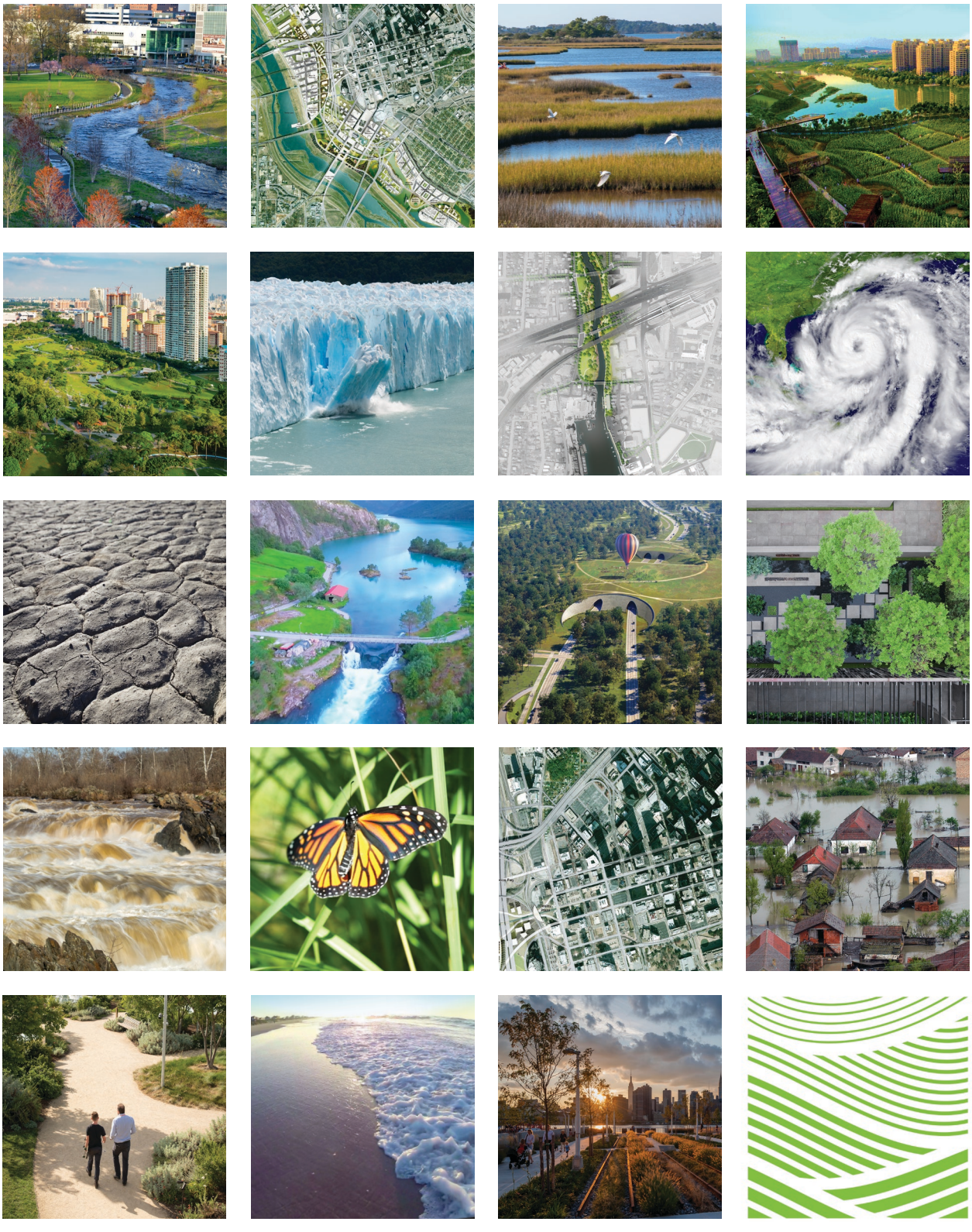
Smart Policies for a Changing Climate

The Report and Recommendations of the ASLA Blue Ribbon Panel on Climate Change and Resilience



