship of a site should be planned early in the project process with an understanding of the lived experiences, histories, and priorities of the community. When stewardship is cultivated through inclusive planning and shared understanding, it fosters a deeper sense of ownership and responsibility that can endure beyond the project's completion.

ACTION 3.4.1

Collaborate to establish methods of community stewardship of projects early in the project process. Initiate partnerships with community members at the earliest stages of a project to co-develop frameworks for stewardship of the project beyond design and construction. Embed stewardship goals into the project from the outset, ensuring that local residents support and embrace the project and, where applicable, evolve into long-term caretakers of its spaces and systems. Recognize and lift up the community's knowledge, values, and motivations as central to this evolution.

Support the community's embrace of the project and their evolution towards long-term stewardship. Foster the community's efforts to create, protect and grow spaces central to ongoing climate resilience and biodiversity. **(LA, CG, CL, CM, DE)** SITES Credit 2.4: Engage users and stakeholders.

Mithun designed the Louisiana Children's Museum to provide a nature-based educational space for students, parents, and teachers in an underserved community in New Orleans. It accommodates periodic flooding and reduces hot, humid temperatures. Image credit: ASLA 2022 Professional Communications Honor Award. Louisiana Children's Museum: A Joyous Landscape in City Park. New Orleans, Louisiana. Mithun / Kevin Scott

- Collaborate with community members for post-occupancy outreach and evaluation. Maintain engagement beyond project completion by working with residents to assess outcomes, measure impact, and identify areas for continued care and improvement.
- Document and share project outcomes. Capture and communicate qualitative and quantitative performance data to assess whether the community's priorities and goals were achieved. This type of long-term monitoring and documentation is increasingly valued by practitioners and funders—especially when it clearly demonstrates the alignment between initial community aspirations and final project results. Advocate early in the process to include this effort in a project's scope of work.
- Learn insights into land management and resilience from Indigenous stewardship practices that honor Indigenous data sovereignty and ITEK. Recognize that Indigenous-managed territories account for a majority of the world's remaining biodiversity and intersect with many terrestrial protected and ecologically intact landscapes.
- Advocate for budgeting for stewardship of sites and communities during the goal-setting phase of a project. Both financial and organizational support for post occupancy management can support long-term care, environmental performance, and an equitable project legacy.
- Develop maintenance or stewardship plans with community stewardship in mind. Develop adaptive management plans that can be carried out by the community, during or after contractor maintenance.
- Ensure the users and community members have access to project maintenance plans. They should be publicly available and user-friendly. These resources should be co-developed with community input and adapted to local capacities, ensuring that long-term care is feasible and accessible.

GOAL 3 EQUITY: SUCCESS MEASURES

1. Prioritize equity and justice in climate and biodiversity positive design.
2. Strengthen relationships and trust with local, underserved, underrepresented, and Indigenous community members when it relates to equity and climate justice.
3. Collaborate with local communities and advocate on behalf of communities working in self-determination. Strengthen relationships with social, environmental, and climate justice organizations and allied professionals working in these areas.
4. Engage in key decision making, leadership, and strategic groups related to climate justice in the U.S. and worldwide.
5. Advocate for and amplify Indigenous Traditional Ecological Knowledge (ITEK).
6. Lead in the advancement of the rights of nature and protection of all forms of life from the impacts from the climate and biodiversity crises.

GOAL 4
ADVOCACY

Advance climate and biodiversity action through leadership and engagement. Advocate for equitable climate and biodiversity design with clients, allied professionals, policymakers, manufacturers, and communities.

The team that developed the Mosswood Park Master Plan undertook a series of community engagement workshops and meetings to engage the public, prioritizing listening, collective imagining, and community consensus. Image credit: ASLA 2021 Professional Analysis and Planning Honor Award. Mosswood Park Master Plan and Community Engagement. Oakland, California. Einwiller Kuehl Inc., LMS Architecture, Art is Luv / Project Team

Landscape architects are well equipped to lead responses to the climate and biodiversity crises. We must raise the visibility of our work, communicate its environmental and economic impact, and collaborate across disciplines to lead a profession-wide advocacy movement.

We must showcase how landscape architects protect health, safety, and welfare through climate resilience and increased biodiversity. We must demonstrate the economic benefits from better health outcomes, reduced damage from extreme storm events, and reduced gray stormwater infrastructure. This will enable us to shift public opinion and funding priorities and make landscape architecture essential to every climate and biodiversity solution. To elevate the role of landscape architecture, we must amplify our collective voice and push for greater influence in decisionmaking processes at all levels.

