LIVING BETTER

A Regenerative Design Approach to Coastal Redevelopment

Urban Land Institute
Boston/New England

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THANK YOU

We want to thank the ULI Boston/New England's Climate Resiliency Committee and its members for their time, expertise, creative insights, and cross-disciplinary collaboration in creating this report. We'd also like to thank the Alces Foundation and the Randall Lewis Center for Sustainability in Real Estate. Their generous financial support enabled ULI Boston/New England to conduct its initial workshop and produce this report, which we hope will serve as a philosophical and practical guide for moving toward a more holistic approach to development through regenerative design.

In addition, we would like to thank the following organizations: Arrowstreet, which donated time and expertise to the final production of this report; CBT Architects, which graciously hosted our workshop; and both the Mystic River Watershed Association (MRWA) and the City of Everett for their help in grounding us in the challenges, community priorities, and inspiring work along the Mystic River Watershed. Finally, we would like to thank the 50-plus ULI members, experts, staff, and community organizations who participated in the charrette and contributed to this report.

Published: June 2026

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ABOVE Regenerative Design Workshop

Image credits: Steven Lipofsky

PURPOSE OF REPORT

Living Better: A Regenerative Design Approach to Coastal Redevelopment lays out the basic concepts and tools of regenerative design, presents case studies of local and international projects, and explores how regenerative design principles could be applied to the Lower Mystic River Waterfront. The report focuses on communities within this specific region to demonstrate how a regenerative design lens—where systemic solutions restore and revitalize ecosystems and communities—can generate net-positive ecological, social, and economic outcomes.

The report introduces the basic concepts and tools of regenerative design and presents case studies of local and international projects, with a localized focus on how regenerative design principles can be applied to the Lower Mystic River Waterfront. Applying a regenerative design framework to this community, which includes climate-vulnerable and historically underserved areas such as Chelsea and Everett, illustrates how it would be possible to restore ecosystems while enhancing community resilience and equity. Through interdisciplinary collaboration, team members evaluated strategies to promote both ecological restoration and social advancement.

The ultimate goal of this report is to inspire dialogue within the ULI community and beyond, foster a scalable set of solutions applicable to development projects and communities worldwide, and encourage the integration of regenerative design into urban waterfront redevelopment.

Sincerely,

Chen Qin
DLR Group

Torrey Spies
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Norman Lamonde
Turner Construction Company (retired)

Catherine Rollins
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ABOVE View of Everett
Image credit: Chen Qin

Executive Summary

Urban waterfronts face rising climate risks, aging infrastructure, and growing inequities. Yet redevelopment efforts and the structures that guide them often focus on minimizing harm rather than creating regenerative value. While redevelopment has made important strides in reducing harm, today's challenges call for approaches that can generate broader, longer-term value across ecological, social, and economic systems.

ABOVE Chen Qin and Emily Innes facilitate a visioning session.
Image credit: Steven Lipofsky

Our team explored the hypothetical question: How could redevelopment in the Lower Mystic River Waterfront move beyond fragmented, static interventions toward a systems-based, regenerative approach that restores ecosystems, supports thriving communities, and enables people and nature to co-evolve over time?

That question frames the focus of this report. **Regenerative design is a holistic, systems-based approach that moves beyond minimizing impact to actively restoring and strengthening the interconnected ecological, social, and economic systems that support life. Rather than simply reducing harm, it seeks to create net-positive value by enabling development to function as a living part of its ecosystem, where people and nature can co-evolve and thrive over time.**

Living Better: A Regenerative Design Approach to Coastal Redevelopment introduces regenerative design as a framework for coastal redevelopment, using the Lower Mystic River Watershed, with a focus on the Everett riverfront, to demonstrate how integrated strategies can generate net-positive environmental, social, and economic outcomes in climate-vulnerable communities. We want to emphasize that regenerative design is an iterative process that prioritizes learning, collaboration, and adaptation over time. This framework illustrates how understanding place, co-creating goals, and integrating strategies foster long-term regeneration rather than one-time solutions.

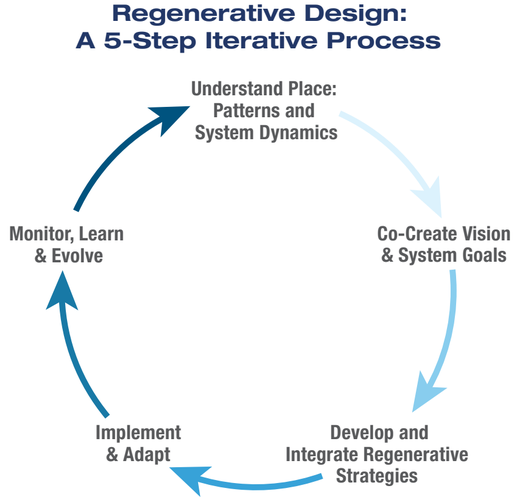
APPROACH

The idea for this report was conceived by ULI Boston/New England's Climate Resiliency Committee and launched at a full-day interdisciplinary charrette that brought together more than 40 ULI members, external experts, and local stakeholders. Participants explored how regenerative design strategies could be applied to real-world development sites, including the Lower Mystic River Watershed. The charrette was followed by months of research, discussions, system analysis, and conceptual design. This report is the result of those collective efforts.

A regenerative, systems-based approach to design and development is inherently complex and place-based, so there is no universal formula to apply across locations and projects. Our hope is that this report will stimulate dialogue and discovery on how to approach development opportunities through a regenerative lens, and that our site-specific example will provide insight into how to incorporate systems thinking into planning, design, and decision-making strategies for other waterfront projects.

The study of the Lower Mystic Waterfront demonstrates that regenerative design offers a viable pathway for transforming vulnerable, post-industrial waterfronts into thriving, climate-resilient communities. By examining the Mystic River Watershed and the Everett riverfront, we illustrate how systems-based thinking can address interconnected vulnerabilities while generating net-positive ecological, social, and economic value.

The Lower Mystic Waterfront's compounding risks—hardened shorelines that limit ecological function, minimal tree canopy that intensifies heat, restricted mobility that isolates environmental justice communities, and fragmented governance—are shared by many industrial waterfronts. These vulnerabilities do not exist in isolation; they reinforce one another across ecological, social, and economic systems. Conversely, the City of Everett possesses significant assets: a strategic waterfront location, engaged community organizations, and a resilient community fabric. We focused on this area because of this unique intersection of challenge and opportunity. It should be noted that the purpose of this report is not to offer a formal development proposal, but to demonstrate how a regenerative design approach could be applied to industrial waterfront sites to achieve transformative results.



The local and international case studies in this report reveal shared success factors: nature-based solutions that perform multiple functions, community-engaged design processes, and policies that align restoration with development. Research corroborates measurable benefits, including reduced flood exposure, improved health outcomes, enhanced property values, and job creation, demonstrating how regenerative principles manifest in practice.

The design explorations reveal how a systems-based approach, one that integrates ecological, social, mobility, and economic systems, can translate regenerative principles into spatial strategies that create resilient communities and places for Living Better.

As you will see later in the report, the team shifted away from a siloed approach, instead combining three strategic interventions, listed below, that demonstrate regenerative principles in practice. These processes were intentionally conceived as interconnected system interventions that demonstrate how regeneration can occur across multiple scales simultaneously.

- **The MBTA Transit Corridor** – Intentional connectivity design breaks down mobility barriers while natural elements create cooling, connected landscapes.
- **Beacham Street** – Coordinated street-scale interventions demonstrate how targeted use and design of space can support a transformation that allows economic, social, and natural systems to co-evolve toward lasting resilience.
- **The Everett Riverfront** – Restored salt marshes and living shorelines provide flood protection, natural habitat, educational opportunities, and public access.

By applying regenerative design principles to a real-world redevelopment scenario, we hope to help developers, planners, designers, and community partners envision how systems thinking can be incorporated into their own urban waterfront projects. The Lower Mystic Waterfront example offers a practical framework for shifting from risk mitigation toward long-term value creation, helping waterfronts not only withstand climate pressures but also actively contribute to ecological health, social equity, and economic resilience.

ABOVE Workshop attendees discuss a vision for different systems on the Everett site.
Image credit: Steven Lipofsky

“Regenerative design presents our largest opportunity for mankind to give all that we have taken from our earth’s ecosystem, restoring the places people depend on.”

Arlen Stawasz *Sustainability Director, Gensler Europe*

“Our job is to turn all living spaces into places where life can thrive, not just survive.”

Carol Sanford *Regenerative Business Educator, Author of* The Regenerative Business

“Climate change impacts all our systems in dramatic ways. As we respond to these threats and invest in resilience, we must take a holistic and regenerative approach that fosters and sustains interconnection.”

Rebecca Herst *Associate Director Resilience, Boston Green Ribbon Commission*

“How can architecture be more generous within private land? Not only by regeneratingecological space in cities but making it publicly accessible, with the kind of amenities that bring people together, that strengthen the public realm, that build community.”

Michelle Laboy *Associate Professor Northeastern University and Principal, FieLDworkshop*

“As summer temperatures get hotter each year, the implementation of resiliency solutions becomes ever more imperative to ensure the equitable health of all communities.”

David Sittenfeld
Director, Center for the Environment Science Museum of Science, Boston

“The environment is where we all meet; where we all have a mutual interest; it is the one thing all of us share.”

Lady Bird Johnson *Former First Lady of the United States, Environmental Advocate*

“Regenerative design focuses us on what we want to grow—community, ecology, resilience—not just what we’ve lost or stand to lose.”

Nasser Brahim *Director of Climate Resilience, Mystic River Watershed Association*

“Regenerative design is not about sustaining—it’s about renewing the relationship between people, place, and planet, so every decision becomes a seed of change that strengthens the larger system.”

Chen Qin *DLR Group Climate Action Strategist*

“Regenerative design in cities means leaning into what we’ve lost and who we together want to become in this climate-altered world.”

Julie Wormser *Chief Climate Officer, Cambridge*

“The Lower Mystic River Watershed is a critical region that determines Boston’s vulnerability to flooding and our ability to manage storm-water from extreme weather. Redeveloping the watershed with regenerative design principles will provide our city with long-term resilience, job creation, and a more vibrant waterfront that will give back to our communities for generations to come.”

Brian Swett *Chief Climate Officer, City of Boston*

“Applying a regenerative lens like this taps the wellspring of lived experience, wisdom, resilience, and care that are typically ignored in most design processes. By aligning with life, with a place’s history, essence, and true potential, we can reshape our built world so it works for all of us.”

Meredith Elbaum *Executive Director, Built Environment Plus (BE+)*

“A regenerative future for the Commonwealth is one in which our built environment and our human landscapes reflect the fact that humans are irrevocably interconnected with the natural world.”

Melissa Hoffer *Chief Climate Officer, Office of Climate Innovation and Resilience, The Commonwealth of Massachusetts*

ABOVE Expert panel shares how regenerative design is being practiced in the Lower Mystic region and beyond.
Image credit: Steven Lipofsky

What is Regenerative Design—and Why It Matters

"Regenerative development and design is about the evolution of living systems—enabling people and place to express their full potential."

From *Regenerative Development and Design: A Framework for Evolving Sustainability* by Pamela Mang and Ben Haggard, cofounders of the Regenesis Group

What is Regenerative Design?

At its core, regenerative design is a holistic, systems-based approach that moves beyond minimizing impact to actively restoring the interconnected ecological, social, and economic systems that support life. Rather than simply reducing harm, it seeks to create net-positive value by enabling development to function as a living part of its ecosystem, fostering a state in which people and nature can co-evolve and thrive over time.

Bill Reed of the Regenesis Group expands on this definition by offering the following: "Regenerative development offers a way to create enduring and increasing value by deepening the relationship between people and their places over time. The process begins by cultivating (developing) new ways of understanding place—insights that then inform design and long-term stewardship. Rather than something applied to a site or ever fully achieved, regeneration is an ongoing practice that complements restoration by developing the human and institutional capacities needed to adapt as conditions change—a fundamentally co-evolutionary process. Concepts such as circularity can provide helpful structure, yet living systems are not closed mechanical loops. Entropy is always present, and long-term resilience arises less from efficiency alone than from the continual renewal of vitality, diversity, and adaptive capacity. While contemporary frameworks have brought renewed attention to this way of working, regeneration itself is not new. It has been practiced for decades by those who understood, as Buckminster Fuller and others observed, that our role is not to fix the world, but to participate more skillfully in its becoming."

THE EVOLUTION OF REGENERATIVE DESIGN

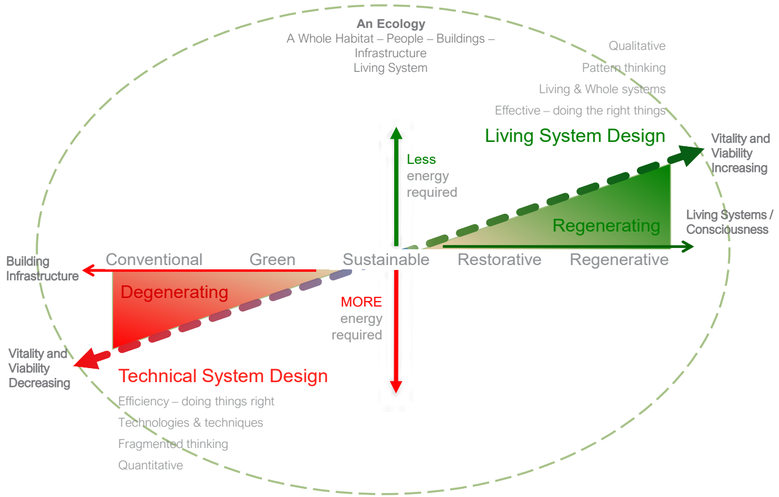
The accompanying diagram clarifies the shift from technical problem-solving to regenerative practice. On the degenerating side of the spectrum, conventional and green design approaches focus on technical system design, emphasizing efficiency and optimization. These approaches often prioritize "doing things right," without fully questioning whether they are doing the right things.

Sustainability sits at the center of this trajectory. It represents an important transition by reducing harm and improving effectiveness, but it largely aims to slow degradation rather than reversing it.

At the regenerative end of the spectrum are restoration and regeneration, which reflect a shift toward living-system design. Restoration focuses on repairing damaged ecological subsystems and recovering lost capacity. Regeneration goes further, asking how human and natural systems can co-evolve, with development contributing to the ongoing health, adaptability, and vitality of place.

This distinction also clarifies how regenerative design differs from resilience. While resilience emphasizes the ability to withstand shocks, regenerative design focuses on improving system health over time, enabling places not only to recover from disruption but also to evolve and thrive as a result.

BELOW A Trajectory towards Regenerative Design
Source: Regenesis Group



CORE CHARACTERISTICS OF REGENERATIVE DESIGN

The following characteristics capture the essence of regenerative design and outline how it creates long-term, place-based value.

Works with Living Systems
Regenerative design begins by understanding the world as an interconnected web of living systems—ecological, social, cultural, and economic. Design decisions focus on strengthening relationships, flows, and feedback loops that support life, rather than optimizing individual components in isolation.

Reveals and Works with the Unique Essence of Place
Every place has a distinctive history, identity, and role within its broader landscape. Regenerative design seeks to reveal this "essence of place" and create solutions that align with it. Instead of applying generic best practices, it responds to local ecological patterns, community culture, and long-term potential. This place-based approach fosters outcomes that are meaningful, resilient, and lasting.

Creates Net-Positive Impacts and Added Value
Rather than limiting itself to harm reduction, regenerative design aims to generate net-positive benefits, including improved ecological health, strengthened community well-being, and increased social and economic value. These impacts are not static; they grow over time as systems mature, relationships deepen, and capacities expand.

Enables the Co-Evolution of People and Nature Over Time
At the heart of regenerative design is the belief that human and natural systems can evolve together in mutually beneficial ways. By fostering stewardship, collaboration, and long-term commitment, regenerative design helps people become active participants in the renewal and evolution of their place. This creates conditions where both communities and ecosystems thrive over generations.