ASLA

Smart Policies for a Changing Climate

The Report and Recommendations of the American Society of Landscape Architects Blue Ribbon Panel on Climate Change and Resilience

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American Society of Landscape Architects

Executive Summary

Climate change is intensifying the negative impacts of standard development practices and putting people and communities at risk. We need a new paradigm for building and enhancing communities that works in tandem with natural systems and considers the needs of all. To meet that goal, ASLA's interdisciplinary Blue Ribbon Panel on Climate Change and Resilience identified the following core principles, key planning and design strategies, and public policies that will promote healthy, climate-smart, and resilient[i] communities.

Core Principles

- Policies should be incentive-based wherever feasible.
- Policies should promote holistic planning and provide multiple benefits.
- Policies should address environmental justice and racial and social equity issues.
- Policies should reflect meaningful community engagement.
- Policies should be regularly evaluated against performance measures and reviewed for unintended consequences.
- Policies should address broader regional goals and issues as well as local and site-specific concerns.




[i] "Resilience is a capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, the economy, and the environment." Source: www.globalchange.gov/climate-change/glossary

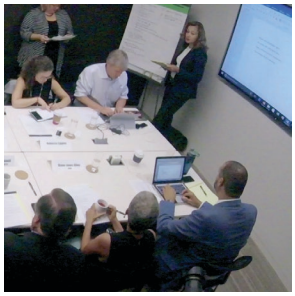
Natural Systems

Designing and planning in concert with natural systems promotes resilience, capitalizes on the multiple benefits provided by natural systems, and provides greater long-term return on investment than conventional development. Design and planning solutions must also address biohabitat to ensure plant and animal communities remain resilient in the face of climate impacts.

Solutions and Recommendations Summary

- Provide dedicated funding for green stormwater infrastructure[ii].
- Require new development to retain stormwater on site.
- Incentivize planting of locally/regionally appropriate and biodiversity-supporting vegetation; require planting of pollinator-friendly vegetation on public lands.
- Protect and enhance natural vegetative buffers, including wetlands and water's edge plantings, along coastlines and inland waterways.
- Prioritize retention and expansion of green space; address inequities in access to open space and recreation.
- Adopt a national urban and suburban tree planting strategy to preserve and expand tree canopy.
- Promote or require water conservation and water reuse technologies.
- Adopt a national water strategy to protect critical water sources.
- Incentivize healthy soil management practices.
- Preserve wildlands.
- Assess climate change risks to biodiversity and promote greenways and biocorridors for plant and animal migration.





[ii] When nature is harnessed by people and used as an infrastructural system it's called "green infrastructure." Green infrastructure reduces and treats stormwater at its source while delivering environmental, social, and economic benefits.

Community Development

Compact, walkable, transit-oriented development reduces energy use. When designed in concert with natural systems, these "smart growth" communities are also resilient and climate smart.

Solutions and Recommendations Summary

- Require transit-oriented development using green infrastructure and complete streets[iii] principles and integrating clean energy and energy efficiency.
- Reuse/redevelop brownfields[iv] and grayfields[v], including for open space.
- Require environmental justice analysis and view transit policy through an equity lens.
- Develop municipal and regional climate resilience plans and require climate change analysis of existing laws and regulations.
- Restructure insurance programs to encourage resilient rebuilding.
- Create community investment trusts to fund green infrastructure and resilience projects, including clean energy projects.
- Assess and address public health impacts of climate change.
- Require walkable open space within a quarter mile radius of all residential development.

Vulnerable Communities

Special attention must be paid to communities that are at special risk from the effects of climate change. These include communities located in coastal and inland floodplains as well as underserved and low-income communities.