Advocacy can happen at many levels:

- As practitioners, we can embed climate and biodiversity positive design into every project.
- Firms can promote their climate and biodiversity expertise to clients and collaborators.
- Educators can shape the next generation of practitioners, equipping them with leadership skills and techniques to achieve climate and biodiversity positive design.
- With ASLA, ASLA Chapters, and other organizations, we can engage in campaigns that influence local, state, and federal policy.

While policy change is critical, building broad support among clients, communities, suppliers, and allied professionals is equally essential. Through strategic engagement across these groups, we can build momentum for climate and biodiversity action—and position landscape architects at the forefront of that change.

OBJECTIVE 4.1

Lead, engage in, and advocate for equitable climate and biodiversity positive design.

Landscape architects can play an important role in advancing climate and biodiversity positive design within their organizations, communities, and cities. To lead effectively, we must build internal and external support for design approaches that address the climate and biodiversity crises. This begins with educating yourself and your teams on regional climate and ecological challenges—and integrating climate and biodiversity positive strategies into everyday practice.

At the community and city scales, cultivate relationships with key decision-makers to strategically advocate for policies, programs, and projects that promote climate and biodiversity positive outcomes while also advancing equity and inclusive economic development.

ACTION 4.1.1

Champion climate and biodiversity positive design within your organization. Embed climate and biodiversity goals into the core of your organization's culture and operations. Establish a diverse, interdisciplinary committee to define both internal and external climate and biodiversity objectives, and map out clear, actionable steps for achieving them. (LA)

- Create a climate and biodiversity action plan tailored to your organization's values, projects, and regional context. This plan should guide decision-making, project delivery, and accountability — positioning your firm as a leader in climate and biodiversity positive design (see Action 1.4.4). Firms can work with experts from ASLA chapters on plan development. See examples of organizational climate and biodiversity action plans.
- Identify knowledge gaps and develop in-house training and continuing education on climate and biodiversity positive design.
- Develop or identify design standards and refine design processes to include climate and biodiversity goals on every project.
- Rewrite standard specifications to include language supporting climate and biodiversity positive design.
- Use ASLA's guide Towards Zero Emission Business Operations for strategies to reduce operational emissions within your organization.
- Attend public meetings and advocate for climate and biodiversity goals.
- Advocate for municipal climate and biodiversity action plans along with programs and funding for implementation.

ACTION 4.1.2

Communicate your organization's climate and biodiversity impact. Increase the visibility of your work by sharing your firm's contributions to climate resilience and biodiversity. Many projects likely support these outcomes already, and their narratives can be reframed to highlight their climate and ecological value. Share lessons learned, performance data, and success stories through a range of platforms. Transparent, accessible storytelling strengthens the profession's voice and inspires broader support for climate and biodiversity positive design. (LA)

- Curate project tours with elected officials, clients, stakeholders, school groups and community members.
- Create one-page information sheets for policymakers highlighting metrics, strategies, and economic benefits of your projects.
- Create marketing materials highlighting your firm's climate and biodiversity work.
- Develop a media strategy to promote your firm's work with local newspapers, design and sustainability magazines, e-zines, blogs, podcasts, and visual media.
- Contribute case study data to the Landscape Architecture Foundation's Landscape Performance Series and other databases.
- Mentor smaller firms or emerging professionals in leadership skills and climate and biodiversity positive design strategies.

ACTION 4.1.3

Engage with and educate clients, collaborators, developers, contractors, and site managers. To shift toward climate and biodiversity positive design, we need to demonstrate the benefits to clients, users, collaborators, and communities. Engage clients and collaborators in dialogue about the enhanced economic and social benefits of climate mitigation, resilience, and biodiversity. Use public engagement processes as opportunities to explain how the work we do willbuild stronger, more resilient communities (CL, SUP, MFR, HO, AR, CE, PL, LA, PUB, CO, CN, GE, SE).

- Propose and implement climate and biodiversity positive design strategies on projects.
- Demonstrate how climate resilience and nature-based solutions will meet client and stakeholder needs and goals.
- Make the economic, social, environmental, and performance case for climate and biodiversity measures.

ACTION 4.1.4

Educate and engage the public about the benefits of climate and biodiversity positive design. Use project engagement, community involvement, and other methods to be an advocate for climate and biodiversity solutions. Help people see how these design strategies directly support the issues they care about: healthier neighborhoods, stronger economies and livelihoods, cleaner air and water, healthy ecosystems, and long-term community resilience. (CL, PUB, CM, CG). SITES Credit 2.4: Engage users and stakeholders.