MAXIMIZING REGENERATIVE POTENTIAL

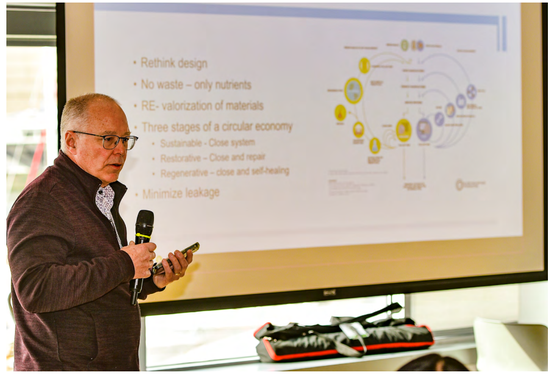
The opportunity for regeneration is greatest in the early stages of the project life cycle—during the visioning stage, before capital is committed and design intent is finalized. Early alignment across disciplines enables equity, health, and ecosystem goals to be embedded in a project's DNA. This timing is critical: as a project advances, the window for transformative outcomes narrows. However, it should be emphasized that the objective is 'progress over perfection'. The goal is to shift the trajectory of every project toward greater vitality, circularity, and resilience.

Regenerative Design is Gaining Momentum
Regenerative design is increasingly shaping how cities, institutions, and developers respond to climate risk, equity, and long-term resilience in the built environment.

At the local level, policymakers are beginning to embed regenerative principles directly into development requirements. In Cambridge, Massachusetts, Climate Resilience Zoning integrates flood resilience and ecological performance into the zoning code, moving projects beyond mitigation toward measurable ecological and social benefits. At the state level, Massachusetts' Whole-of-Government Climate Report calls for a whole-systems approach to climate action, aligning social, environmental, and economic priorities in ways that closely reflect regenerative thinking.

Globally, cities such as Melbourne and Amsterdam are using regenerative frameworks not only as planning tools, but as economic strategies, integrating nature-based solutions, circular investment, and social equity into long-term urban transformation. Together, these efforts signal a broader shift from isolated, project-by-project responses toward approaches that treat development as an opportunity to strengthen living systems over time.

As regenerative design gains traction across the policy, planning, and practice spectrum, its value is increasingly defined by the tangible outcomes it produces. The following sections demonstrate how these approaches deliver ecological, social, and economic benefits that strengthen communities over time.



ABOVE LEFT Community leaders discuss opportunities to improve ecology in Everett during the Living Better Charette.
Image credit: Steven Lipofsky

ABOVE RIGHT Wayne Bates shares evolution of regenerative frameworks.
Image credit: Steven Lipofsky

The Ecological, Social, and Economic Value of Regenerative Design

Regenerative design creates value across three interconnected dimensions: ecological systems, social well-being, and long-term economic performance. The following sections describe how regenerative approaches enhance ecosystem function, strengthen community health and equity, and improve economic resilience, which explains why this framework is gaining traction in development, investment, and public decision-making.

ECOLOGICAL VALUE: WORKING WITH AND ENHANCING LIVING SYSTEMS

A central aim of regenerative design is to promote and enhance ecological function while integrating the built environment into living systems. Nature-based solutions are often an important component of regenerative design because they enhance ecosystem processes rather than simply controlling natural systems.[1] Research on nature-based solutions validates that these approaches can restore ecological function, support biodiversity, improve water quality, and bolster resilience against climate-related stressors.[2]

These benefits are particularly evident in coastal environments. Regenerative design strategies, including nature-based solutions such as dunes, salt marshes, mangroves, and oyster reefs, protect shorelines while supporting habitats for species and essential coastal processes. Studies evaluating restored coastal systems demonstrate their capacity to attenuate wave energy, trap sediments, reduce erosion, and adapt dynamically to rising sea levels.[3] Coastal wetland sediments can effectively sequester carbon long-term, contributing to both adaptation and climate mitigation goals. [4]

SOCIAL VALUE: CONNECTION, ACCESS, AND EQUITY

Regenerative design also creates social value by improving health, well-being, and connection to place. Multiple studies show that access to green and blue spaces can improve human health, well-being, and quality of life, especially in urban environments.[5] Participatory processes that engage local communities in shaping their environments foster social cohesion, trust, and long-term stewardship,which creates “social hubs” that enhance well-being and connection. [6, 7]

The social value of regenerative design depends on who benefits and who participates. Justice in regenerative and nature-based approaches requires attention not only to outcomes, but also to decision-making processes. Research emphasizes that marginalized communities must have meaningful influence over design, governance, and long-term management.[8] Embedding environmental justice principles into regenerative design requires equitable benefit-sharing, long-term engagement, and recognition of the social contexts in which ecological restoration occurs, ensuring that regenerative design interventions strengthen—not fragment—the communities they aim to protect.

ABOVE ULI Resiliency Committee Co-chairs kick off a day long Regenerative Design workshop with ULI professionals and local leaders.
Image credit: Steven Lipofsky

ECONOMIC VALUE: LONG-TERM RESILIENCE AND SHARED PROSPERITY

As Wayne Bates, Director of Resiliency & Sustainability at Tighe & Bond, emphasizes, the question is not simply, “How do we design differently?” but “How do we define ‘value’ differently?” He describes this shift as an evolution from business-as-usual models toward regenerative value creation:

A Linear Economy follows the “take, make, waste” model, which prioritizes short-term function and profit while disregarding long-term environmental and social costs. Performance is measured by output and immediate return, with negative downstream risks absorbed by ecosystems and communities.

A Green Economy improves upon this model by focusing on efficiency, pollution reduction, and cleaner technologies. While it reduces harm and internalizes certain environmental risks, it still relies on ongoing resource consumption and does not fundamentally restructure how value is created.

A Circular Economy pivots to the principle that “there is no waste.” It redesigns systems to retain material value, reduce extraction, and extend asset life cycles, strengthening resource security and supply chain resilience while investigating how economic activity fits within ecological and cultural systems.

A Regenerative Economy extends beyond efficiency and circularity. It redefines value to include ecosystem health, social stability, and long-term systemic resilience. In the context of real estate and industrial development, this shift reframes assets not simply as vehicles for near-term return, but as long-horizon economic infrastructure that strengthens land value, reduces climate-related financial exposure, stabilizes insurance and lending conditions, and enhances regional competitiveness over time.

Framing the discussion in economic terms addresses what ultimately drives decision-making: capital allocation, risk assessment, and long-term return. If regenerative principles are not economically feasible, they remain aspirational rather than actionable.

Translating Performance into Financial Value

Regenerative design strengthens economic performance by improving the long-term viability, desirability, and durability of places, particularly in coastal and climate-exposed environments. Properties located in FEMA-designated flood zones often face higher insurance requirements, stricter lending conditions, and constrained development potential.[9] When regenerative strategies measurably improve site performance, insurers and lenders can reflect these improvements through more favorable premiums and underwriting terms, improving project feasibility.[10,11] Because many ecological benefits extend beyond individual parcels, cities can strengthen development feasibility by linking regenerative outcomes such as restored wetlands, improved public access, heat mitigation, and biodiversity uplift to predictable zoning incentives or streamlined approvals. This alignment allows ecological benefits to be reflected directly in financial models, supporting both private feasibility and public resilience goals.

Regenerative environments also tend to be more desirable places to live and work. Neighborhoods that integrate resilient energy systems and green stormwater systems experience more stable operating conditions and improved comfort.[12,13] Research indicates that people increasingly choose neighborhoods aligned with environmental and health priorities, and, by extension, companies often cite resilient, nature-positive locations as a factor supporting workforce satisfaction and ESG commitments.[14,15] As a result, regenerative projects often experience stronger demand, higher occupancy, and longer tenant retention, improving long-term asset value.

Regenerative design delivers economic benefits across multiple metrics. Nature-based solutions are projected to generate millions of jobs in the next few years, and studies show that nature-based infrastructure generates more jobs per dollar than traditional grey infrastructure because nature-based solutions require ongoing stewardship.[16,17]

Beyond the macro-scale, regenerative environments bolster economic resilience at the household level by mitigating energy, transportation, and health-related costs through reduced urban heat island effects and enhanced transit connectivity. Additionally, improving ecological systems in urban areas can increase nearby property values,[18] demonstrating that environmental restoration can translate into shared economic gains when paired with policies that prevent displacement.

ABOVE Participants identify challenges and opportunities, strategies and actions, and moonshot ideas to advance different systems goals in Everett.
Image credit: Steven Lipofsky

ABOVE Newly created Living Shoreline at Clippership Wharf
Image credit: Ed Wozniak

Case Studies: Insights from Real-World Examples

Case Studies in Regenerative Design

The following case studies demonstrate how regenerative design generates value across diverse contexts and scales. Each example illustrates how systems-based, integrated strategies restore ecological function, strengthen connections to place, and support long-term resilience. Collectively, these projects offer lessons from real-world applications that move beyond conventional sustainability toward net-positive outcomes.

LEFT Paula Ramos Martinez shares Regenerative Design Insights from Antwerp.
Image credit: Steven Lipofsky

Clippership Wharf

Ecologically restored and designed to be resilient against sea-level rise over the next century, Clippership Wharf is an innovative mixed-use redevelopment on East Boston's waterfront. Once a hub for the shipbuilding and maritime industries of the 1800s, the site underwent multiple iterations before falling into disuse in the 1990s. For over two decades, it sat dormant, with only dilapidated wharf structures overgrown with vegetation marking its history.

The post-industrial brownfield site, which included 1.8 acres (0.73 hectares) of degraded tidelands, was acquired by developer Lendlease in 2016, and its transformation was complete in 2021. Lendlease remediated the contaminated soils and elevated the site's occupiable areas well above FEMA requirements, creating a 14-foot buffer from the current mean high tide to the ground-floor level of apartments and amenities, which also minimized costly site excavation.

Other resiliency measures included stabilizing existing seawalls, creating new wetland resource areas, rain gardens, and bioswales, and updating neighborhood stormwater infrastructure, while adding green space and waterfront access in East Boston. In addition to raising the ground plane, Lendlease incorporated a first-of-its-kind "living shoreline" that utilizes natural plantings, salt marshes, rocky beaches, and wildlife habitats to enhance the site's climate resilience. Portions of the shoreline were rebuilt using repurposed on-site granite, and the developer prioritized landscape quality, ecological function, and community access over a traditional hardened-edge waterfront despite higher upfront costs.

In addition to the 478 residential units and the 30,000 square feet (2,800 sq m) of public space and community amenities (a large amphitheater, a dog park, and docks), Clippership Wharf links a section of Boston's 43-mile (69 km) Harborwalk system via a 1,400-foot (427 m) connecting section, and also provides active transportation opportunities. The development enabled public waterfront access in the area (including a water shuttle) for the first time in more than 30 years. The development also features works by local artists throughout the site.

ABOVE TOP Pathway through primary courtyard connecting the neighborhood to the harborwalk
Image credit: Ed Wozniak

ABOVE BOTTOM View of Clippership Wharf from new butterfly garden
Image credit: Ed Wozniak

PROJECT FACTS

Location: East Boston, MA, United States

Site Area: 12 acres (4.8 ha) in total, including five acres (2 ha) of tidelands. Seven acres (2.8 ha) were suitable for development

Type: Mixed-use residential

Project Duration: 2016-2021

Developable Site Area: 295,518 square feet (27,455 sq m), with 189,000 square feet of open space (17,559 sq m) representing 64% of the developable area.

Buildings: 555,200 square feet (51,580 sq m). Four structures with two condominium buildings (194 units), two apartment buildings (284 units), and 30,000 square feet (2,800 sq m) of common, amenity, and public areas, including three retail outlets totaling 8,000 square feet (743 sq m).

Developer: Lendlease Development

Development Team:
Architect: The Architectural Team (TAT)
Landscape Architect: Halvorson | Tighe & Bond
Engineers: Cates Engineering (Structural); Nitsch Engineering (Civil); WSP USA (MEP)
Project Cost: $287.5 million (USD)

Certifications/Awards: LEED Platinum, Residential; LEED Silver, Neighborhood

Additional Project Information: ULI, Multi-Housing News, Lendlease

BENEFITS

Environmental – The project restores diverse intertidal habitats (salt marsh, tide pools, and native flora) across roughly 24,000 square feet (2230 m) of new wetlands and supports marine species and shorebirds while improving overall harbor water quality. As these systems mature, they will strengthen the shoreline's adaptive capacity to rising seas.

Social – Reconnects the community to the waterfront through accessible, engaging public spaces and creates recreational and educational opportunities along the shoreline. By restoring ecological and public access in tandem, the project reinforces long-term stewardship and place-based identity.

Economic – The resilient features and living shoreline are estimated to avoid losses and damages of up to $2 million (USD) per major storm event. On-site retail also provides local amenities and jobs. The living shoreline functions as resilient ecological infrastructure, bolstering long-term asset stability and investor confidence.

BELOW View of Boston Harbor from Clippership Wharf
Image credit: Ed Wozniak

Cambridge Crossing

Cambridge Crossing (CX) is a 4.5 million-square-foot (418,000 sq m) master-planned, mixed-use development located at the convergence of Boston, Somerville, and Cambridge, with over 80% of the project in Cambridge. The 43-acre former industrial railyard, previously disconnected by rail lines and infrastructure, is being transformed into a resilient, transit-oriented, urban district.

Following several ownership transitions, DivcoWest acquired the site in 2015 and began reimagining it as a regenerative urban neighborhood. The project builds upon a master plan by CBT Architects, which has guided its urban design since 2003. A defining regenerative strategy was the prioritization of the public realm, sequencing the development of open space first to establish a healthy ecological and social foundation for the district.

Landscape design and tree canopy growth were prioritized early in the development process to establish ecological systems and a strong sense of place before vertical construction began. At the center of the site is an 11-acre (4.5 ha) public realm network, including a pond and the 5-acre (2 ha) Central Common, which serves as high-performance infrastructure as well as a civic anchor. The site was raised to meet future sea-level rise projections based on the region's 2070 flood modeling. A stormwater system designed as part of the Common captures, treats, and reuses rainwater for landscape irrigation. Site-wide, more than 1,275 trees and 2,900 shrubs have been planted, improving air quality, enhancing carbon sequestration, supporting biodiversity, and reducing urban heat island effects. Salvaged granite blocks from a historic seawall uncovered during excavation were repurposed as landscape elements. Open spaces across CX host a diverse range of programs, including a dog park, community garden, sports field, picnic grove, and areas for art, music, film, and performance.

Regenerative design is also reflected in cultural layering. Since 2016, the development team has fostered a robust community partnership and site activation program, which remains active to this day.

ABOVE Aerial view of Cambridge Crossing
Image credit: CBT Architects

LEFT Reclaimed granite blocks become a key landscape element.
Image credit: CBT Architects

Events, public art, and cultural programming are free and open to all, helping to shape a shared neighborhood identity. Several streets and open spaces in the district are named to honor historically significant figures from Cambridge's rich heritage. Public art is community-generated and integrated throughout the project. The built environment is designed for long-term adaptability and reflects a layered approach to cultural and ecological regeneration. All buildings are targeting LEED Gold or Platinum certification, with the district guided by the WELL Community, SITES, and Envision frameworks.

PROJECT FACTS

Location: Jacobs St., Cambridge, MA, United States

Site Area: 43 acres (17.4 hectares)

Type: Mixed-use (Residential, Commercial, Retail)

Project Duration: 2003-Present

Development: 4.5 million square feet (418,000 sq m) with 11 acres (4.5 ha) of open space

Buildings: When complete, Cambridge Crossing will consist of 2,700 residential units, 2.1 million square feet (195,096 sq m) of commercial space (primarily life sciences and technology), 100,000 square feet (9,290 sq m) of retail, and two public transit stops.