Solutions and Recommendations Summary

- Assess and address climate impacts on vulnerable communities.
- Focus on environmental justice and equitable access to transportation, housing, jobs, and recreation and open space.
- Develop relocation, retreat, and/or evacuation plans.
- Limit or prohibit building in floodplains to protect life, property, and floodplain function.
- Update Federal Emergency Management Agency flood maps and include projections of climate change impacts.
- Limit or prohibit building in fire-prone rural areas.
- Promote mixed-income housing and mixed-use development that provides easy access to essential services.
- Establish/increase low-income housing and new market tax credits.

[iii] "Complete Streets are streets for everyone. They are designed and operated to enable safe access for all users, including pedestrians, bicyclists, motorists and transit riders of all ages and abilities. Complete Streets make it easy to cross the street, walk to shops, and bicycle to work. They allow buses to run on time and make it safe for people to walk to and from train stations." Source: smartgrowthamerica.org/program/national-complete-streets-coalition/what-are-complete-streets/

[iv] "A brownfield is a property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant." Source: www.epa.gov/brownfields/overview-brownfields-program

[v] A grayfield is a previously developed site.

Transportation

Transportation must be considered through multiple lenses: as critical connectivity from homes to jobs, amenities, and essential services; as a major source of greenhouse gas emissions; and as a contributor to or detractor from a community's appearance and function. Planned and designed thoughtfully, transportation systems can promote resilience.

Solutions and Recommendations Summary

- Require transit-oriented development, including affordable housing, with multimodal green and Complete Streets.
- Provide equitable access to transportation options, including safe, connected pedestrian, bicycle, and transit routes.
- Anticipate, plan, and provide infrastructure to support electric vehicles and new transportation methods and technologies.
- Apply technologies and design strategies to achieve net-zero-carbon streets.
- Promote regional transportation planning and development.

Agriculture

At the same time that farmland is being lost to expanding development and sprawl, agricultural systems are being stressed by the effects of climate change and unsustainable farming practices. Current and future impacts on food production and security, including equitable access to healthy food options, must be addressed.

Solutions and Recommendations Summary

- Preserve farmland and support local food production.
- Incentivize urban and suburban agriculture.
- Incentivize conservation agriculture that builds healthy soil, increases food's nutritional value, and sequesters carbon.
- Encourage location of affordable healthy food sources/options in underserved areas.

Introduction

Climate change is a threat to people and the ecosystem services[vi] on which we depend. Extreme weather events are on the rise.[1,2] Flooding, drought, and wildfires are more frequent and more severe.[3] Higher temperatures are increasing community health risks.[4] The changing climate is causing species dislocation and accelerating the rate of species extinction.[5] Global agricultural systems are increasingly stressed.[6] These early effects are harbingers of the more severe consequences that science tells us we can expect in the future if we do not act.

Even without climate change, standard development patterns and practices are putting our people and our communities at risk.[7] Natural systems that protect shorelines are removed to make way for development. Engineered stormwater systems designed to move water rapidly off buildings and pavements disrupt natural hydrology, contribute to water pollution, and weaken or destroy marine ecosystems. "Pave the planet" development replaces natural vegetation with impervious surfaces, leaving even inland communities outside floodplains prone to flooding.[8] Development patterns emphasizing car travel isolate communities from recreation opportunities and contribute to unhealthy, sedentary lifestyles. Taken together, these practices have made our communities and people more vulnerable and set the stage for significantly greater loss of property and life in the face of inevitable natural disasters.

We can, and must, do better.

In September 2017, the American Society of Landscape Architects convened the interdisciplinary Blue Ribbon Panel on Climate Change and Resilience.[9] The panelists included a diverse range of practitioners, experts, and stakeholder representatives, with experience working at various scales in different geographic and technical areas. The panel was given two tasks: first, to identify the most important design and planning approaches for creating healthy, climate-smart, and resilient communities,[vii] and second, to identify specific public policy recommendations to support those approaches. This report summarizes their work and their recommendations. It is a blueprint for securing a sustainable and resilient future.