- Develop clear, engaging tools for speaking with the public about climate and biodiversity positive design.
- Write letters to the editor, blog posts, or short articles to share success stories and local relevance.
- Build relationships with local journalists covering climate or environmental topics—position yourself as a trusted subject matter expert.
- Use broad-reaching media platforms—such as podcasts, e-zines, social media, and vlogs—to reach diverse audiences.
- Incorporate interpretive signage into built projects to communicate ecological functions and benefits.

For a month-long design festival in Detroit, Spackman Mossop Michaels created Talk Tree to Me to engage the public in a new way. The project uses an interactive chatbot technology to encourage community engagement with trees, educating the public about the roles of nature in the city. Image credit: ASLA 2022 Professional Communications Honor Award. Talk Tree to Me: Facilitating a Complex Conversation Around Trees in Detroit. Detroit, Michigan / Spackman Mossop Michaels

- Partner with local community groups to involve residents in site stewardship and long-term care, fostering connection and shared responsibility.

ACTION 4.1.5

Engage manufacturers and suppliers by sharing your climate and biodiversity goals, communicating product performance expectations, and sharing your preferences for climate and biodiversity positive attributes in specifications. Treat vendors and manufacturers as key partners; their full engagement depends on a clear understanding of your objectives and decisionmaking criteria. (AR, CE, CN, MFR, HO, SUP)

- Clearly communicate project goals such as climate and biodiversity positive design, third-party certification (LEED, SITES, Living Building Challenge, etc.) with product manufacturers, vendors, nurseries, and other suppliers.
- Build shared goals with manufacturing partners to advocate for information transparency, data and optimized practices that will support climate and biodiversity goals.
- Advocate for manufacturers to achieve the standards and criteria of ecolabels where applicable (FSC, Cradle to Cradle, Declare, The Natural Stone Sustainability Standard (ANSI/NSI 373), etc.)
- Request EPDs, LCA information, and other third party verified data from manufacturers and suppliers.
- Ask detailed questions about practices along the supply chain from raw material extraction to fabrication to make informed decisions.
- Collaborate on pilot projects that test climate positive materials or systems.
- Advocate for the elimination of invasive plants from the nursery industry.
- Advocate for genetic biodiversity within the nursery industry.
- Maximize the genetic diversity within species being planted by avoiding clonal material.
- Make purchasing decisions clear to manufacturers who do not provide third party verified information about their products to help them understand the business case for engaging in life cycle assessment, other data collection, and optimized manufacturing practices.

OBJECTIVE 4.2

Build strong alliances. Strategic partnerships are essential to driving collective action in our communities. Seek opportunities to connect with local community groups, allied professionals, academics, businesses, researchers, subject-matter experts, Indigenous groups, and activist organizations. A robust, interdisciplinary network focused on climate and biodiversity will amplify our collective voice, expand access to knowledge and resources, and lead to more effective, collaborative solutions.

To establish landscape architecture as a credible and essential part of climate and biodiversity solutions, we must look beyond our profession. By engaging with experts outside the field, we build both credibility and capacity to lead transformational change.

As a STEM-designated profession, landscape architects can integrate science and data into design. Collaborating with academics, researchers, and the scientific community can elevate the role of evidence-based practice, attract new resources, and generate visibility for the field. In return, landscape architects can offer valuable real-world contexts for research and data collection, strengthening academic-practitioner partnerships.

ACTION 4.2.1

Engage a broad network of allied professionals and organizations to maximize collective impact in climate resilience and biodiversity. (PRO, CO, TKB, NN, NGO, CM, ECO, UNI, AR, CE, TE, SE, GE, COE)

- Join allied organizations to advocate for landscape architects as leaders in climate and biodiversity positive design.
- Build local partnerships with community groups focused on climate, biodiversity, the environment, and/or youth development to share resources and information.
- Participate and present at allied organizations' conferences to elevate the role of landscape architects in climate and biodiversity solutions.
- Collaborate with professionals in allied fields to foster cross-disciplinary innovation and broaden your impact.

Landscape architects with the ASLA Vermont Chapter led a site tour in Northfield, Vermont with federal, state, and local elected officials. Image Credit: Emily Lewis, ASLA Vermont Chapter

ACTION 4.2.2

Strengthen ties with scientists and academics through collaboration on projects and research. Engage with students and educators to build awareness of climate and biodiversity actions and increase discourse between academia and practice. (RE, ECO, UNI, RE)

- Seek out ways to bridge the gap between scientists, academics, and practitioners, and leverage each other's strengths
- Sponsor and support Student Climate and Biodiversity Action Committees
- Engage in performance monitoring and publish data.