Developer: DivcoWest

Development Team:
Architect: CBT
Landscape Architect: Michael Van Valkenburgh Associates
Engineers: Beals and Thomas (Civil Engineering); WSP (MEP), RSE Associates (Structural Engineering); Vertex (Geotechnical Engineering)

Certifications/Awards: 2023 ULI Americas Awards for Excellence; Finalist, Fast Company's 2025 Innovation by Design Awards

Additional Project Information: ULI, DivcoWest, Michael Van Valkenburgh Associates

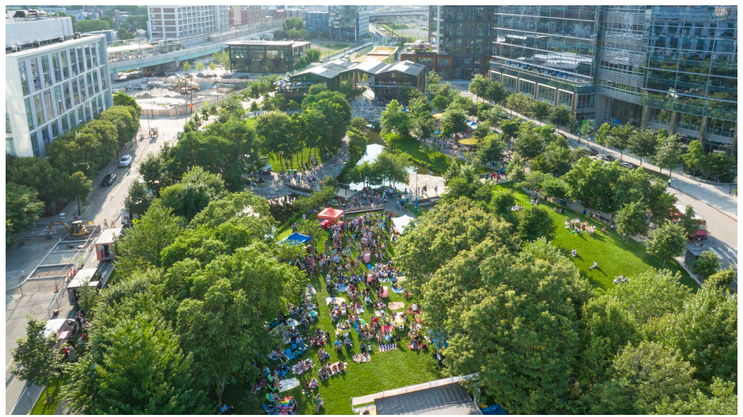
BENEFITS

Environmental – The site was elevated to meet future sea-level rise projections. The stormwater system is designed to capture, treat, and reuse rainwater for landscape irrigation, and the landscape design incorporates salvaged stone from the site. By prioritizing open space, ecological systems become foundational infrastructure for sustained district growth.

Social – CX hosts a diverse range of programming, including a dog park, community garden, sports field, picnic grove, and areas for art, music, film, and performance. Increased housing density allows people to live near where they work, with many jobs on-site or in the neighborhood. The integration of housing, culture, and landscape strengthens long-term social resilience.

Economic – Home to innovative companies like AbbVie, Astellas, Philips, Bristol Myers Squibb, and Sanofi. Reuse of site materials, such as granite from the historic seawall. The alignment of ecological restoration and economic clustering supports durable long-term property value.

BELOW View of the central common during summer nights
Image credit: CBT Architects



Crane Cove Park

Located in San Francisco's Central Waterfront within the historic Pier 70 Historic District, the former shipbuilding facility was transformed into a neighborhood waterfront park. Designed to accommodate 50 years of predicted sea-level rise and withstand major earthquakes, Crane Cove Park preserves historic maritime resources, opens a formerly inaccessible industrial shoreline to provide public access to the Bay, and provides open space and recreational facilities for the new Pier 70 neighborhood. The park is also a vital component of the Blue Greenway, a 13-mile (21 km) necklace of waterfront public access that connects the City to the shore via pathways, parks, and open spaces.

Home to shipbuilding operations beginning in the late 19th century, the site remained dormant for decades before the Port of San Francisco sent out an RFP for its redevelopment in 2011. The Crane Cove redevelopment includes the waterfront park, the 19th Street extension and parking lot, and the restoration of the historic 8,000-square-foot Building 49, a WWII-era warehouse that houses a YMCA and a kayak and paddleboard facility. The park honors the region's industrial legacy by featuring two massive shipyard cranes at the park's entrance that were once used to load and unload ships. The cranes, seating fabricated from reclaimed concrete cribbing and timber, and salvaged relics throughout the site serve as reminders of the site's industrial character.

Due to the site's industrial history, soil contamination was a major concern. Clean fill was brought in to raise the grade, protect against future sea-level rise, and shield against contaminants. The Bay also benefits from implemented stormwater management strategies, including bioretention areas, bioswales, and permeable paving.

FAR RIGHT The historic slipway transformed into a plaza and event space.
Image credit: AECOM

ABOVE TOP Arial view of Crane Cove Park
Image credit: AECOM

ABOVE BOTTOM The design utilized various stormwater management techniques including bioretention and permeable pavers.
Image credit: AECOM

PROJECT FACTS

Location: San Francisco, CA, United States

Site Area: 7 acres (2.8 ha)

Type: Public Park

Project Duration: 2019-2025 (Construction to completion)

Developer: Port of San Francisco

Development Team:
Civil Engineering, Coastal Engineering, Structural Engineering: AECOM
Civil, Structural and Geotechnical Engineering: AGS
Architecture: Architectural Resources Group
Landscape Architect: Richardson & Associates

Project Cost: $37 Million (USD)

Certifications/Awards: Northern California Chapter, American Society of Landscape Architects (ASLA) Merit Award, General Design

Additional Project Information: WLA, Crane Cove Park

BENEFITS

Environmental – The park is designed to guard against 50 years of projected sea-level rise, and incorporates stormwater management, water-efficient landscaping, and energy-efficient lighting. Precast tide pools, integrated with a rip-rap edge, help restore marine habitat, while native plantings further support habitat and biodiversity. These interventions transform the shoreline into a living system capable of adapting over time.

Social – The park reclaims a historic shipbuilding site while providing access to the waterfront, 7 acres of open and recreational space, and a YMCA/Kayak facility. The project promotes residents' and visitors' health and well-being. By combining heritage preservation with ecological restoration, the project regenerates a cultural connection to the Bay.

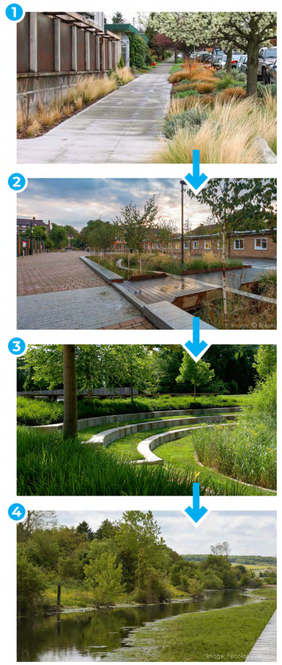
Economic – Crane Cove Park attracts a large volume of visitors, generating business for nearby hotels, restaurants, and shops; The open space of Crane Cove Park increases surrounding property values, creating a stronger local tax base; Park development, maintenance, and related tourism create jobs, from construction to hospitality; Reclaimed and reused site materials contribute to a circular economy; and the park's climate-adaptive infrastructure supports district vitality.

Waterplan Antwerp

The Waterplan is a strategic framework developed by the City of Antwerp to address the urgent need for climate adaptation and resilient urban investment. Faced with increasing extreme rainfall, prolonged droughts, and the urban heat island effect, Antwerp's strategy transforms these climate challenges into opportunities to create a water-resilient, attractive living environment.

To build this framework, the City conducted a detailed analysis of its current water system, mapping historical water traces (known as the "vlieten", historic canals of Antwerp that were filled in or covered over) to uncover hidden hydrological structures. Using sewer system models to identify flood-prone areas, the City assessed existing blue-green networks for their potential to support integrated water management and created a Vision Map. This map is structured around five distinct water systems, each requiring tailored, water-sensitive building blocks. The strategy prioritizes a decentralized flow: starting with on-site infiltration and reuse on private property, transitioning to neighborhood-scale rain gardens, and ultimately draining into regional park buffers. Collectively, these multi-scalar measures ensure stormwater is redirected from overburdened sewage pipes into the natural environment.

Following nearly two years of stakeholder engagement, the Waterplan is now embedded across city departments, utility companies, and regional institutions. It serves as both a hydrological and spatial blueprint for Antwerp's transition over the coming decades, using water as the primary catalyst to redesign the city, mitigate flooding, and significantly expand urban greenery.



The Rainwater Cascade Principle

1. **Local Streets + Private Domain**
   Delay / Reuse / Infiltrate / Transport
2. **Collection Streets**
   Delay / Infiltrate / Transport
3. **Delaying Parks**
   Delay / Infiltrate
4. **Enlarged Streams**
   Delay / Store / Infiltrate / Transport
5. **Scheldt River**
   Transport

ABOVE The Rainwater Cascade Principle
Image credit: 1. Danielle Johnson 2. Robert Bray Associates 3. Brittney Butler 4. Nicolas Waltefaugle, Territoires

FAR RIGHT The Antwerp vision map structured around five water systems
Image credit: De Urbanisten

PROJECT FACTS

Location: Antwerp, Belgium

Site Area: Citywide

Type: Approved Municipal Strategy

Development: N/A

Buildings: N/A

Originator: City of Antwerp

Development Team:
Urban Designer and Landscape Architect: De Urbanisten
Engineering Consultant: Witteveen+Bos
Environmental Consultant: Common Ground

Certifications/Awards: 2021 Belgian Construction Awards, Climate Proof Award; World Landscape Architecture (WLA) Professional Awards, Concept — Analysis & Planning

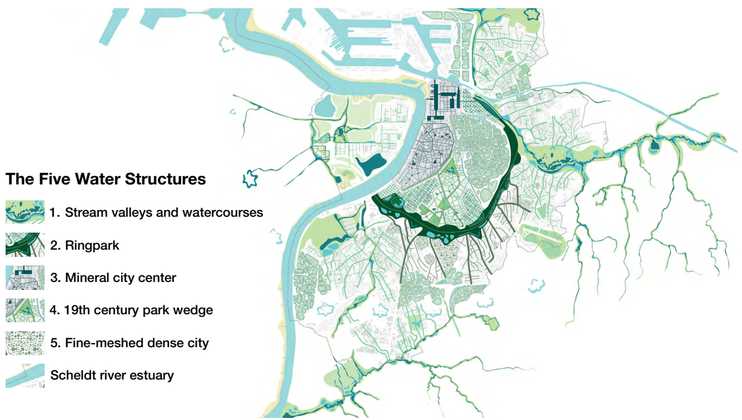
Additional Project Information:
De Urbanisten, Full Report

BENEFITS

Environmental – The strategy will create water-resilient public spaces and improve overall water quality. It will also help establish interconnected blue and green infrastructure across the city, fostering a healthier urban ecosystem, enhancing biodiversity, and mitigating urban heat through increased vegetation and water features.

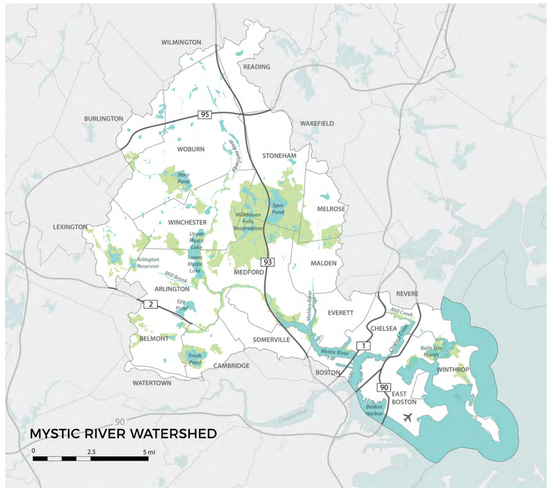
Social – Enacting the Waterplan will ensure reliable water availability and reduce the risk of extreme drought events. It will also provide water-based recreational opportunities, improve mental health by expanding green and public spaces, and promote water awareness and stewardship among residents.

Economic – The strategy will limit damage and associated costs from flooding, reduce water treatment expenses, and lower long-term infrastructure maintenance costs. Implementation and management will also support local jobs. It positions water systems as long-term economic assets that generate sustained financial, environmental, and civic value for the city.



ABOVE Workshop attendees discuss existing site conditions in the Lower Mystic, Everett waterfront site.
Image credit: Steven Lipofsky

Site Context: The Lower Mystic River and Everett Riverfront



ABOVE Mystic River Watershed Map
Credit: Mystic River Watershed Association

76
SQUARE MILES

44
LAKES & PONDS

21
COMMUNITIES

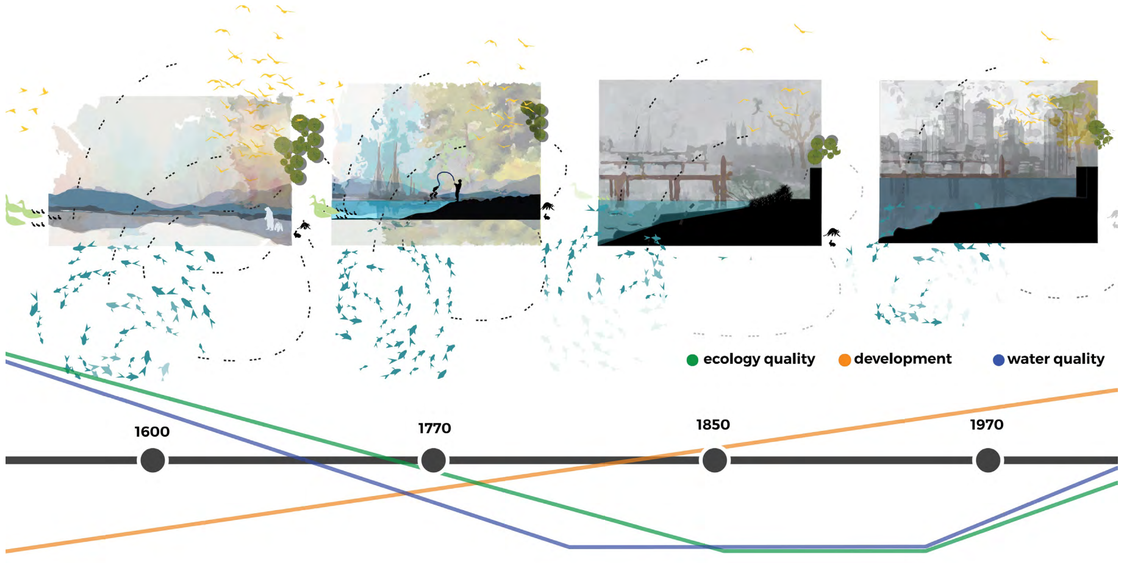
600,000
PEOPLE

LEARN MORE
MYSTICRIVER.ORG

Overall Context

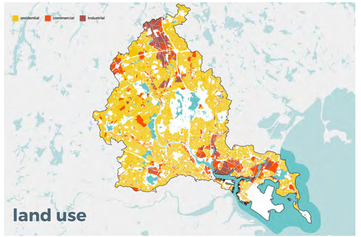
The ULI Resiliency Committee selected the City of Everett and the Lower Mystic River Watershed because the area resides at the intersection of high climate vulnerability and immense transformational potential. Long shaped by industrial land uses, environmental justice burdens, heat exposure, and flood risk, the corridor now faces major redevelopment opportunities, from transit expansions to large mixed-use proposals. Its complex mix of social need, ecological degradation, and emerging investment makes it an ideal landscape to demonstrate how regenerative design can guide equitable, climate-ready urban revitalization.

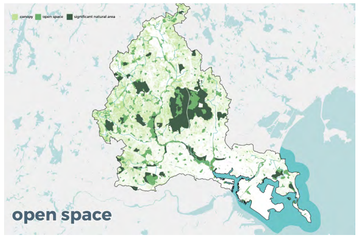
The Mystic River Watershed spans 76 square miles across 21 cities and towns, draining from the Aberjona River in Woburn through the Mystic Lakes into the Mystic River and ultimately Boston Harbor and the Atlantic Ocean. Prior to European contact, the watershed was home to the Pawtucket, Nipmuc, and Massachusett Tribes. The name Mystic is an English translation of Missi-Tuk (Great Tidal River in Massachusett) or Muhs-uhtuq (Big River in Wampanoag dialect). Indigenous peoples settled along the Mystic for access to fresh water, fish, and the abundance of watershed ecosystems, from animals to fertile soil to clay for pottery. At the time of European contact in the 1620s, much of the Mystic River watershed was presided over by the Saunkskwa of Missitekw, who lived near the Mystic Lakes, and the watershed was settled by her people and other Indigenous communities.