Numbered citations are in Appendix II on page 22.

vi "Ecosystem Services - The benefits produced by ecosystems on which people depend, including, for example, fisheries, drinking water, fertile soils for growing crops, climate regulation, and aesthetic and cultural value." Source: www.globalchange.gov/climate-change/glossary

vii The Blue Ribbon Panel was asked to focus on the issues of land planning and design that are critical for building community resilience. The Panel's recommendations should be used in concert with increased use of renewable energy, energy efficient building and transportation design, and other strategies for advancing energy efficiency, reducing carbon emissions, and increasing carbon sequestration.

Core Principles

The Blue Ribbon Panel identified the following core principles that provide a basis for public policies that support resilience.

Policies should be incentive-based wherever feasible.

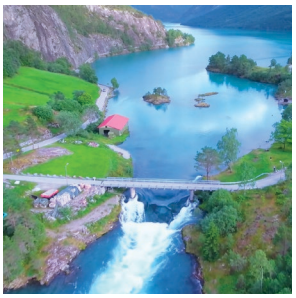
Incentive-based policies invite collaborative and cooperative solutions to climate change impacts and should be employed as a primary approach. Although mandates may be necessary to achieve community-wide benefits, policies that rely on fees, penalties, or mandatory requirements can reduce community acceptance and create opposition. Positive incentives may include direct financial incentives, priority treatment (e.g., expedited permitting processes for higher quality development projects), and/or recognition (e.g., awards for participating organizations). Policies and incentives should always include intentional, thoughtful, and inclusive community engagement.

Policies should promote holistic planning and provide multiple benefits.

Policies to promote resilience should be developed through holistic, cross department/agency planning that considers broad community quality of life goals in addition to development and climate-related concerns.

Policies should address environmental justice and racial and social equity issues.

Negative environmental impacts, both current and resulting from new development, are frequently concentrated in specific areas and populations within the community. These same populations typically are less engaged due to barriers to participating in community decision making. Policy design and implementation should include input from and benefit the entire community.



Policies should reflect meaningful community engagement.

Effective community engagement (e.g., charrettes, surveys, town halls) is critical for development and implementation of appropriate and effective resilience strategies and policies. Community members have valuable knowledge of their own ecological, social, and cultural environment that can inform policy goals and help avoid potential stumbling blocks. Conversely, community engagement that merely "checks the box" can create avoidable controversy and opposition. Community engagement should address the social and racial equity and environmental justice issues described above.

Policies should be regularly evaluated against performance measures and reviewed for unintended consequences.

Policies should include performance measures with clearly defined metrics and benchmark goals. Performance measures should include both quantitative (e.g., dollars spent, stormwater reduced/flooding avoided, air quality, etc.) and broader goals (e.g., community attitudes, access to and use of public space, etc.). Public reporting of policy outcomes, both intended and unintended, should be transparent and comprehensive.

Policies should address broader regional goals and issues as well as local and site-specific concerns.

To achieve resilience goals, policies must reach across political boundaries and should be developed based on landscape ecology and a blend of science and planning using a regional, national, and/or global scope.

Natural Systems

Natural systems—or ecosystems—are critical for humans and all forms of life on the planet. Many of the problems we currently face—flooding, urban heat island effect, air and water pollution, coastal erosion, groundwater-related subsidence—are the direct result of either ignoring or trying to engineer our way around natural systems. On the other hand, designing and planning in concert with natural systems promotes resilience, capitalizes on the multiple benefits provided by natural systems, and provides greater long-term return on investment. This natural systems approach should be incorporated in site, community, and regional planning and design, and applied to retrofit and rebuild projects and new development.