ACTION 4.2.3

Engage with global alliances and initiatives to support their goals for climate mitigation, resilience, biodiversity and equity. These global initiatives, referred to throughout this document and listed below, offer standards, policies and benchmarks for equitable climate and biodiversity positive design. They can offer additional support as we advocate with clients, communities, and collaborators for the actions contained in this plan. (LA, HQ, CHP, NGO, GOV)

- Support the United Nations (UN) Sustainable Development Goals (SDGs). Adopted in 2015, the 17 SDGs provide a framework for a more peaceful and just world. They address five pillars: people, prosperity, planet, peace, partnership. Embed the SDGs into actions and plans.
- Support the International Federation of Landscape Architects (IFLA) Climate Action Commitment.
- Support the Kunming-Montreal Global Biodiversity Framework's goals:
  - Halt global biodiversity loss by 2030.
  - Keep 30 percent of land, freshwater, and marine areas in a natural or semi natural state.
  - Restore 30 percent of degraded land, freshwater, and marine areas by 2030
- Support the range of global Biodiversity Net Gain (BNG) Initiatives
- Collaborate with architects to support Architecture 2030 and AIA Commitment.

OBJECTIVE 4.3

Collaborate on climate and biodiversity policy with policymakers and elected officials.

One of the most powerful ways landscape architects can affect change is by shaping policy at the local, regional, and state levels. By building relationships with elected officials and other policymakers, we can serve as trusted advisors and collaborators in developing or enhancing policies that

support climate and biodiversity positive design.

Sharing knowledge and resources with public agencies can help them to advance their internal initiatives and strengthen climate and biodiversity design and planning. Seek opportunities to participate in policy advisory groups, task forces, commissions, or stakeholder consultations where your expertise can help shape decisions.

ACTION 4.3.1

Work with elected officials to guide policies for climate and biodiversity positive design and planning. By contributing to the development or revision of policies, we can help make equitable nature-based solutions, climate resilience, and biodiversity a standard part of planning and design practices (GOV, UP).

- Engage with ASLA's federal and state advocacy efforts such as iAdvocate, state advocacy days, and student policy internships. Track state legislation.
- Align your policy advocacy with the UN Sustainable Development Goals (UN SDGs)
- Build relationships with local and state elected officials through consistent communication, resource sharing, and collaborative engagement.
- Organize project site tours for policymakers to demonstrate the real world impacts of landscape-led climate and biodiversity strategies.
- Invite elected officials to ASLA events and conferences to showcase the work of landscape architects in their districts.
- Serve on task forces, advisory boards, or working groups to provide direct input into policy development and implementation.

ACTION 4.3.2

Collaborate with public agencies and clients to establish or strengthen climate and biodiversity positive design and development standards. Use your planning and design work as a platform for advancing sustainable policies and advocating for systemic change. (GOV, CL, SM, UP)

- Develop metric-driven goals, design guidelines, and specifications that support climate and biodiversity outcomes.
- In planning projects, work with clients to incorporate climate and biodiversity positive goals and standards into the planning criteria.
- Advocate for agencies to adopt minimum standards of care for climate mitigation, resilience, and biodiversity.
- Work with agencies to develop stewardship frameworks to guide long-term management and monitoring of designed landscapes.

GOAL 4 ADVOCACY: SUCCESS MEASURES

1. Lead projects with equitable climate and biodiversity positive solutions.
2. Set and meet climate and biodiversity goals on every project.
3. Engage and educate clients, communities, policymakers and the public about the climate, biodiversity, equity, and economic impacts of projects.
4. Collaborate with allied professionals to advance common goals.
5. Work with policymakers to help shape equitable local, regional, and state climate and biodiversity policies.