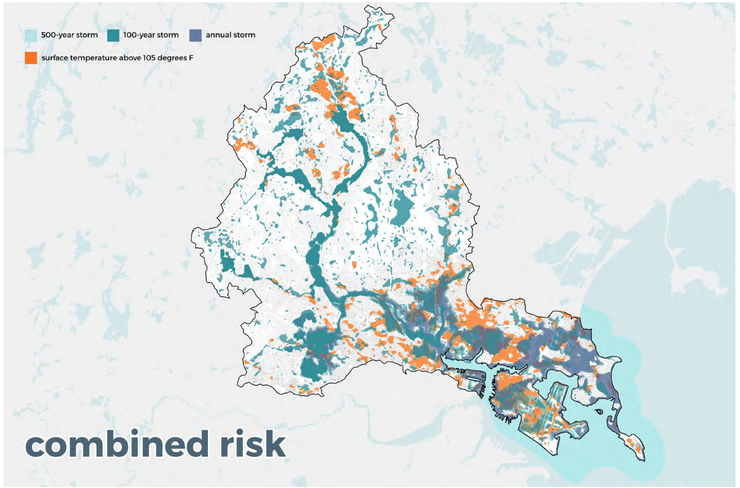


ABOVE Historical Evolution of the Mystic River Watershed, Sasaki Internship Project, 2019
Image credit: Sasaki

European settlement rapidly transformed the region. The first tall ship was launched in 1631, followed by dams and mills. By 1803, a canal linking the Mystic to the Merrimack River was completed. Industrialization accelerated throughout the nineteenth and twentieth centuries, with the development of tanneries, chemical plants, a Ford assembly line, and a major power plant. Everett's population grew from 2,000 to 40,000 between 1870 and 1920, and redlining practices in 1938 entrenched industrial expansion into residential areas. Wetlands and tidal waterways were filled or altered, and two centuries of industrial activity left the river severely polluted; by 2007, the EPA rated its water quality a 'D'.







ABOVE AND RIGHT Watershed Overview Analysis of the Mystic River Watershed, Sasaki Internship Project, 2019
Image credit: Sasaki

The Mystic River Watershed continues to be defined by its industrial past. Its shipyards, fuel storage, rail lines, and fenced industrial parcels have hardened shores, degraded ecosystems, and restricted river access. These historic land-use decisions have also produced heat-vulnerable neighborhoods, limited open space, significant mobility barriers, and persistent environmental burdens in communities such as Everett, Chelsea, and East Somerville. As climate risks intensify, bringing stronger coastal flooding and extreme heat, local efforts are beginning to restore wetlands, reconnect open spaces, and create healthier waterfronts.

The ULI Climate Resiliency Committee selected Everett as the focus area because it is at the confluence of multiple challenges: significant industrial infrastructure, rapidly evolving development pressures, and pronounced equity concerns. It also contains some of the most heat-vulnerable neighborhoods and flood-susceptible shorelines in the watershed. Most importantly, Everett holds transformative potential. By reimagining underutilized land, the city can deliver expanded open space, cleaner industry, and a regenerative future in which both the community and the natural ecosystem can thrive.

MAJOR REDEVELOPMENT TRANSFORMATIONS IN EVERETT

Today, Everett sits at the center of the watershed's most significant transformation in decades. Several major regional opportunities are reshaping the future of the Lower Mystic, including:

- The proposed New England Revolution soccer stadium at the former power plant site
- The Davis Companies' planned mixed-use redevelopment along the waterfront
- The Silver Line extension improving transit access between Everett, Chelsea, and Boston
- A new Somerville footbridge strengthening regional pedestrian/bicycle connectivity
- Jupiter Power's energy-storage facility, signaling a shift toward clean-energy infrastructure

At the same time, rapid housing development by companies such as Greystar and V10 Development is accelerating—amid a widening affordability gap identified in the Everett Housing Production Plan.

LEFT Upcoming major redevelopment in Everett

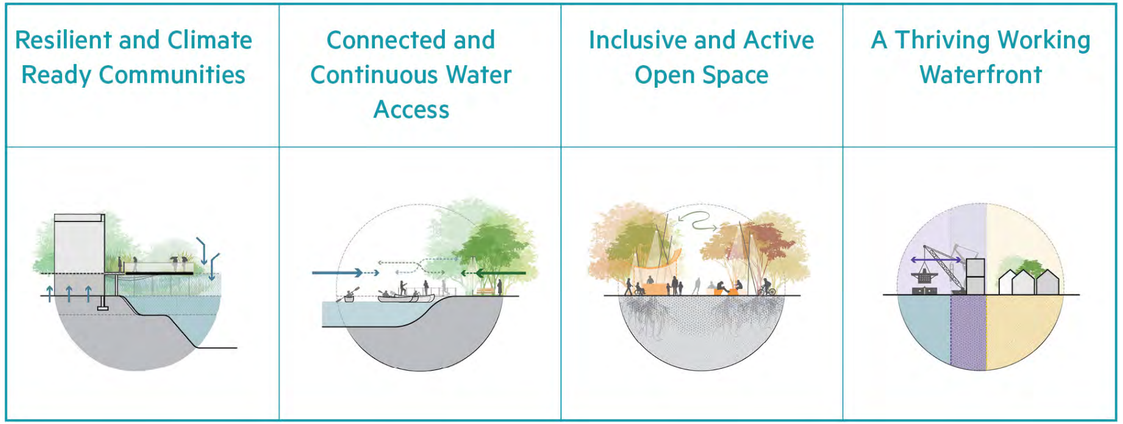
ABOVE Community members volunteer and discuss the future of the Mystic River Watershed.
Image credit: Mystic River Watershed Association

COMMUNITY COALITION CONTEXT

Watershed coalitions led by the Mystic River Watershed Association (MyRWA) and the Resilient Mystic Collaborative (RMC) have driven the region's environmental recovery and climate adaptation. In partnership with the City of Everett and Everett Community Growers, they have implemented tree-planting campaigns and expanded greenways, reducing heat vulnerability and creating safer, more connected walking and biking routes. Projects such as the restored wetlands at Gateway Park and community air-quality monitoring further enhance flood protection, restore habitat, and ensure that residents can breathe cleaner, healthier air. Its long-term efforts, including the installation of fish ladders at three dams, enabled the largest herring migration recorded in the state in 2025, with over 800,000 river herring reaching the Mystic Lakes.

RMC, formed in 2018 and now comprising 21 municipalities and nonprofits, coordinates cross-jurisdictional strategies to address flooding, extreme heat, environmental justice, and infrastructure vulnerability. Its regional approach, with joint flood modeling, climate-safe housing guidance, and shared adaptation priorities, has become a statewide model for collaborative climate resilience.

The recently published Lower Mystic Waterfront Vision Report by RMC prioritizes resilient, climate-ready communities; connected, continuous water access; inclusive, active open spaces; and a thriving working waterfront that aligns development with long-term ecological and community health. Their collaborative approach and attention to how ecological, social, economic, and urban systems connect can serve as a model for regenerative design as new development emerges in Everett.



ABOVE Lower Mystic River Waterfront Vision Themes based on extensive community input
Image credit: STOSS Landscape Urbanism

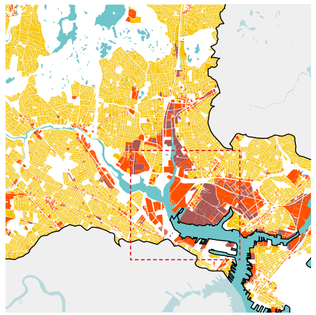
SITE VULNERABILITY OVERVIEW

The Everett industrial waterfront study area is shaped by decades of heavy industrial land use that left a patchwork of brownfields, aging utilities, and Designated Port Area (DPA) parcels caught between hazardous legacy conditions and fast-moving redevelopment proposals. Intensifying heat is exacerbated by large expanses of impervious surfaces, minimal shade, and very limited publicly accessible open space within the district. Low-lying land and hardened, channelized river edges create high exposure to storm surge, precipitation-driven flooding, and future sea-level rise, stressing stormwater systems that were not designed for climate-driven extremes. Mobility constraints, stemming from large superblocks, highway barriers, freight activity, and gaps in active-transportation infrastructure, further isolate the riverfront from surrounding communities, making safe access and evacuation routes difficult during disruptions.

Site Overview

land use

residential commercial industrial



building footprint

building

open space

canopy open space significant natural area

The Lower Mystic River Watershed is highly urbanized, with land use dominated by residential, commercial, and industrial development. Residential neighborhoods account for approximately 21 percent of the study area, while commercial and industrial uses comprise about 26 percent and 18 percent, respectively. The area is characterized by dense building footprints and extensive paving, reflecting a long industrial legacy. Although portions of the watershed are transitioning to mixed-use, higher-density development, impervious surfaces continue to dominate the landscape. Approximately 25 percent of the watershed is covered by buildings, and more than 50 percent of the land area is impermeable.

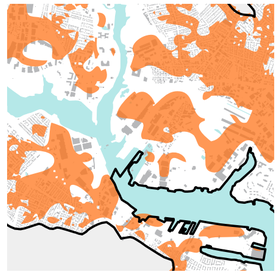
Open space is limited and unevenly distributed across the watershed. GIS analysis indicates that only about 2 percent of buildings are located near accessible open space. While some open space exists along the river corridor, much of the waterfront remains occupied by commercial and industrial uses. Residential neighborhoods have few pocket parks, limiting access to recreational and green spaces for local residents.

These land-use and open-space conditions create significant environmental vulnerabilities. A limited tree canopy and extensive hardscape intensify urban heat island effects, while extensive impervious cover limits stormwater infiltration. Together, these factors increase exposure to extreme heat and compound risks from riverine, lowland, and coastal flooding.

Site Vulnerabilities

extreme heat risk

surface temperature above 105 degrees F



Extreme heat is common in commercial zones as well as residential zones in Somerville and Malden.

riverine flooding

100-year storm

Riverine flooding at the Fresh Pond spills out into the nearby commercial zone.

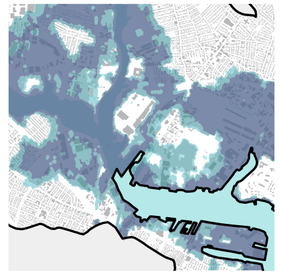
lowland flooding

100-year storm

Lowland flooding is a problem in Somerville and Malden.

coastal flooding

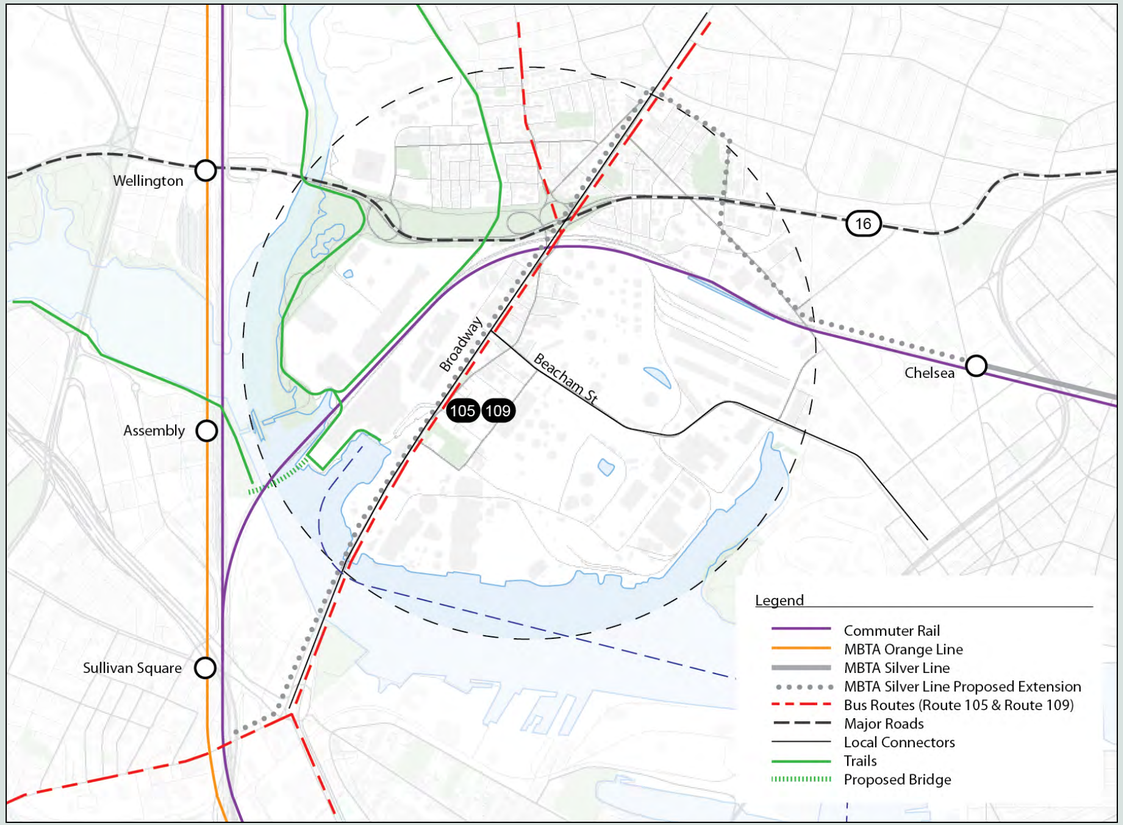
500-year storm 100-year storm annual storm



Coastal flooding overflows the Mystic River into Malden, Somerville, Everett, and the Fresh Pond area.

The Mystic River is vulnerable to the overlapping threats of extreme heat, riverine, lowland, and coastal flooding.

ABOVE AND LEFT Lower Mystic River Watershed Analysis, Sasaki Internship Project, 2019
Image credit: Sasaki



Site Mobility

Past and Future

For much of the past century, the Lower Mystic Waterfront was dominated by industry, storage yards, docks, and freight activity, with large-format retail added later. East of the study area, the state Designated Port Area (DPA) continues to maintain land for water-dependent industrial uses, shaping redevelopment potential along the river. Recent planning efforts for this area, including the Lower Broadway Urban Renewal Plan, the Everett Docklands Innovation District, and the New England Revolution Soccer Stadium, promise to transform the area into a mixed-use, multimodal neighborhood with substantial public-realm investment.

Vehicular Network

The study area is underserved by transportation modes, with two major local connectors providing substantial access: Broadway and Beacham. Broadway is a major corridor running north-south, connecting Everett Square and the rest of Everett north of the Route 16, through the site area, which becomes Alford St. as it crosses the Mystic River and connects to Sullivan Square. Beacham Street is a major corridor running east-west through the study area. Beacham Street has historically connected multiple industries (primarily energy infrastructure) and serves as a major freight corridor for the area. The planned developments will transform the land uses in this area, and Beacham Street will evolve into a multimodal corridor. Route 16 runs east-west to the north of the study area, functioning as a visible boundary between the residential areas of Everett and the commercial/industrial areas south of Route 16. The Lower Mystic Working Group Report estimates traffic could increase by approximately 34% as development expands. Because roadway widening alone will not resolve congestion, the report recommends targeted intersection improvements, refined freight management, and stronger transit, walking, and biking options.

Rapid Transit / Commuter Rail

Everett lacks direct rapid-transit service. The nearest Orange Line stations, Sullivan Square Station and Assembly Station, require bus transfers. The MBTA's Silver Line Extension (SLX) study proposes extending the SL3 through Everett via Broadway, with dedicated lanes and new stations. Commuter rail tracks pass through the area, but the nearest station is Chelsea. The Lower Mystic Working Group Report identified potential infill commuter rail stations as a long-term solution for strengthening access.

Bus

Currently, the area lacks a rapid transit connection and relies on MBTA bus routes 105 and 109 as its primary public transportation arteries. To address existing service gaps, the MBTA Bus Network Redesign and Lower Broadway – Alford Street Transit Priority Corridor propose numerous improvements. This project would construct a new separated busway, improve existing bus service, increase safety, and make way for future SL3 service extension between Chelsea and Sullivan Square. Complete Street enhancements, including dedicated lanes, queue jumps, and upgraded ADA-compliant shelters, would transform the corridor into a more reliable and dignified transit experience.