Design and planning solutions should also address plant and animal habitat to ensure these living communities remain resilient and productive in the face of climate impacts. Healthy and intact natural systems are inherently resilient. When climate and habitat changes are slow and gradual, plants and animals can relocate through their natural life cycles, e.g., plant seeds spreading naturally and animals moving with food and water sources. However, in the face of rapid climate change and human disturbance, catastrophic loss of species is possible—such as the widespread die-off of temperate tree species in the western states. Design and planning strategies must anticipate and seek to mitigate loss of species through active support.

The following are key design and planning strategies, followed by policy recommendations, that benefit from and support natural systems.

Design and Planning Solutions

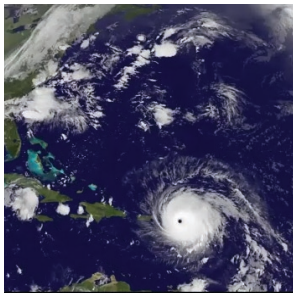
- ***Incorporate green infrastructure into all new and existing urban and suburban development.*** The term "green infrastructure"—also called the "sponge city" approach—refers to the use of trees and vegetation in addition to permeable hard surfaces to capture, infiltrate, and clean stormwater. Beyond stormwater management, green infrastructure also provides significant additional benefits including air cooling and cleaning, reduced building energy use through shading, air cooling through evapotranspiration, enhanced aesthetics, and public health benefits. Key design and planning elements of this nature-based approach should include the following:
    - ***At street level, reduce paved areas and maximize incorporation of trees and vegetation*** supported by healthy soils, including bioswales and rain gardens.
    - ***Maximize use of green (vegetated) roofs*** for stormwater capture and air cooling/cleaning benefits.
    - ***Maximize use of porous pavement technologies*** to support natural hydrology.
    - ***Use cisterns for capturing and enabling reuse of excess stormwater*** for irrigation, etc.
- ***Prioritize preservation and enhancement of tree canopy.*** Tree canopy cover directly correlates to reduced urban heat island effects, reducing the effect of heatwaves and reducing emissions from cooling loads. Tree cover is also correlated with air quality improvements that improve public health outcomes.

- ***For all trees and vegetation, follow best practices for planting and maintenance.***
- ***Preserve existing open space and parkland in community and regional planning.*** Recapture part or all of abandoned brownfield and grayfield sites for green/open space.
- ***Protect, expand, and/or restore natural systems,*** including wetlands and adjacent upland areas, that provide buffers along coastlines and inland waterways. Maintain setbacks from streams to protect watershed function and quality.
- ***Limit or prohibit building in floodplains.*** (See policy recommendations for vulnerable communities.)
- ***Plan "gray" stormwater infrastructure,*** i.e., engineered systems, thoughtfully and sustainably in concert with natural green infrastructure systems.
- ***Incorporate water conservation and water reuse technologies in all development and land uses.***
- ***Protect critical water sources, including aquifers,*** using best available science in concert with design and planning strategies.
- ***Select biohabitat-supporting and pollinator-friendly native or adapted plant species*** appropriate to the site/region and changing climate conditions. Prioritize vegetation species that are more likely to withstand potential climate changes, including drought. In some cases, this may involve introduction of species not currently present.
- ***Preserve wildlands,*** i.e., intact green spaces that have never been developed, to support healthy and diverse plant and animal communities.
- ***Include greenways and wildlife corridors in regional plans to support plant and animal migration and relocation.*** Assess and plan for both natural and assisted migration of plant and animal species. This may include the introduction of new species in place as well as the relocation of seed stock and breeding animals to more suitable environments.

Policy Recommendations

- ***Provide dedicated, ongoing funding for green infrastructure.***
- ***Require new development to retain and infiltrate precipitation on site*** following rigorous models based on ecosystem services, such as the SITES™v2 Rating System.
- ***Incentivize planting of native and locally/regionally appropriate, pollinator-friendly, and drought-tolerant (where appropriate) vegetation,*** along with corresponding reduction of turf areas, through direct incentive payments, tax credits, and/or water-use charges.
- ***Adopt a green space plan*** to prioritize retention of existing green space and identify opportunities to create/capture new green spaces. The plan should address open space/recreation area inequities across communities.