RESOURCES FOR MORE INFORMATION

EMBODIED CARBON

- Decarbonizing Specifications: Guidelines for Landscape Architects, Specifiers, and Contractors
- Decarbonizing the Design Process: A Phase by Phase Approach for Landscape Architects
- Navigating Environmental Product Data: A Guide for Landscape Architects, Specifiers, and Industry Partners
- Towards Zero Emission Business Operations: A Landscape Architect's Guide to Reducing the Climate Impacts of Offices
- Guideline for Project Performance Data Takeoff: Sustainability and Carbon Evaluations in BIM projects and related platforms
- Collaborating with Industry Partners on Climate Action and Biodiversity: A Guide to Conversations Among Landscape Architects, Vendors, and Product Manufacturers
- Climate Positive Design Toolkit (CPD)
- Designing with a Carbon Conscience V2
- Carbon Leadership Forum (CLF) - The Embodied Carbon Challenge and CLF North American Material Baselines Report
- Embodied Carbon in Construction Calculator (EC3)
- EPD International
- Sustainable Minds Transparency Catalog
- Spot UL Environment
- *Details and Materials for Resilient Sites: A Climate Positive Approach* by Meg Calkins
- Whole Life Carbon, LETI

CARBON SEQUESTRATION AND STORAGE

- Landscape Design for Carbon Sequestration by Deanna Lynn
- Planting Soils for Landscape Architectural Projects by Barrett L. Kays
- Climate Positive Design Toolkit (CPD)
- *Planting in a Post-Wild World: Designing Plant Communities for Resilient Landscapes* by Thomas Rainier and Claudia West
- *Principles of Ecological Landscape Design* by Travis Beck
- *The Living Landscape: Designing for Beauty and Biodiversity in the Home Garden* by Rick Barke and Douglas W. Tallamy
- *The Dynamic Landscape: Design, Ecology and Management of Naturalistic Urban Planting* by Nigel Dunnett and James Hitchmough

MULTI ATTRIBUTE CERTIFICATIONS AND ECOLABELS

- Cradle to Cradle
- Nordic Swan Ecolabel
- UL ECOLOGO
- Living Product Challenge
- DECLARE
- Oeko-Tex Standard 100
- TRUE Certified Zero-Waste Facility
- SCS Recycled Content Standard
- USDA Certified BioPreferred
- Forest Stewardship Council (FSC) Certified
- Programme for the Endorsement of Forest Certification (PEFC)
- Rainforest Alliance Certified
- WaterSense
- Energy Star
- Climate Positive Design Challenge

NATURE-BASED SOLUTIONS

- Economic Benefits of Nature Based Solutions by ASLA
- Nature Based Solutions Evidence Platform
- Naturebase
- The Natured Based Solutions Knowledge Database
- The Nature Based Solutions database
- Network for Engineering with Nature
- Naturance

FIRE SAFE DESIGN

- Playbook for the Pyrocene: Design Strategies for Fire-Prone Communities by SWA
- Wildland Urban Interface Wildfire Resilience Homeowner Handbook
- California Wildfire Rebuilding Guide
- US Green Building Council California Wildfire Defense- Home Hardening and Defensible Space Toolkit
- Sustainable Defensible Space
- CalFire
- Wildfire Home Hardening Guide, Prepare for Wildfire, CalFire
- Theodore Payne Foundation Wildfire Resource
- Insurance Institute for Business & Home Safety (IBHS) Wildfire Prepared
- ASLA Guide to Resilient Design: Fire

HEAT ISLANDS

- Landscape Architecture Solutions to Extreme Heat by Daniella Hirchfeld and Amy Guenther
- Cool Science, Heat Island Group, Berkeley Lab
- ENVI-met (3D modeling software)
- Thermal Toolkit: Technologies and Techniques for Visualizing Heat by Keenan Gibbons and Salvador Lindquist, ASLA
- Cool Kit. Landscape-Based Solutions to Combat Extreme Heat + Advance Cool Equity by Atlas Lab

STORMWATER CONTROL MEASURES AND REDUCED FLOOD RISK

- Cities and Flooding: A Guide to Integrated Urban Flook Risk Management for the 21st Century
- Urban Street Stormwater Guide
- Environmental Protection Agency (EPA) National Stormwater Calculator
- Federal Emergency Management Agency (FEMA) Flood Map Service Center

WATER CONSERVATION

- What to Plant, EPA Watersense
- California Dept of Water Resources Model Water Efficient Landscape Ordinance (MWELO)
- Water Use Classification of Landscape Species (WUCOLS)
- SelecTree

SEA LEVEL RISE

- FEMA Flood Map Service Center
- Coastal Risk Screening Tool
- Coastal Flood Exposure Mapper, National Oceanic Atmospheric Administration
- Cities and Flooding: A Guide to Integrated Urban Flood Risk Management for the 21st Century
- *Coastal Infrastructure: A Typology for the Next Century of Adaptation to Sea-level Rise* by Kristina Hill
- San Francisco Bay Conservation and Development Commission Resources and Mapping
- Adapting Cities to Sea Level Rise: Green and Gray Strategies by Stefan Al
- Landscape Architecture for Sea Level Rise, Innovative Global Solutions by Galen Newman and Zixu Qiao