Pedestrian & Bicycle

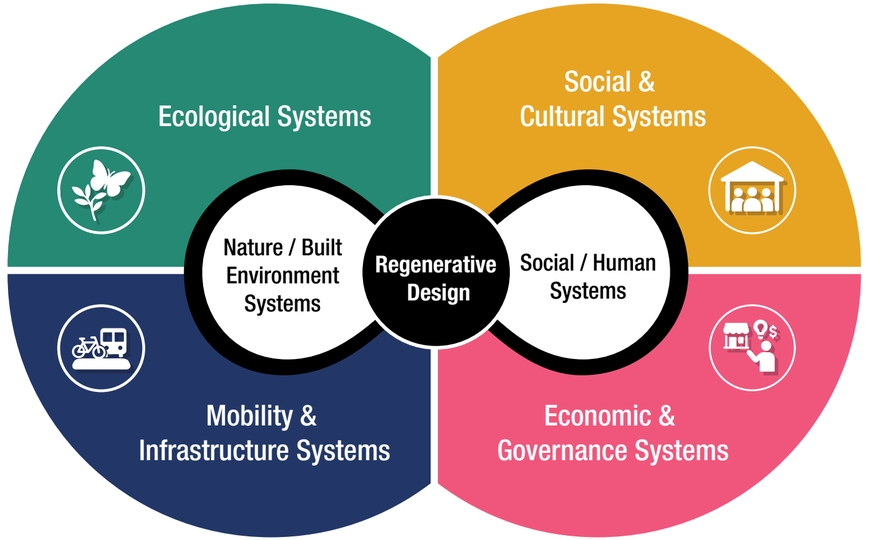
Walking and biking in this area are encumbered by fragmented sidewalks and dense roadway traffic. The most notable trail is the Northern Strand Community Trail, which connects to a larger regional trail network. The trail was recently extended all the way to the Riverwalk. Everett Crossing and the Encore Boston Harbor casino have initiated riverwalk segments, and the proposed stadium project is expected to extend public shoreline access. A proposed pedestrian-cyclist bridge would greatly increase connectivity from this area across the Mystic River.

Water Transportation

The Encore Boston Harbor dock supports water shuttles, taxis, and private vessels, offering quick access to Long Wharf and downtown Boston. Farther upriver, water transport is obstructed by the Amelia Earhart Dam.

ABOVE ULI members explore regenerative strategies to address local challenges and opportunities
Image credit: Steven Lipofsky

Regenerative Systems Thinking & Strategies



Regenerative Design Systems

Regenerative design enables us to reimagine Everett and its surrounding communities not as isolated sites of intervention, but as an interdependent, living system—one capable of restoring its own social, ecological, and economic well-being. Grounded in systems thinking, feedback loops, and a culture of shared stewardship, regenerative design challenges us to look beyond surface-level indicators such as flood extents or heat-island hotspots. Instead, it compels us to consider the underlying system dynamics, the intersections of land, water, mobility, culture, and governance that produce these vulnerabilities. By transforming these roots, we can move from reactive mitigation to proactive regeneration.

Ecological Systems
The Lower Mystic is home to some of the region's most critical infrastructure, but also some of its most degraded ecological systems. Historical industrial land use has left contaminated soils, hardened shorelines, filled-in wetlands, and extremely low tree canopy. Water quality remains impaired, with multiple river segments listed as polluted and large portions of the waterfront physically inaccessible. Climate change is intensifying these pressures: modeling indicates increasing exposure to storm surge, riverine flooding, and extreme heat, with heightened concerns about overtopping of flood-control structures and repeated inundation of low-lying industrial districts, such as the Island End River and the Everett waterfront. These ecological vulnerabilities undermine habitat health, diminish natural flood buffering, and increase risks to both communities and critical infrastructure.

Mobility & Infrastructure Systems
Mobility systems across the Lower Mystic are fragmented and dominated by auto traffic, making it difficult for residents to travel safely and conveniently by walking, biking, or public transit. Busy arterials, gaps in greenway networks, fenced industrial parcels, and restricted access through Designated Port Areas limit safe routes between neighborhoods, job centers, and the waterfront. Despite living near the river, many residents of Everett, Medford, Chelsea, and Malden face physical and psychological barriers to accessing it. This limited access reinforces automobile dependence, increases congestion and air pollution, and restricts opportunities for recreation, cooling, and exposure to nature, especially for environmental justice communities that face the greatest climate burdens.

Social & Cultural Systems
Social vulnerability is closely linked with physical and environmental risks. Everett and Chelsea are almost entirely classified as environmental justice communities, with residents disproportionately exposed to air pollution, extreme heat, industrial hazards, and limited access to high-quality open space. Health burdens, including asthma, heat stress, and cardiovascular risk, are exacerbated by poor air quality and limited tree canopy cover. Additionally, many communities lack safe, direct access to recreational resources, cultural amenities, or the river's healing benefits. These inequities compound over time, creating a system in which those with the fewest resources face the greatest climate and health impacts.

Economic & Governance Systems
The Lower Mystic Waterfront anchors critical logistics, energy infrastructure, and food distribution hubs, economic functions that can potentially incur substantial financial losses during flood events, extreme heat, and infrastructure disruptions. In addition, fragmented governance across multiple municipalities hinders coordinated adaptation, leading to project-by-project fixes rather than system-wide solutions. Intensifying development pressures along portions of the waterfront, including Everett, create both opportunities and risks. Waterfront access, a cleaned-up post-industrial environment, entertainment, and local jobs are all within reach, but without shared governance and a clear, equitable vision, market-driven projects may erode working waterfront lands, displace vulnerable residents, or miss critical opportunities to restore ecosystems and build long-term community value.

ABOVE Workshop team explores layers of site conditions and opportunities
Image credit: Steven Lipofsky

SYSTEMIC CONSEQUENCES ACROSS ECOLOGICAL, SOCIAL, AND ECONOMIC SYSTEMS

Ecologically, the hardened shoreline and filled wetlands of the Lower Mystic Waterfront have reduced flood storage, habitat quality, and water filtration capacity. This degradation exacerbates stormwater pollution and diminishes the river's natural capacity to buffer both chronic rainfall and extreme storm surges. Urban heat islands and low tree canopy in adjacent neighborhoods increase heat stress and the need for energy-intensive air conditioning, raising household costs in a community already facing affordability burdens. Until the electrical grid is decarbonized, increased electricity consumption will further increase fossil fuel use. These interacting stressors create a feedback loop in which ecological degradation amplifies infrastructure vulnerability, while failing infrastructure further impairs the river's natural recovery.

Socially, the combination of climate-intensified flooding, heat, and infrastructure fragility disproportionately harms low-income residents and workers who are less able to relocate, absorb income loss, or recover from service disruptions. Limited mobility options and fragmented connections along the river – gaps in continuous waterfront paths, incomplete bike and pedestrian networks, and constrained transit access—exacerbate isolation, reduce access to jobs and open space, and deepen inequities in who benefits from the waterfront. These mobility and access barriers compound social vulnerability, creating a system where those facing the greatest climate burdens receive the fewest health and recreational benefits.

Economically, repeated flooding and heat risk threaten billions of dollars of regional real estate and industrial activity concentrated along the Lower Mystic, including logistics, energy, and food distribution hubs. Funding volatility and fragmented governance across multiple municipalities make it harder to deliver long-term, integrated solutions, leaving communities to focus on individual projects rather than coordinated, systemwide investment that could further stabilize businesses, protect workers, and build shared value.

CORE MINDSET SHIFTS FOR REGENERATIVE SYSTEM THINKING

Mindset Shift 1: From Isolated Risks to Regenerative Potential
Resilience planning in the watershed has made significant progress in recent years, particularly in identifying risks and coordinating across municipal boundaries. The ongoing efforts of the Resilient Mystic Collaborative are detailed in their report, *Mystic River Waterfront Vision*, and also represent a critical shift: From individual public sector-led climate adaptation projects that address flooding, heat, and equity to a concrete set of regional guidelines, standards, and policies that promote holistic outcomes across all projects, public and private. Their vision for the waterfront moves beyond mitigating environmental risks to identifying community and ecological assets that, when bolstered or regenerated, transform vulnerable shorelines into thriving, self-sustaining places.

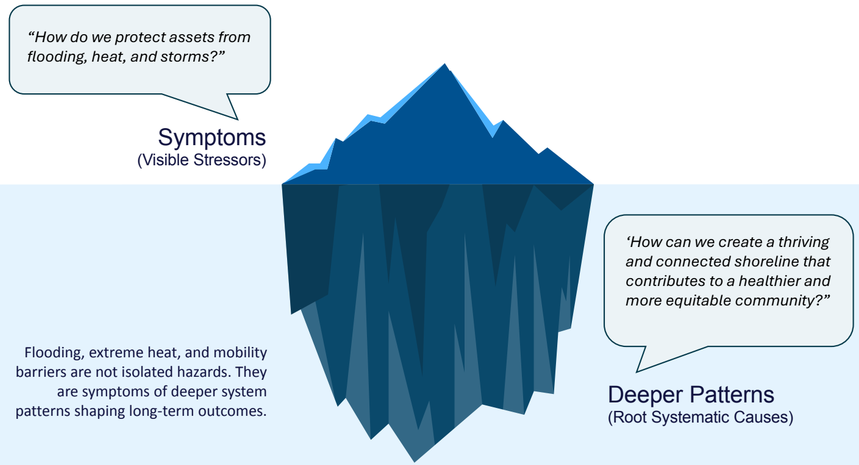
Mindset Shift 2: From Asset Protection to Net-Positive Value Creation
As development along Everett's Lower Mystic Riverfront gains momentum, there is an opportunity to transform these local initiatives into watershed-wide impacts. As developers and designers, we can shift from a project-resilience mode, more narrowly focused on protecting assets, to a regenerative design approach that fosters net-positive benefits. By incorporating regenerative design thinking, the question "How do we avoid damage from sea level rise and storms?" can be reframed as, "How can we mitigate flood risk while simultaneously building an ecologically productive, connected shoreline that generates health and equity for the community?

Mindset Shift 3: From Isolated Hazards to Underlying System Inequities
Regenerative thinking urges us to examine all levels of a system, recognizing that flooding, heat, and industrial decline are not isolated hazards. Instead, they are symptoms of deeper structural patterns, including fragmented governance, historical land-use decisions, and systemic disinvestment in Environmental Justice communities. When viewed through this lens, what appear to be purely physical vulnerabilities reveal interdependent relationships between ecological health, mobility networks, economic stability, and community power.

Mindset Shift 4: From an Asset-Centered Focus to Inclusion
Widening the frame of 'Who benefits?' is equally important in regenerative design thinking. Rather than focusing on protecting assets as a primary objective, it is essential to consider how climate investments can expand health, access, culture, and economic opportunity, particularly in environmental justice communities. This approach expands opportunities for inclusive shoreline access, community gathering spaces, small-business incubation, and green-job creation, all of which are directly tied to regenerative ecological functions.

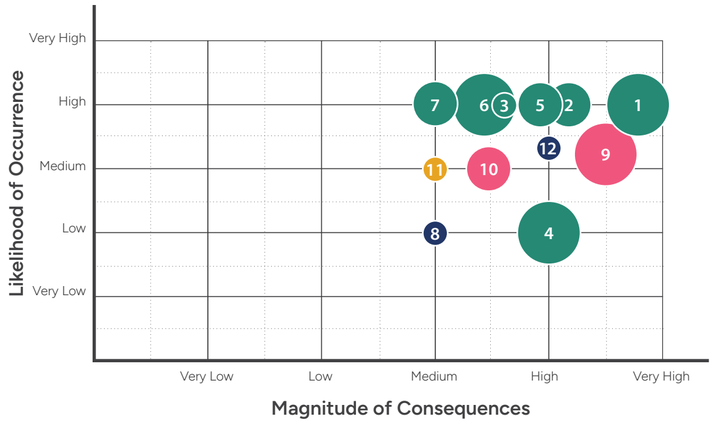
Mindset Shift 5: From Fixed Solutions to Adaptive Co-evolution
Finally, regenerative design calls for strategies that co-evolve with the changing climate, community needs, and ecological processes. These can include a phased restoration of wetlands and shorelines, improving mobility and access as neighborhoods grow and change, and strengthening governance initiatives as regional coordination deepens. By embracing co-evolution, design solutions become living systems themselves, capable of increasing their ecological, social, and economic value over time.

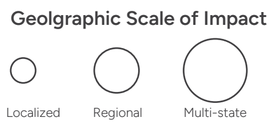
To provide context for the following section, the team evaluates the key climate and social stressors affecting the Lower Mystic River Waterfront. Drawing on the 2023 ResilientMass Plan, this high-level assessment identifies the systemic pressures that influence long-term performance and regional stability.



Stressors Evaluation

The diagram below illustrates twelve identified stressors, including climate-change drivers such as extreme temperatures, coastal flooding, and shoreline erosion, as well as social and economic pressures, such as housing affordability, health disparities, and mobility barriers. The horizontal axis represents the magnitude of potential consequences, from Very Low to Very High, while the vertical axis indicates the likelihood of occurrence using the same scale. Circle size reflects the geographic scale of impact, ranging from localized effects to regional or multi-state influence.

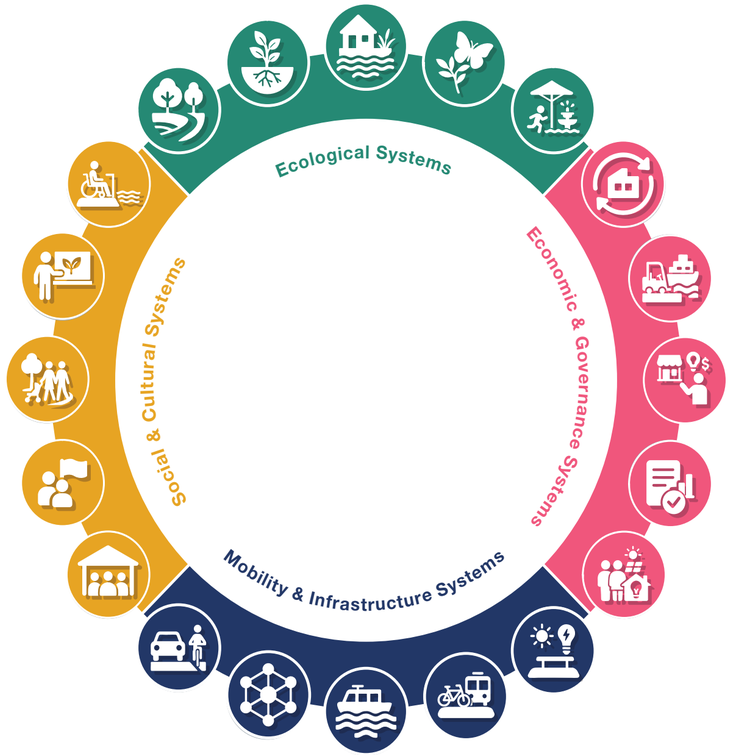




STRESSORS

1. Extreme Temperatures
2. Coastal Flooding
3. Flooding from Precipitation
4. Drought
5. Changes in Groundwater
6. Invasive Species
7. Coastal Erosion
8. Industrial Legacy
9. Housing Pressure
10. Income Inequality
11. Health Disparities
12. Mobility Barriers

Regenerative Design Matrix With Systems Overlay



Regenerative Design Strategy Matrix

Building on the system's assessment of stressors, vulnerabilities, and underlying patterns, the next step is to translate these insights into action. Regenerative design requires moving beyond isolated solutions toward coordinated strategies that work across ecological, social, mobility, and economic systems.

The Regenerative Design Strategy Matrix organizes this shift. It brings together system vulnerabilities, regenerative principles, and place-based actions to illustrate how these interventions can reinforce one another over time. Rather than addressing challenges in isolation, the matrix frames regeneration as a set of interconnected measures designed to evolve with ecological conditions, community needs, and regional coordination.

These strategies are not intended as a checklist or a single prescription. Instead, they provide a flexible framework that can be adapted to site-specific conditions, governance structures, and development contexts, supporting regenerative outcomes across public and private projects.

With this framework in place, the following section illustrates how regenerative strategies could be applied within a specific context along the Lower Mystic River Waterfront. By grounding the framework in an actual site, the design explorations demonstrate how systems-based thinking can inform spatial decisions and identify opportunities for regeneration that evolve over time.

Regenerative Design Strategies

Ecological Systems

System Vulnerabilities	Regenerative Principles	Strategies: Regenerative Benefits
Urban heat islands, degraded soils, biodiversity loss, flood risk, fragmented ecosystems.	Restore natural cycles and biodiversity for a healthier ecosystem	**Blue/Green Corridors:** Restore hydrological cycles, reduce urban heat, increase biodiversity connectivity
		Soil renewal and remediation: Remove toxins, improve soil fertility, carbon sequestration
		Living or Hybrid Shorelines: Flood protection, erosion control, habitat creation
		Biodiversity and Native Species: Enhance pollinator networks, restore ecological balance
		Urban Forest and Shade: Improved thermal comfrot: Reduce urban heat islands through shade and evapotranspiration. Reduce wind.