- ***Adopt a national urban and suburban tree planting strategy,*** based upon state and local models, with specific tree canopy goals, incorporating best practices for enhanced tree health and longevity. Incentivize long-term maintenance and planning, and provide funding mechanisms. Plans should also address reforestation of areas devastated by flood and fires.
- ***Incentivize development that retains existing native and locally appropriate vegetation*** and fosters biodiversity while managing or eliminating invasive plant species.
- ***Require planting of native and locally appropriate, pollinator-friendly vegetation*** on state and local rights-of-way, around public buildings, and on other publicly-owned land and civic spaces.
- ***Adopt a national water protection and management strategy*** that is regionally calibrated for careful capture and treatment of stormwater with protection of subsurface waters.
- ***Prioritize protection of critical water sources;*** restrict or prohibit development that puts critical sources at risk of depletion or degradation.
- ***Incentivize or require water conservation and reuse technologies.***
- ***Protect wildlands.*** Protect already fragmented migration corridors from further degradation.
- ***Incentivize regional planning and development that assesses climate change risks to biodiversity*** and incorporates/enhances regional plant and animal migration paths.
- ***Incentivize the use of soil management practices*** that build soil health in urban, suburban, and rural settings.



Community Development

The "smart growth" approach to community planning and design emphasizes compact, walkable, transit-oriented (including active and nonmotorized transportation) development. Smart growth communities are more energy and resource efficient than their urban/suburban sprawl counterparts and provide more opportunities for use of clean energy and distributed generation. When designed in conjunction with natural systems, these communities are also inherently more resilient and climate smart. Smart growth concepts apply at all scales—from individual sites to local communities to broader regional planning.

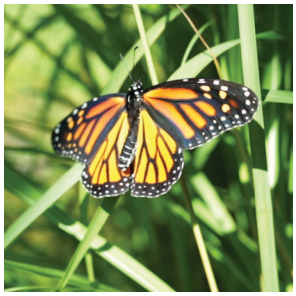
Design and Planning Solutions

- ***Plan and design using smart growth approaches*** to decrease energy use and promote resilience. Walkable, livable, compact development significantly reduces emissions and energy use.
- ***Include reuse/redevelopment of brownfields and grayfields*** in smart growth plans. Depending on size, location, and community needs, these previously developed sites can become sites for new compact development, parks and open spaces, or agriculture.
- ***Incorporate clean energy and energy efficiency solutions in local and regional planning.*** Renewable energy and distributed generation is increasingly cost-competitive with other generation sources and available in simple "off the shelf" modular products, primarily rooftop solar and community solar gardens (i.e., larger solar installations). Integrated backup battery storage prices are also falling rapidly, allowing for practical installation in single-family homes and residential and commercial buildings.

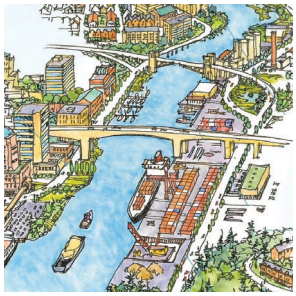
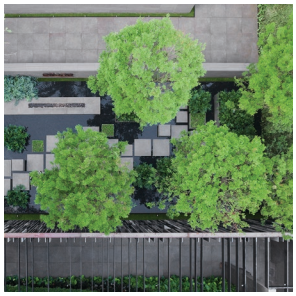
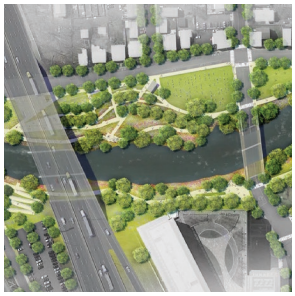
Policy Recommendations

- ***Require climate change analysis of existing laws, rules, and regulations*** to identify and address areas that are inadvertently incompatible with climate mitigation and adaptation strategies. Since design and planning are heavily driven and/or constrained by insurance rules, zoning, and codes, review and revision of existing regulations and policies are essential to promote climate-smart growth.
- ***Prioritize and incentivize brownfield and grayfield rehabilitation*** over developing on open green space.