- Salty Urbanism: A Design Manual for Sea Level Rise Adaptation in Urban Areas by Jeffrey Huber with Brooks + Scarpa

BIODIVERSITY

- Society of Ecological Restoration (SER) Principles of Ecosystem Restoration.
- UN Convention on Biological Diversity
- UN Convention on Biological Diversity (CBD) Kunming-Montreal Global Biodiversity Framework
- Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)
- Global Assessment Report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)
- Assessment of Invasive Alien Species and Control (IPBES)
- UN Environment Program Human Rights and Biodiversity
- Five Key Drivers of the Biodiversity Crisis
- Ecology of Place Petal: Living Building Challenge
- International Federation of Landscape Architects (IFLA) Landscape Architect's Guide to the UN Sustainable Development Goals
- Australian Institute of Landscape Architects (AILA) Biodiversity Positive Design Statement
- The Global Biodiversity Standard: Manual for Assessment and Best Practices
- New Zealand Biodiversity Action Plan – 2016- 2020
- Living Planet Report 2022 – Building a Nature Positive Society
- Guidelines for Biodiversity Monitoring
- Monitoring Biodiversity: Quantification and Interpretation
- US Department of Interior Guidance for Adaptive Management
- The Role of Landscape Architects in Promoting Biodiversity
- Plant Diversity in a Changing World: Status, Trends, and Conservation Needs
- Impacts of Climate Change on the Future of Biodiversity
- Reimagining Infrastructure for a Biodiverse Future
- The Benefits of Environmental Stewardship
- The Landscape Institute's Commitment to Addressing the Climate and Biodiversity Emergencies
- Dark Skies Lighting Recommendations
- Noise Impacts to Resident or Migratory Species
- Best Practices for Water Quality

EQUITY

- "Louisiana's Response to Extreme Weather," Adapting to a Smaller Climate: Restoration, Protection, and Social Justice in Coastal Louisiana by Scott A. Hammering, Shirley Laska (editor)

- Black Flags and Windmills: Hope, Anarchy, and the Common Ground by Scott Crow
- Race, Place, and Environmental Justice After Hurricane Katrina: Struggles to Reclaim, Rebuild and Revitalize New Orleans and the Gulf Coast by Robert D. Bullard and Beverly Wright.
- Environmental Health and Racial Equity in the United States: Building Environmentally Just, Sustainable, and Livable Communities by Robert D. Bullard, Glenn S. Johnson, Angel O. Torres. American Public Health Association.
- The Just City by Susan S. Fainstein.

ADVOCACY

- UN Sustainable Development Goals (UN SDGs)
- ASLA Guide to Hosting Project Site Tours
- ASLA iAdvocate Network
- ASLA Coalition Building Toolkit
- Find My Legislators
- United Nations Framework Convention on Climate Change
- Reframing Landscape Architecture, FrameWorks Institute

GENERAL LANDSCAPE ARCHITECTURE RESOURCES FOR CLIMATE AND BIODIVERSITY

- ASLA Climate and Biodiversity Action
- Landscape Performance Series Case Study Briefs
- IFLA Climate Action Commitment
- Australian Institute of Landscape Architects Climate Positive Design

CLIMATE GOAL DEFINITIONS

AEC: Architecture, Engineering, and Construction

Albedo: Albedo is a measure of the percentage of sunlight that a surface reflects away. Different elements of the Earth's surface have different albedos. (NASA)

Benchmark: A set of environmental impact results that serve as a reference point from which the relative performance of other landscapes can be evaluated. It is sometimes called a baseline when it is the starting point for a business as usual design.

Biogenic carbon: Biogenic carbon refers to carbon that is derived from or contained in biomass (e.g. plants and trees) (EN 16485:2014). This is in contrast to fossil carbon, which comes from organic matter that has been deposited in the ground and is often emitted from the burning of fossil fuels.

Business as usual: A term used in this plan to describe ordinary practices prior to use of climate or biodiversity positive design strategies. A business-as-usual scenario can be used as a baseline or benchmark when measuring embodied carbon, carbon sequestration, or biodiversity.

Carbon drawdown: Removing carbon dioxide from the atmosphere, ultimately to the point that global warming starts reversing.

Carbon neutral: Describes an activity that removes as much carbon dioxide (CO2) from the atmosphere as it emits.