Social & Cultural Systems

System Vulnerabilities	Regenerative Principles	Strategies: Regenerative Benefits
Waterfront inaccessibility, limited ecological literacy, community disconnection, unewelcoming spaces	Center equity, cultural identity, and community well-being	**Inclusive shoreline access:** Expand equitable access to waterfront recreation, cultural expression, and well-being
		Ecology Education Programs: Build stewardship, knowledge transfer, and cultural connection to ecology
		Spaces & Amenities for Community: Places to express culture that supports and invites community and connection. Amenities that simply support comfort in enjoying public spaces.
		Community Stewardship: Organizational involvement, and community engagement in stewarding the land and community spaces.
		Participatory Decision-Making: Strengthen civic trust, understanding and engagement. Support procedural justice and outocmes

Economic & Governance Systems

System Vulnerabilities	Regenerative Principles	Strategies: Regenerative Benefits
Industrial legacies, economic vulnerability, inequality, short-term incentives.	Align governance and investment with a regenerative, circular economy	**Circular Economy Manufacturing Hub:** Close resource loops, create green jobs, reduce industrial waste, minimize extraction of virgin material
		Working Waterfront with Local Jobs: Support local economy while minimizing displacement of working-class community members.
		Small Business Incubation: Support entrepreneurs, strengthen local economic resilience
		Policy + Incentive Reform: Address fragmented governance. Modernize policies to allow for recent or novel regenerative solutions. Shift incentives toward equity, resilience, and low-carbon solutions
		Equitable Revitalization: Target equitable distribution of burdens and benefits. Capture increase in property values to support public infrastructure investments and local services. Minimize displacement.

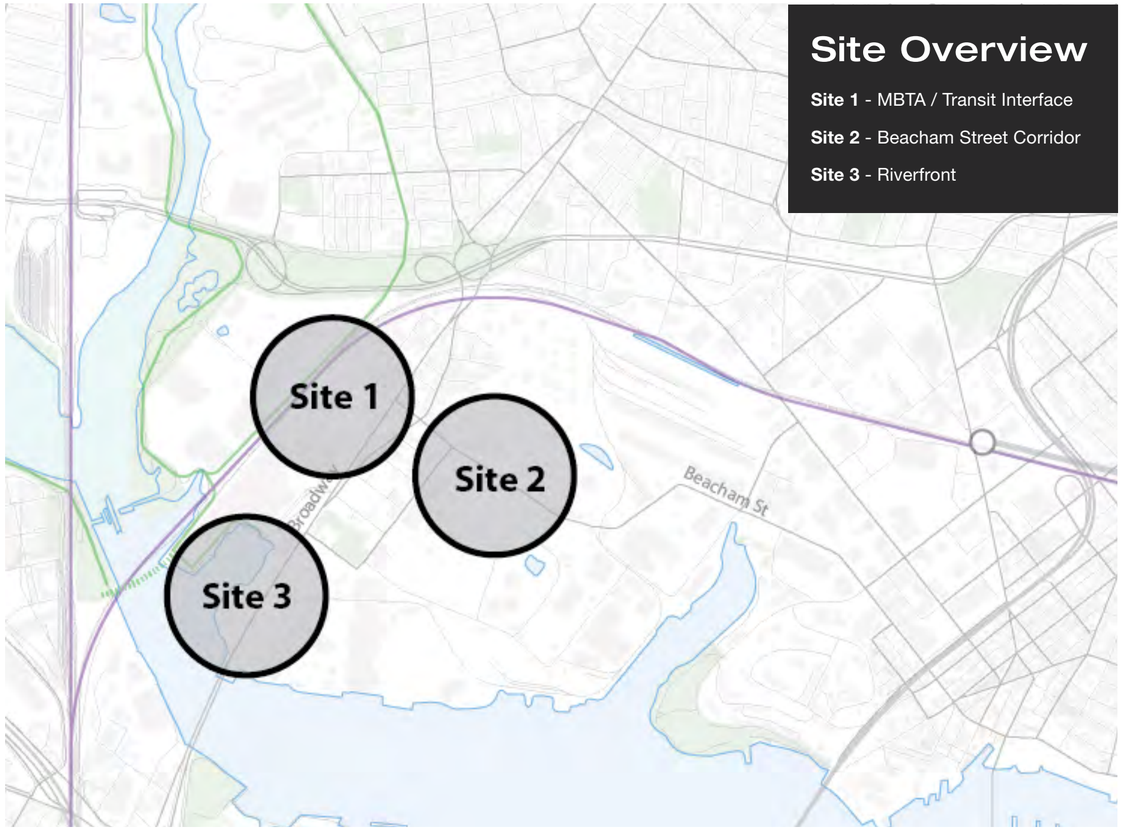
Mobility & Infrastructure Systems

System Vulnerabilities	Regenerative Principles	Strategies: Regenerative Benefits
Car dependency, disconnected green space, carbon emissions and history of extractive economy	Reclaim Streets for People and Nature and achieving a net zero carbon development	**Living Green Streets:** Reduce heat island effect, prioritize pedestrian/cyclist safety and comfort, stormwater infiltration
		Regional Resilience Network: Interconnected green/blue/grey infrastructure and designed redundancy minimize risk to transit or utility operations
		Water-Based Transit: Improve walkability, reduce vehicular reliance, Connect communities
		Reclaimed Land for Mobility Corridors: Reduce vehicle emissions, reconnect communities to waterways, multimodal resilience, expand options
		Innovative Energy Systems & Ownership: Grid resiliencie (through storage, distribution), equitable distribution of benefits and burdens of energy tranformation

ABOVE Workshop Team develops design concepts
Image credit: Steven Lipofsky

Regenerative Design Explorations

This report examines three strategic geographies within Everett's industrial waterfront where targeted interventions can catalyze resilience, expand access, and unlock long-term community value. Each site offers a unique opportunity to resolve local challenges while integrating the waterfront into the region's broader economic and ecological networks.



Site 1

MBTA / Transit Interface: A Connected, Community-Centered Gateway

SITE CONTEXT & CHALLENGES

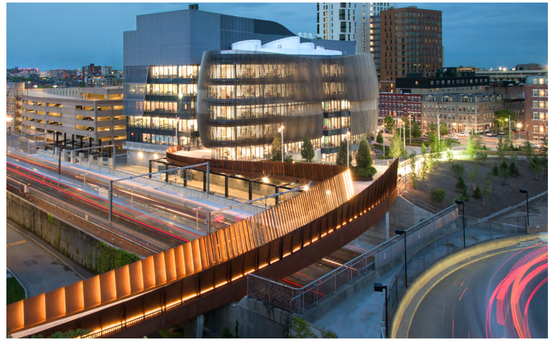
Situated along the Lower Mystic River, this site is rich in transit assets yet encumbered by fragmented rail infrastructure, wide industrial roadways, and heat-prone hardscape. The MBTA Main Repair facility - which provides support to all bus and rapid transit vehicles, is also located on the opposite side of the train tracks. Pedestrian and bike access to jobs and the waterfront is unsafe, discontinuous, and inequitable for those without motor vehicles.

GOALS & VISION

Transform the area into a safe, people-first mobility corridor that seamlessly connects the neighborhood to the shoreline. The vision emphasizes shaded streets, accessible crossings, legible pathways,

BOTTOM LEFT View of Gateway Center looking toward Encore
Image credit: Google. 2025. Retrieved Februrary 22, 2026

RIGHT Site 1 Design Exploration
Image credit: Design by Devanshi Purohit, Render by Annabelle Li



TOP LEFT Frances Appleton Pedestrian Bridge in Boston, MA
Image credit: Chen Qin

TOP RIGHT The PedX bridge at Northeastern University elegantly knits together campus and neighborhood across several lines of track near a high use transit station.
Image credit: Tanguy Marquis, Payette

BOTTOM LEFT Heartland of America Park
Image credit: HDR and OJB Landscape Architecture

BOTTOM RIGHT BP Pedestrian Bridge, Chicago
Image credit: Torsodog

and public realm upgrades that facilitate travel on foot, by bicycle, or in wheelchairs, making it easy, comfortable, and dignified.

DESIGN CONCEPT

A new transit node anchors the site and serves as the primary equitable access point to riverfront jobs, amenities, and open spaces. A bicycle and pedestrian bridge at this hub crosses the rail corridor, knitting the area together by connecting:

- Alford Street bike lanes
- The Broadway corridor
- Northern Strand Community Trail
- The Waterfront

These connections extend into blue-green corridors featuring native, climate-adaptive plantings, bioswales at flood-risk locations, and tree canopies/shading structures to create cooler, safer routes for commuters and residents year-round.

REGENERATIVE BENEFITS

Ecological – Expanded habitat and nature-based stormwater systems increase biodiversity, absorb runoff, and reduce local heat stress.

Social – Enhanced active-mobility access improves health, lowers transportation burdens, and opens pathways to jobs, services, and recreation for public transit-reliant communities.

Economic – A safer and more appealing “gateway” attracts waterfront investment, encourages a modal shift that reduces operating costs and emissions, and activates the shoreline as a daily destination.

Together, these layered interventions transform the rail-barrier edge into a community-centered hub that supports climate resilience, inclusive access, and long-term economic vitality.

Site 2

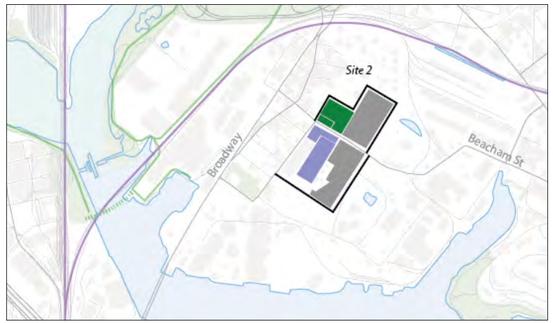
Beacham Street Corridor: A Regenerative Industrial Corridor for Community Prosperity

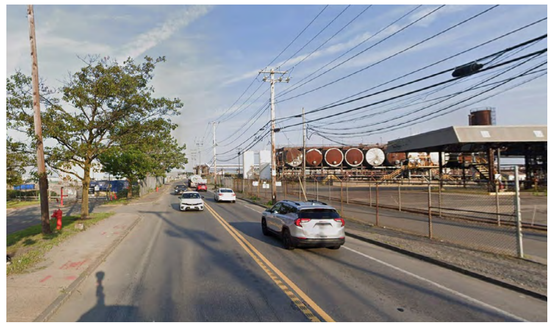
SITE CONTEXT & CHALLENGES

Beacham Street is a industrialized logistics corridor characterized by aging infrastructure, expansive impermeable surfaces, and vulnerability to extreme heat. Despite its strategic role in regional logistics, it currently functions as an industrial backlot—extracting value from the land while burdening nearby residents. The proposed battery storage facility represents an important step in the regional energy transition. Such facilities typically require setbacks and perimeter fencing, which can create physical separation. The challenge is to ensure that essential energy and industrial uses coexist with an improved public realm, stronger ecological performance, and expanded community access.

GOALS & VISION

The vision repositions Beacham Street as a regenerative industry corridor that strengthens the local economy while improving environmental performance and neighborhood quality of life. By transitioning from a fossil-fuel-centric logistics zone toward a circular-economy innovation district, the corridor can foster workforce development and create public interfaces that invite community participation. This future aligns with regional goals to sustain local jobs, advance clean energy, and create community-rooted economic value.





BOTTOM LEFT View of Beacham Street
Image credit: Google. 2025. Retrieved February 22, 2026

RIGHT Site 2 Design Exploration
Image credit: Design by Chen Qin, Render by Annabelle Li

TOP LEFT Hamilton Center, a resilient, triple net-zero community built on a circular systems framework integrating energy, water, and carbon
Image credit: HDR

TOP RIGHT Cira Green, a 1.25-acre elevated public park in Philadelphia's University City by Erdy McHenry Architecture, built atop a parking garage. The park functions as a vibrant community gathering space while mitigating stormwater runoff.
Image credit: Christopher Kao, Philly By Drone

DESIGN CONCEPT

Battery Park and the Materials Innovation Yard reimagine the industrial edge as a civic-oriented place. A multi-level parking structure anchors the transition between industry and community. Clad with a photovoltaic façade and topped with an accessible green roof, the structure serves as both renewable energy infrastructure and a physical buffer, shielding proposed Battery Storage site next door while softening the edge of the public realm.

Battery Park: The Energy Interface

- **Youth-Focused Creative Hub:** A learning center wraps the street edge.
- **Energy Overlook:** A walkable green roof atop the parking structure, integrated with photovoltaic façade panels, generates on-site renewable energy while providing a view of the proposed clean-energy systems. This transforms traditionally "gray" infrastructure into an educational and civic asset.
- **Regenerative Plaza:** Replaces asphalt with rain gardens that manage industrial runoff while creating a shaded gathering space.

Materials Innovation Yard: The Circular Hub

- **Low-Carbon Architecture:** : Mass timber structures and integrated photovoltaics provide a sustainable home that supports small businesses, fabrication bays, and materials R&D.
- **The Maker's Market:** Covered maker spaces host weekend markets, connecting residents with innovators transforming waste into new products.

REGENERATIVE BENEFITS

Ecological – Native or adapted non-invasive plantings, rain gardens, and reduction of hardscape improve stormwater resilience and reduce heat effects, while clean-energy infrastructure lowers emissions and dependence on fossil fuels.

Social – Public-facing industrial interfaces foster transparency, youth education, and pride in local innovation; shaded, walkable streets improve safety and comfort for workers and residents.

Economic – Circular-economy ventures generate stable, well-paid jobs, support workforce training geared to nearby neighborhoods, and convert previously extractive land uses into community-owned opportunities.

By uniting clean energy, circular production, and welcoming public space, Beacham Street evolves from a back-of-house zone into a regenerative industrial district, one that powers the city, restores ecological function, and builds long-term prosperity for the community it serves.