Carbon positive: Describes an activity that sequesters more carbon than it emits.

Carbon sequestration: The process of capturing and storing atmospheric carbon dioxide (CO_2) to mitigate climate change by reducing the amount of greenhouse gases in the atmosphere. This can happen naturally through biological processes, like trees absorbing CO_2, or through human-engineered geological methods, such as injecting captured CO_2 into concrete.

Climate positive design: Design that reduces emissions and increases sequestration over a project's life span while also providing environmental, cultural, and economic co-benefits such as biodiversity, equity, and resilience.

Design for disassembly: The design of landscapes to facilitate future change and the eventual dismantlement (in part or whole) for recovery of systems, components, and materials.

Deconstruction: The systematic dismantling of a landscape, typically in the opposite order it was constructed, to maximize the salvage of materials for reuse, in preference over salvaging materials for recycling, energy recovery, or sending the materials to the landfill.

Embodied carbon emissions: The greenhouse gas (GHG) emissions generated by the manufacturing, transportation, installation, maintenance, and disposal of construction materials used in landscapes, transportation infrastructure, and buildings. The terms "embodied carbon," "embodied carbon emissions," and "embodied emissions" can be used interchangeably.

Environmental product declarations (EPDs): Standardized, third-party-verified documents that report the environmental impacts of a product based on a product life cycle assessment (LCA). EPDs are the best available mechanism for requiring product embodied carbon reporting and transparency.

Emissions scenarios: In the context of the UN Intergovernmental Panel on Climate Change (IPCC) assessments, scenarios are directed at exploring possible future emissions pathways, their main underlying driving forces, and how these might be affected by policy interventions.

Emission Scopes 1, 2, and 3: These terms come from the Greenhouse Gas Protocol, which is the world's most widely-used greenhouse gas accounting standard.

- **Scope 1** emissions come from sources that an organization owns or controls directly – for example, from burning fuel in company vehicles.
- **Scope 2** emissions are those that a company causes indirectly when the energy it purchases and uses is produced. For example, energy purchased to heat and cool offices.
- **Scope 3** emissions are not produced by the company itself, but by those that are indirectly responsible for. Project emissions fall into the Scope 3 category.

Global Warming Levels (GWLs): The global mean surface temperature change, or "global warming level" (GWL), is a "dimension of integration" that is highly relevant across scientific disciplines and socio-economic actors.

Global Warming Potential (GWP): The potential climate change impact of a product or process as measured by an LCA. GWP is reported in units of carbon dioxide equivalent (CO2e) and is the agreed-upon metric for tracking embodied carbon.

Greenhouse gas emissions (GHG): Any gas in the atmosphere emitted by human activity that absorbs and re-emits heat. There are seven GHGs covered by Kyoto Protocol: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulphur hexafluoride (SF6), and Nitrogen trifluoride (NF3).

Life Cycle Assessment (LCA): A systematic set of procedures for compiling and evaluating the inputs and outputs of materials and energy, and the associated environmental impacts directly attributable to a product or process throughout its life cycle.

Material reuse: Installation of a previously used material or product that requires limited to no processing for reinstallation and use on a different project.

Nature-based solutions: Nature-based solutions (NbS) are actions to protect, sustainably manage, and restore natural and modified ecosystems that address societal challenges effectively and adaptively, simultaneously benefiting people and nature.

Net zero emissions: An activity that removes as much greenhouse gases – inclusive to all, such as carbon dioxide, methane, or sulfur dioxide – from the atmosphere as it emits.

Operational Carbon Emissions: In contrast to embodied carbon, operational carbon refers to the greenhouse gas emissions.

Product category rule (PCR): A set of specific rules, requirements, and guidelines for conducting an LCA and developing EPDs for one or more product categories.

Service life: The duration for which a site effectively serves its intended purpose, meeting the functional needs of users without requiring substantial reconstruction. When performing whole site life cycle assessments, a service life of 60 years is typically assumed although individual structures such as decks and pavements are often planned for 30 years.

Transit-oriented development (TOD): An approach to support creating communities with dense, mixed-use housing and commercial districts adjacent to transit corridors.

Whole Life Carbon: Whole Life Carbon emissions are the sum total of all asset related GHG emissions and removals, both operational and embodied over the life cycle of an asset including its disposal (Modules: A1-A5 Upfront; B1-B7 In Use; C1-C4 End of Life). Overall Whole Life Carbon asset performance includes separately reporting the potential benefit from future energy recovery, reuse, and recycling (Module D).

Wildland-urban interface (WUI): The WUI is the zone of transition between unoccupied land and human development. It is the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.

Zero emissions: An activity that releases no greenhouse gases to the atmosphere. As opposed to net-zero emissions, which allows for offsetting of emitted carbon to reach a balance of zero, the zero emissions approach focuses on the absolute emissions.

BIODIVERSITY GOAL DEFINITIONS

Adaptive management: A structured, cyclical approach to managing biodiversity interventions, that explicitly acknowledges uncertainty, and incorporates learning from ongoing monitoring and evaluation to inform maintenance and management activities.

Behavioral diversity: Changes or shifts in behaviors due to environmental conditions, amongst species or between species. .

Biomes: Biomes can be differentiated by the organisms residing within and by the climate. Organisms within a biome share adaptations specific to that particular environment.

Bioregions/ecoregions: An ecoregion is a geographically distinct assemblage of ecological communities, which share a majority of their species and ecological dynamics, and have similar environmental conditions critical for their long-term success.

Conservation: Preservation and protection of nature to prevent decay or damage to resources, wildlife or ecosystems.

Ecological characteristics: Composition, structure, function, connectivity, and species composition and diversity that occur within a natural range of variation.

Ecological (ecosystem) integrity: With reference to ecological restoration or enhancement, the similarity of a site to its reference conditions inclusive of composition, structure, and function.

Ecological niches: Ecological niches describe the role an organism plays in a community. A species' niche includes the physical and environmental conditions required for species survival (ie. Temperature, habitat, or terrain) and the interactions it has with other species.

Ecosystems: Ecosystems are the interactions between biota, such as plants and animals, as well as energy and nutrient flows within an environment. Multiple ecosystems may inhabit a single biome.

Emergence: Novel characteristics or patterns in the landscape that can occur due to interactions and self-organizing processes within an ecosystem or community of plants or animals.

Gene flows: A change in the genes of a particular group of plants due to the movement of pollen, seed, or live plants carrying modified DNA sequences (transgenes) between populations with different genetic profiles.

Genetic diversity: Measured by the gene flow across a population that provides genetic diversity within species.

Habitat: A space that provides for all the needs for species survival. For wildlife this includes food conditions that support reproductive success, and shelter. For plants those conditions include appropriate access to light, air, water, nutrients, and soil media.

Populations: Populations are subsets of individuals of one species that occupy a particular geographic locale, having evolved for the specific conditions of that site.

Protection: Prevents damage to an existing natural area, feature, or ecosystem.

Reference ecosystem: Typically a functional intact ecosystem used to establish restoration targets on a site. This involves describing the specific compositional, structural, and functional ecosystem attributes requiring restoration to meet a desired restoration outcome.

Regeneration: Natural renewal or recovery of ecological function following an impact or disturbance event (storm, fire, development, etc.); sometimes spontaneous, sometimes with assistance of land stewards or ecological restoration approaches.

Relative abundance: The number of a specific species in an area relative to other species.

Restoration: The act of aiding a degraded ecosystem to achieve a more natural and functional state, similar to an undisturbed condition.

Species diversity: Both species richness and species evenness.

Species evenness: The relative abundance of each specific species in the ecosystem.

Species richness: The number of distinct species (variety) that characterize an ecosystem.

Taxonomic or phylogenetic diversity: The genetic relationship between different groups of species.

Trophic chains: Relationship between functional classifications of taxa within a community that is based on feeding relationships (e.g., aquatic and terrestrial green plants make up the first trophic level and herbivores make up the second); relationships between producers, consumers, and decomposers.

EQUITY GOAL DEFINITIONS

Equity: Ensures fair and just access to public spaces, green spaces, and environmental resources. Equity offers protection from environmental hazards for all people, regardless of their socio-economic, racial, cultural or gender identity. It involves addressing systemic inequalities in the distribution of environmental benefits and burdens.

Equality: Focuses on providing the same level of benefits and addressing the same level of burdens for everyone.

Distributive justice: Addresses the distribution of projects, resources, services, and opportunities in addressing climate and biodiversity issues, and recognizes the social, economic, and environmental diversity and complexity in impacted communities.

Procedural justice: Addresses who is in control and leading the process and ensures community participation is substantial and real.

Contextual justice: Addresses the social impact of climate and biodiversity projects through understanding the current and past social conditions and origins of any existing environmental inequities. Generational justice, ensuring that today's decisions protect the rights of future generations, is a part of contextual justice.