BOTTOM LEFT The New York Climate Exchange, a climate innovation campus by SOM featuring mass timber and PV arrays, unites research labs, community and education programs, and public space.
Image credit: SOM

BOTTOM RIGHT Texas A&M University Aplin Center, a hybrid mass timber-forward academic hub by DLR Group that advances low-carbon construction and regenerative, hands-on learning environments
Image credit: DLR Group

Site 3

Riverfront: A Regenerative Shoreline for Ecological and Community Resilience

SITE CONTEXT & CHALLENGES

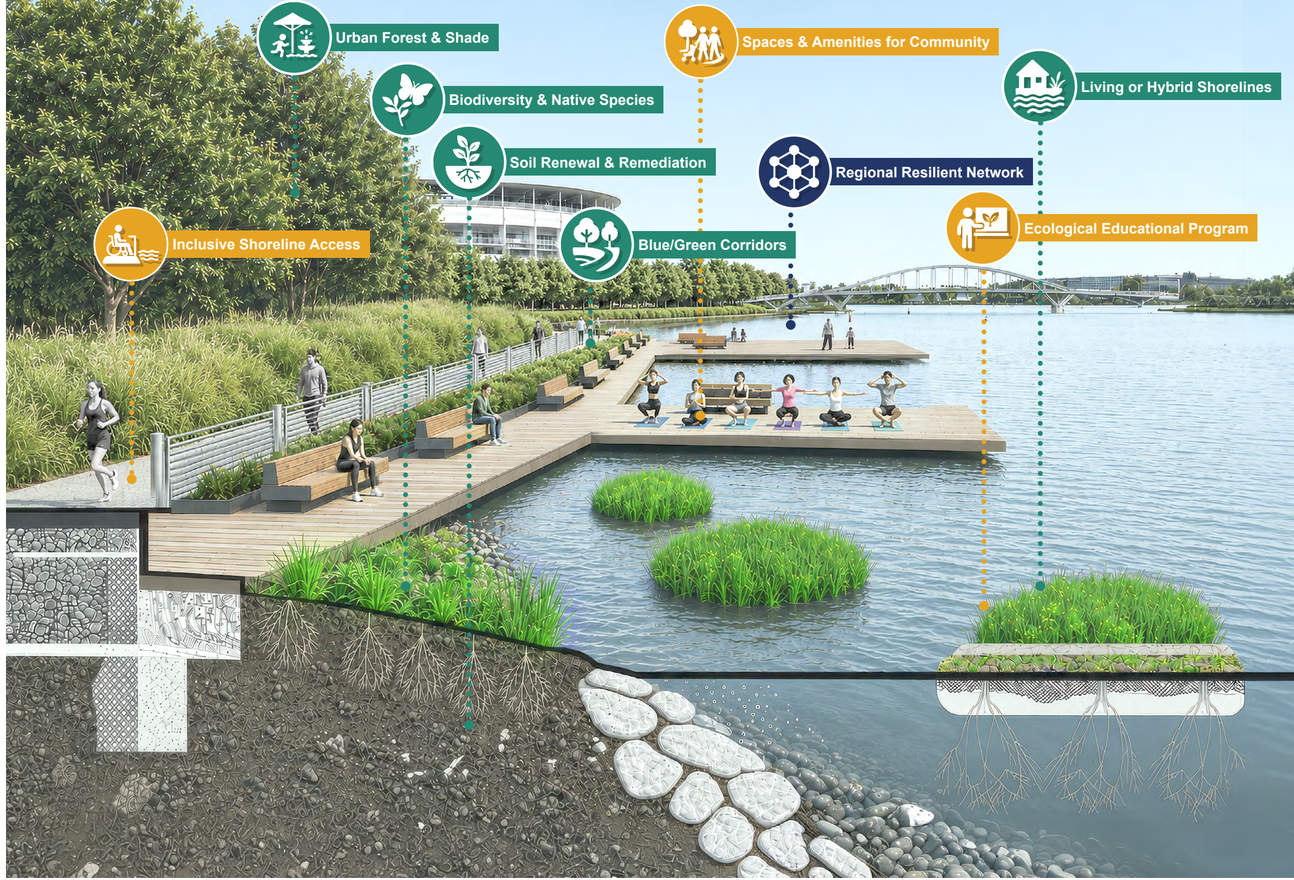
The river's edge in Everett is dominated by hardened industrial infrastructure that impedes ecological functions and restricts community access to the water. This area of the Mystic River has been filled in over the years and is increasingly vulnerable to storm surges and sea-level rise. Everett's environmental justice communities, located in the site's densely built interior, lack green space for recreation and are vulnerable to extreme heat in the summer. Redevelopment of the shoreline and industrial area offers an opportunity to improve equitable access to green and blue spaces.

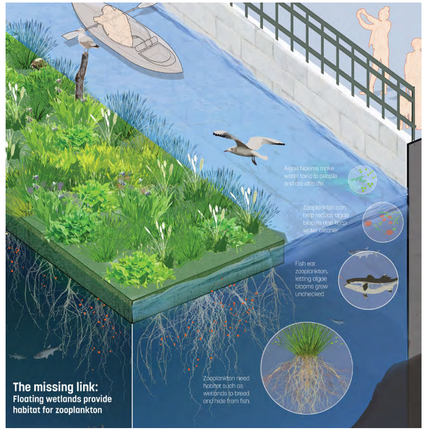
GOALS & VISION

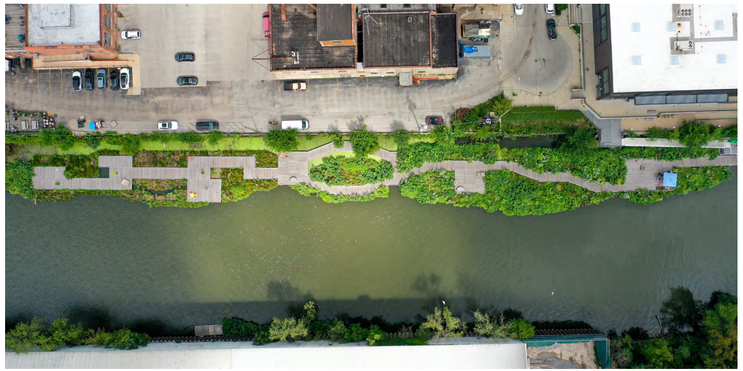
The vision is to create a regenerative shoreline that is ecologically thriving and socially inclusive. In place of an inert protective edge, the shoreline transforms into a welcoming public landscape where restored salt marshes and mudflats, along with a habitat-rich berm vegetated with stabilizing native grasses and pollinator species, reinforce community health, reduce climate risks, and provide an enduring connection to the Mystic River. This aligns with local initiatives, including the Mystic River Watershed Association's shoreline revitalization work, demonstrating that ecological repair and public benefit are mutually reinforcing goals.

BOTTOM LEFT View of Mystic River from Encore Riverwalk
Image credit: Google. 2025. Retrieved February 22, 2026

RIGHT Site 3 Design Exploration
Image credit: Design by Gary Hon, Render by Annabelle Li







DESIGN CONCEPT

A new floating boardwalk provides the vital missing link to the Mystic River Riverwalk, connecting Encore Boston Harbor to the proposed Revolution Stadium, transforming the waterfront into a continuous, accessible public realm.

- The floating structure accommodates tidal fluctuation and provides an immersive platform with direct access for kayaking, fishing, and swimming.
- Living shoreline treatments replace hard edges with wetlands and vegetated banks that mitigate erosion and flooding, filter runoff, provide habitat and diversity, and sequester carbon.
- Seawalls and vegetated berms provide flood protection, integrating a raised pedestrian and bike path that remains accessible when water levels rise
- Demonstration wetlands allow visitors to engage with ecological restoration as a visible, educational process that encourages environmental advocacy.

Collectively, these elements restore the river's edge as both a climate-adaptive infrastructure system and a community destination.

TOP LEFT Charles River Floating Wetland
Image credit: Dr. Max Rome, Charles River Conservancy

TOP RIGHT Charles River Floating Wetland
Image credit: Dr. Max Rome, Charles River Conservancy, Sasaki, Hideo Sasaki Foundation

BOTTOM LEFT Block Party at the Wild Mile
Image credit: Sage Rossman, Urban Rivers

BOTTOM RIGHT Bird's eye view of Wild Mile
Image credit: Sage Rossman, Urban Rivers

REGENERATIVE BENEFITS

Ecological – Enhanced habitat diversity, improved water quality, and stronger natural flood storage—benefits that will increase as vegetation matures and ecosystems regenerate.

Social – Expanded public access to the water provides cooler landscapes, healthier recreation opportunities, and everyday river engagement for nearby EJ communities who have been historically excluded.

Economic – Activation of the shoreline supports new recreational and tourism opportunities while protecting adjacent development from future storm damage, reducing long-term risk and costs. It also supports the blue economy, providing maintenance, engineering, ecological testing, and research jobs.

HOW THESE 3 SITES AND THE PROPOSED STRATEGIES WORK TOWARDS AN INTEGRATED REGENERATIVE FUTURE

Taken together, the regenerative shoreline, community-centered neighborhood, and regenerative industry form an interdependent system rather than three isolated initiatives. The regenerative shoreline provides ecological performance (flood storage, cooling, habitat) that underpins safe, attractive public spaces and protects both homes and workplaces, while people-first streets and greenways ensure waterfront benefits are physically accessible to nearby EJ communities.

Reciprocally, the circular economy and resilient industrial uses anchor local employment and expand the tax base in ways that are synergistic with restored ecosystems and public access. This reduces pressure to displace maritime and industrial jobs entirely while still improving environmental performance. Over time, this system can evolve through iterative, community-led planning that builds on existing regional collaborations like the Resilient Mystic Collaborative. This will enable governance to shift from fragmented, project-by-project decisions to shared stewardship of a regenerative river corridor that continually improves ecological health, social equity, and economic resilience.

THIS PAGE Regenerative Design Workshop
Image credits: Steven Lipofsky

ABOVE Participants in the Boston ULI Resiliency Committee's Regenerative Design Workshop, Spring 2025
Image credit: Steven Lipofsky

Toward Regenerative Futures

Where do we go from here?

Building upon the foundation of previous ULI Boston Resilience Committee reports, *Living with Water* and *Living with Heat*, this latest report, ***Living Better: A Regenerative Design Approach to Coastal Redevelopment***, was conceived as a strategic visioning exercise. Our goal was to apply the nascent concepts of Regenerative Design and Systems Thinking to a complex, real-world environment: the Lower Mystic Watershed, an area currently undergoing significant redevelopment.

While this holistic approach requires a radical shift in thinking, the urgency has never been greater. Whereas previous reports addressed specific climate consequences by 'future-proofing' our living spaces, this report recognizes that both our species and our built environments are already evolving in response to a changing climate. As these risks accelerate, we must shift from a fundamentally defensive posture toward a design philosophy that works in harmony with living systems.

AN EVOLUTIONARY PROCESS

The movement toward Regenerative Design is rooted in the foundational work of organizations such as the U.S. Green Building Council (USGBC,founded in 1993) and locally, the Boston Green Roundtable, which spawned the USGBC Chapter in Massachusetts now known as BE+. These pioneering efforts (as well as those of numerous other organizations) paved the way for the Living Building Challenge in 2009, which, at the time, was considered visionary, albeit difficult to achieve in its full scope. This evolution led to the 2025 launch of LEED v5, which transforms regenerative strategies such as ecological restoration and circularity from optional credits to essential components of LEED's rating systems.

The evolution of Regenerative Design parallels the evolution of our own species: change is constant, and survival requires adaptation. The degradation of natural habitats, persistent pollution, threats to food security, and global inequality now jeopardize the survival of all species, demanding creative, swift, and systemic action.

ENTER REGENERATIVE DESIGN AND SYSTEMS THINKING

By integrating emerging technologies with science-based studies of indigenous natural systems, we can move beyond isolated solutions toward holistic systems thinking. This allows us to bridge the gap between theory and practice, evolving our approach from *systems thinking* into *systems behaving*.

As the report states, municipal planners, developers, designers, entrepreneurs, and environmental groups are increasingly integrating these systems into project design and development.

Examples

Here are additional examples of the various components of Regenerative Design principles in practice:

WATER

A regenerative design approach will create more resilient water management systems that implement integrated strategies.

We saw this in practice following the devastating impacts of Tropical Storm Helene in 2024. The City of Asheville, North Carolina, enlisted the assistance of a ULI Advisory Services Panel to provide guidance on developing a new resilience framework. The team devised a single, cohesive strategy that integrates infrastructure, equity, housing, the economy, and cultural vitality. As detailed in the Fall 2025 edition of ULI's *Urban Land* magazine, the objective was to "Not just 'build back same' but 'build back with an urban plan so it's better for the whole community.'"

The panel recommended moving away from a siloed approach toward a countywide strategy that included establishing a One Water Council to align city and county agencies, launching a countywide stormwater master plan, and upgrading critical infrastructure. Restoring natural floodplains and riparian buffers was also emphasized as a cost-effective, regenerative path toward long-term resilience.

AIR

Regenerative design thinking will clean the air through strategies that incorporate living systems.

Green roofs and walls filter pollutants and sequester carbon, using natural materials and non-toxic finishes that minimize air pollution. Biophilic design that includes natural ventilation and daylighting reduces energy use and improves indoor air quality. These principles go beyond sustainability to actively restore and enhance environmental health within the built environment and the surrounding ecosystem. An example of an international residential project that integrated strategies to reduce carbon emissions and mitigate the heat island effect is the Vertical Forest Project in Milan, Italy.

FOOD

The production of food as a vehicle for sustaining life while restoring the natural environment.

Two examples of this practice are New York City's Billion Oyster Project and the Mass Oyster Project, which are helping to restore the ecosystems of New York Harbor and Boston Harbor. Additionally, the Boston Farms Community Land Trust, founded by the Urban Farming Institute, converts vacant land into green spaces for food production in the Boston neighborhoods of Roxbury, Dorchester, and Mattapan. Vertical farming is the practice of converting underutilized, existing buildings into spaces for growing crops, taking advantage of existing assets – and their embodied carbon – while eliminating the need to ship food to cities over long distances.

INTERCONNECTEDNESS OF PEOPLE WITH NATURE

Regenerative Design will also reinforce and promote the connections between human beings and nature.

One large-scale example of how this can be effectively implemented is the Great Green Wall in Africa. This project transcends mere 'tree planting' to address the interconnectedness of people and nature. Restoring 100 million hectares (247,105,380 acres) of degraded land creates a self-sustaining system for food security, job creation, and climate stability across an entire continent.

There are many examples of how Regenerative Design and Systems Thinking have been incorporated into projects large and small. What we have learned over the course of this strategic visioning exercise is that implementing these principles into development and redevelopment projects will require a fundamental change in design philosophy. We have also learned that small, strategic interventions, when executed with a holistic understanding of a site's context and systems, can have a significant impact.

We can begin by looking to nature to determine our path forward. Despite recent evidence to the contrary, humankind is capable of becoming a keystone species – a role critical to an ecosystem's stability, much like the stone at the apex of an arch that prevents a structure from collapsing. While beavers, bees, and coral play pivotal roles in supporting their habitats, humans have become something closer to an invasive species (non-native organisms that spread rapidly and harm the environment, economy, or human health). Since the dawn of the industrial era, our impact has shifted from supporting the arch to destabilizing it.

Returning to the original question, 'Where do we go from here?' We face a fundamental choice: to remain in our current role as an invasive presence or to pivot to one of a keystone species. For those of us shaping the built environment, this is more than a visionary goal. Given our professional Standard of Care, we have an ethical obligation to move toward a regenerative future. We invite planners, designers, and ecologists alike to join this conversation, breaking down our professional silos to ensure the 'arch' of our shared environment remains stable for all.

Appendix & Resources

Appendix A: Footnotes

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Appendix B: Additional Resources

REGENERATIVE DESIGN

HDR Regenerative Design Landing Page (AEC firm)
Definition of regenerative design, framework for regenerative design, list of related articles.
Sub Topics: definition, building scale, mass timber,

Living Future Regenerative Materials Now Playbook (2024)
Regenerative Materials NOW: A Playbook for Designers and Specifiers is an industry report from Living Future offering 40 actionable strategies to help design professionals advance the use and advocacy of regenerative materials through holistic, systems-based approaches.
Sub topics: materials, carbon footprint

How do we achieve nature positive? A vision and targets for the UK residential and commercial development sector | npj Urban Sustainability (2025)
A journal article about biodiversity and nature positive with several interesting concepts including "the biodiversity net gain standard" and backcasting as a process to identify
a future vision and how to get there.
Subtopic: biodiversity

WORKS With Nature — Climate Positive Design (2024)
A worldwide guide containing techniques that effectively adapt, mitigate, and restore both our communities and ecosystems, utilizing nature-based design to prepare for a resilient future.
Sub topics: design, ecological health, public space

Work of Michelle Laboy (Urban Voids and Metabolic Infrastructure)
Urban Voids (2006) and Metabolic Infrastructure (2017) are two projects from FieLDworkshop that identify opportunities and methods for increasing ecological health in urban areas.
Sub topics: public health, public space, design

How regenerative urban design transforms spaces for people and the planet (2025)
Overview of the central concepts and impact of regenerative design.
Sub topics: Urban design, ecological health

ULI – Nature-Positive and Net Zero
A report by Urban Land Institute that outlines how the real estate sector can align climate mitigation (net zero carbon) with biodiversity restoration (nature positive outcomes) by embedding ecological thinking into investment, design, and asset management decisions.

REGENERATIVE DESIGN PLANNING & POLICY

Planning for a Green City: The Green Factor Tool (2018)
An overview and analysis of the Green Factor Tool, which helps cities to increase the share and effectiveness of green areas.
Sub topics: green infrastructure, urban design

Cambridge MA Green Factor/Cool Score
Part of Cambridge's Green Building Requirements, Green Factor is a performance-based standard that encourages heat mitigation through site and landscape designs that have a cooling benefit.
Sub topics: heat resilience, urban design, zoning

Somerville MA Green Score (Section 10.4, Zoning Ordinance)
Somerville's zoning tool to incentivize landscape elements and site design that contributes to the reduction of storm water runoff, the improvement of urban air quality, and mitigation of the urban heat island effect by evaluating site elements for a "Green Score."
Sub topics: green infrastructure, heat resilience, zoning, urban design

Seattle Green Factor
Seattle Green Factor is a score-based code requirement that increases the amount of and improves the quality of landscaping in new development. This requirement primarily applies to multifamily and commercial development.
Sub topics: green infrastructure, heat resilience, zoning, urban design

Washington DC Green Area Ratio (2021)
The Green Area Ratio is an environmental sustainability zoning regulation that sets standards for landscape and site design to help reduce stormwater runoff, improve air quality, and keep the city cooler.
Sub topics: green infrastructure, heat resilience, zoning, urban design

Metro Mayors Climate Smart Cities Platform (Ongoing)
A voluntary coalition of Greater Boston communities who work together to find solutions to common problems, specifically the upcoming impact of climate change, with the support of the Trust for Public Land and MAPC.
Sub topics: climate policy, resilience planning

Project Sunroof: Rooftop Solar PV Potential (Ongoing)
Originated as a resource for determining potential for solar infrastructure for building owners, this tool can be used to determine the potential for solar infrastructure and energy savings on many scales.
Sub topics: Renewable energy

BIODIVERSITY

Somerville Pollinator Action Plan (2024)
Somerville's municipal plan to encourage the development of pollinator gardens. Includes resources for property owners to build and design their own pollinator gardens.
Sub topics: ecological health

New York City BioDiversity TaskForce (2025)
2025 report from the New York City Biodiversity task force lays out priorities and recommendations for maintaining and increasing biodiversity around the city.
Sub topics: Ecological health

Mystic River Herring Run
Informational resource about the native herring found in the Mystic River, including information about their migration habits report of their resurgence after dam passage improvements.
Sub topics: Ecological health

Bug Roads (2025)
This study models how bees move through New York City and finds that buildings significantly lengthen their flight paths between parks while many green spaces lack enough habitat to support native solitary bees. The authors show that connectivity for pollinators is limited but could be improved through added habitat in small parks, green roofs, and "stepping-stone" plantings across the city.
Sub topics: green infrastructure, urban design, ecological health

USDA Plant Hardiness Map (2023)
Nationwide resources for determining plant hardiness zones based on average annual extreme minimum winter temperature.
Sub topics: landscape, ecological health

AHS Plant-Heat Zone Map (Ongoing)
Created as a complementary map to the USDA plant hardiness map, this map tracks nationwide planting zones according to number of days per year over 86°F.

GREEN / COOL ROOFS

Green Roof & Wall Policy in North America (2023)
The Green Roofs for Healthy Cities Policy Guide provides professionals in the green infrastructure industry with information about where to source supportive policies and programs for green roof and wall installation across North America.
Sub topics: policy, resilience planning, green infrastructure

Cambridge Green Roof Requirement (2022)
Cambridge ordinance requiring green roofs, or a payment in lieu, for buildings over 25,000 square feet.
Sub topics: Solar energy, large projects

MAPC Cool Roofs
MAPC resource for the area to demonstrate the benefits of cool roofs and provide resources for interested building owners.
Sub topics: heat resilience

Cool Roof Rating Council
A nonprofit organization that develops fair, accurate, and credible methods for evaluating and labeling the radiative properties of roofing and exterior wall products, providing resources for those interested in cool roofs.
Sub topics: heat resilience

URBAN FOREST PLANNING

Somerville Urban Forest Management Plan (2021)
Plan for the City of Somerville to maintain and expand its tree canopy, including specific recommendations for addressing short-term and long-term maintenance needs for inventoried public trees, as well as suggestions for improving urban forestry operations and public outreach.
Sub topics: green infrastructure, urban design, ecological health

Cambridge Urban Forest Master Plan (2020
City of Cambridge's guide to the development of its urban forest, including a strategic plan to evaluate, maintain and expand the urban forest canopy while being more resilient to climate change, reducing the urban heat island effect, mitigating stormwater runoff, and more.
Sub topics: green infrastructure, urban design, ecological health

Boston Urban Forest Plan (2022)
Citywide plan for how the Boston community can work together to prioritize, preserve, and grow our tree canopy.
Sub topics: green infrastructure, urban design, ecological health

NATURE-BASED SOLUTIONS

A Catalogue of Nature Based Solutions for Urban Resilience (2021)
A good example of a menu of solutions along with cards further describing each solution

Assessing the Socio-Economic Impacts of Nature-Based Solutions in Coastal Resilience Projects
This study examines real-world Nature-based Solutions projects in the U.S., China, and Japan and finds that while these efforts can improve quality of life, support vulnerable communities, and boost local economies in climate-vulnerable coastal cities, they also risk creating inequities.
Sub topics: urban design, equity, coastal resilience

Biophilic City Design Resources
Compilation of resources related to design of biophilic cities, including focus on different aspects of biophilic design such as birds and tree canopy.
Sub topics: urban design, ecological health, green infrastructure

100 Climate Actions from Cities in Asia and the Pacific (2021)
List of city-level initiatives from across Asia that contribute to reducing GHG emissions and building resilience while delivering economic, environmental, health, and social co-benefits.

Coastal wetlands reduce property damage during tropical cyclones (2020)
Fanglin Sun and Richard T. Carson
Shows that coastal wetlands reduced flood damages by up to 29% annually, translating to billions in avoided loss and higher home prices.

Estimating the Effect of Tidal Marsh Restoration on Housing Prices (2022)
Anthony Good and Emily Pindilli
Homes near restored tidal marshes gained $10,000—$37,000 in value depending on distance. Supports the claim that regenerative waterfronts, restored ecological function, and open space raise land values and support stronger underwriting.

Capitalized value of evolving flood risks discount and nature-based solution premiums on property prices (2023)
Asli Mutlu, Debraj Roy, Tatiana Filatova
Finds homeowners' willingness to pay reflects flood-risk reduction from nature-based strategies. Below are items that I'd like to see added to the Resources Section.

URBAN HEAT ISLAND MANAGEMENT / OUTDOOR THERMAL COMFORT

Planck Energies - Cooling Paint R&D (2024)
Article on an emerging cooling paint technology being tested at Northeastern University.

Smart Surfaces Coalition (Ongoing)
Coalition dedicated to expanding the use of Smart Surfaces (green roofs, cool pavement) in cities to reduce heat, mitigate flooding, and increase livability. Offers policy resources to encourage implementation of smart surfaces worldwide.
Sub topics: Urban design, green infrastructure

Toronto Thermal Comfort Guidelines (2025)
Toronto study of thermal comfort of public spaces based on effects of wind, shadows, and heat, and analysis of how municipal ordinances influence overall comfort of the public realm.
Sub topics: public spaces, large projects, urban design

Boston MPO NO-HEAT Project (Ongoing)
Summary of Boston MPO "Neutralizing Onerous Heat Effects on Active Transportation" (NO-HEAT) project, which aims to enhance climate resilience by studying the dangerous heat exposure faced by people in Boston-area communities who walk and bike.
Sub topics: Mobility, Bicycle and pedestrian infrastructure

APA Planning for Urban Heat Resilience (2022)
A framework to support planners so they can equitably prepare for and adapt to both chronic and acute heat risk through heat mitigation and management strategies. This report lays out a framework for addressing urban heat, which requires setting clear urban heat planning goals and developing associated metrics for success.
Sub topics: Equity, community engagement, policy analysis

APA Plan Integration Scorecard for Heat (2022)
Methodology and guidebook for communities to analyze how heat mitigation policies are integrated into different plans and to identify opportunities to better target heat mitigation policies in high heat risk areas.
Sub topics: Policy analysis, equity

EQUITY

Mass. GEAR Tool (Ongoing)
A data and informational resource for Massachusetts communities to evaluate how and who may experience the impacts of extreme climate events in their area.
Sub topic: Equity, resilience planning, public outreach

EPA EJScreen Tool (Archived, 2024)
This tool combines environmental and social data at the neighborhood level to create easy-to-read maps and reports that show where communities may face higher environmental burdens.
Sub topics: Equity, GIS

ULI – 10 Principles for Enhancing Equitable Access to Parks
A framework identifying policy, funding, and design approaches to ensure under served communities gain meaningful and lasting access to high-quality parks and open space.

ULI – Successful Partnerships for Parks: Collaborative Approaches to Advance Equitable Access to Open Space
A guide detailing governance models and cross-sector partnerships that expand and sustain equitable park access in urban neighborhoods.

ULI – 10 Principles for Embedding Racial Equity in Real Estate Development
A strategic framework for integrating racial equity into site selection, community engagement, capital structuring, and long-term stewardship practices.

ULI – Reshaping the City: Zoning for a More Equitable, Sustainable, and Resilient Future
An analysis of how zoning reform can address housing affordability, climate resilience, and social equity through updated land-use policy.

ULI – Healthy Housing for All: How Affordable Housing is Leading the Way
A report demonstrating how affordable housing developers are integrating health-focused design, indoor environmental quality, and resident services to advance equity and long-term community well-being.

HEALTH

American Lung Association 2025 State of the Air Report for Boston Metro Area (2025)
The American Lung Association's newly released 2025 State of the Air report reveals worsening air quality in the Boston-Worcester-Providence, MA-RI-NH metro area.
Sub topics: Air quality, public health

ULI – Building Healthy Places Toolkit: Strategies for Enhancing Health in the Built Environment
A practical toolkit outlining evidence-based design and development strategies that improve physical activity, mental well-being, and social cohesion through the built environment.

ULI – Greening Buildings for Healthier People
A report examining how sustainable building strategies, including improved air quality and reduced toxics, directly support occupant health and productivity.

BROWNFIELDS

Mass DEP Brownfields 21E Sites (MassMapper, ongoing)
A statewide point dataset containing the approximate location of oil and/or hazardous material disposal sites that have been reported and Tier Classified under M.G.L. Chapter 21E and the Massachusetts Contingency Plan (MCP).
Sub topics: brownfields, public health

Manresa Wilds (2025, ongoing)
Project to reimagine and redevelop a 125-acre former power plant as an accessible park with a thriving ecosystem that revives local ecologies.
Sub-topics: Regenerative design, brownfields, ecological health, large projects, landscape design

RESILIENCE

Massachusetts Climate Change Vulnerability Assessment (2022)
The Massachusetts Climate Change Assessment (Climate Assessment) evaluates the impacts of climate change to the Commonwealth, including human health and safety, natural resources, and public and private assets. Includes regional summaries.
Sub topics: Public health, tree canopy, food security

Resilient Mass Maps & Data Center (Ongoing)
Statewide resource for climate projections by town, county, and watershed in Massachusetts. Includes heat, cold, and precipitation projections for 2030, 2050, 2070, and 2090.
Sub topics: extreme weather

Resilient Mass Design Team Standards & Tool
An online tool by ResilientMass that uses site data to deliver a preliminary climate change hazard exposure and risk rating along with recommended climate resilience design standards and guidance with best practices to support implementation.
Sub topics: resilience planning

ULI – Developing Resilience Toolkit: Protecting Buildings and Sites
A practical guide outlining design, engineering, and planning strategies to reduce climate-related risks to buildings and sites while enhancing long-term asset performance.

ULI – Surge: Coastal Resilience and Real Estate
An analysis of coastal flooding and sea-level rise impacts on real estate, offering investment and policy strategies to improve waterfront resilience.

ULI – Harvesting the Value of Water
A framework demonstrating how integrated water management, including stormwater capture and reuse, can generate financial, environmental, and community value in development projects.

ULI – Scorched: Extreme Heat and Real Estate
A report examining the growing financial and operational risks of extreme heat on real estate assets and outlining mitigation and adaptation strategies.

ULI – Parks That Protect: Leveraging Waterfronts for Resilient Communities
A study showing how multifunctional waterfront parks can serve as protective infrastructure while delivering social, ecological, and economic benefits.

ULI – Resilient Retrofits: Climate Upgrades for Existing Buildings
A guide to integrating climate adaptation measures into existing buildings to extend asset life, reduce risk exposure, and strengthen long-term value.

ULI – Physical Climate Risks and Underwriting Practices in Assets and Portfolios
An exploration of how lenders and insurers evaluate physical climate risks and incorporate them into underwriting and portfolio management decisions.

ULI – How to Choose, Use, and Better Understand Climate-Risk Analytics
A primer helping real estate professionals evaluate and apply climate-risk data and modeling tools in investment and development processes.

ULI – Insurance on the Rise: Climate Risk and Real Estate Investment Decisions
An analysis of how escalating insurance costs driven by climate risk are reshaping underwriting standards and investment strategy.

ULI – Climate Risk and Real Estate Investment Decision-Making
A report detailing how climate exposure influences capital allocation, valuation, and long-term real estate investment performance.

ULI – Developing Urban Resilience
An online platform featuring case studies that illustrate applied resilience strategies across urban development projects.

MOBILITY

ULI – Sustainable Mobility and Real Estate: Opportunities for Creating Lasting Development Value
A report by Urban Land Institute examining how transit-oriented development, reduced car dependency, and multimodal access strategies can enhance asset value, resilience, and long-term market competitiveness.

ULI – Active Transportation and Real Estate: The Next Frontier
A publication highlighting how walkability, bike infrastructure, and human-scaled streetscapes drive economic performance, tenant demand, and healthier urban environments.

ECOLOGICAL ACCOUNTABILITY

"Dirtbag Billionaire: How Yvon Chouinard built Patagonia, Made a Fortune, and gave it all away" (2025)
By David Gelles

"What if we get it Right?" by Ayana Elizabeth Johnson
December 12, 2025
Episode: "Earth is our only shareholder" w/ Ryan Gellert (CEO Patagonia)

Indigenous Nations Extend Legal Personhood to the Colorado River
Intercontinental Cry Magazine
January 23, 2026

LOWER MYSTIC RIVER WATERSHED CONTEXT

Finding Alewife/History Slidedeck (2014)
Cambridge Historical Commission materials showing the history of the Alewife Brook and Fresh Pond Marshes in the Alewife area. Includes documentation of filling.
Sub topics: Wetland filling, historical urban development

Map of Boston Harbor, Charles & Mystic Rivers (1777)
Harvard map collection map showing historical extent and banks of the Mystic River.
Sub topics: geology, history

The Geology & Early History of the Boston Area of Massachusetts (1976)
Account of how the geology of the Boston area affected events around the American Revolution.
Sub topic: geology, history

MWRA Mystic River History
Historical timeline tracing the history of the Mystic River from pre-European colonial arrival, through the Industrial Revolution to today.

EPA Mystic River Report Card (2024)
2024 report card for the Mystic River Watersheds based on how frequently waterbodies in the watershed meet bacteria standards for swimming and boating.
Sub topic: water quality
Sub topics: landscape, ecological health

Wicked Hot Mystic (2021)
Summary of Wicked Hot Mystic, a watershed-wide project to map the effects of extreme heat in the Mystic River Watershed, resulting in watershed-wide relative heat maps.
Sub topics: GIS/mapping, air quality

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The mission of the Urban Land Institute is to provide leadership in the responsible use of land and in creating and sustaining thriving communities worldwide.

ULI is committed to:

- Bringing together leaders from across the fields of real estate and land use policy to exchange best practices and serve community needs
- Fostering collaboration within and beyond ULI's membership through mentoring, dialogue, and problem solving
- Exploring issues of urbanization, conservation, regeneration, land use, capital formation, and sustainable development
- Advancing land use policies and design practices that respect the uniqueness of both the built and natural environments
- Sharing knowledge through education, applied research, publishing, and electronic media
- Sustaining a diverse global network of local practice and advisory efforts that address current and future challenges

Established in 1936, the Institute today has more than 45,000 members worldwide, representing the entire spectrum of the land use and development disciplines. ULI relies heavily on the experience of its members. It is through member involvement and information resources that ULI has been able to set standards of excellence in development practice. The Institute has long been recognized as one of the world's most respected and widely quoted sources of objective information on urban planning, growth, and development.

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