- ***Revise development regulations to focus less on land use categorization*** and more on site planning, structure appearance, the quality of the public realm, and integration with community goals.
- ***Develop municipal and regional climate resilience plans*** drawing on both historic data and projections/models of future impacts. Make data available and transparent to the public, and create guidance/models for communities to follow.
- ***Support community land banking to convert vacant and abandoned properties to productive use consistent*** with community plans and goals. Community land banks are public or community-owned entities created for a single purpose: to acquire, manage, maintain, and repurpose vacant, abandoned, and foreclosed properties.
- ***Create community investment trusts to fund local green infrastructure and resilient design projects.*** A community investment trust is a financial inclusion tool created to empower residents and strengthen communities by removing barriers to financial inclusion and providing a low-dollar property investment opportunity to local residents.
- **Restructure property insurance policies and practices:**
  - Coordinate government and private insurance to ensure that federal pooled risk approaches incentivize or require resilient rebuilding after losses.
  - Withdraw insurance benefits in hazard zones (e.g., phase out coverage of repetitive risk properties) and coordinate with relocation planning and funding/compensation for buyouts.
- ***Require FEMA and/or other federal or state agencies to fund programs that support treatment of adverse public health issues resulting from natural disasters.***
- ***Develop a climate and health program/plan*** that forecasts climate impacts and assesses health vulnerabilities.
- ***Fund and implement regional/community designs,*** including planting of trees and other vegetation, that mitigate health impacts from extreme heat and poor air quality.
- ***Require walkable open space within a quarter-mile radius of all residential development.***
- ***Include public health practitioners*** as a part of community development decision-making processes.

Vulnerable Communities

Vulnerable communities are those whose location puts them at special risk from the effects of climate change. These include settlements along coastlines and inland waterways that are at risk from flooding and sea-level rise, as well as communities at risk from increased drought, higher temperatures, and wildfires. Further, special attention needs to be paid to underserved and low-income communities that have fewer resources and face other barriers to accessing resilience and adaptation solutions. These communities typically lack the community and economic amenities that are promoted in smart growth strategies, and many already suffer adverse health impacts from proximity to industry and degraded environments.

Design and Planning Solutions

- ***Proactively address equitable*** access to transportation options, affordable housing, jobs, and recreation and open space.
- ***Address environmental justice explicitly in all design and planning efforts,*** including priority placement of green infrastructure.
- ***Evaluate, discuss, and plan for future climate impacts on vulnerable communities.*** These discussions must include evaluation of options for relocation and managed retreat as well as options for improving safety and resilience in existing locations.

Policy Recommendations

- ***Develop suitable relocation, retreat, and/or evacuation plans.***
- ***Protect floodplain functions*** by avoiding building in floodplains except for minimal impact uses that can accommodate inundation, such as recreational uses, and for essential water-related functions that do not reduce floodplain storage capacity or put people or structures at risk.
- ***Update FEMA flood maps and include an analysis of claims data to capture impervious-surface-driven flooding*** outside floodplains. Include projections of future climate change impacts.
- ***Reinstitute Federal Flood Risk Management Standards.***
- ***Limit or prohibit building in fire-prone areas*** where native vegetation is dense and that are difficult to access by fire and rescue services.
- ***Require environmental justice analyses*** that may also address social and racial inequities for projects utilizing public funding, tax incentives, or specialized permits based on provided public benefits.
- ***Promote mixed-income housing development and mixed-use development*** that provides easily accessible essential services for all.
- ***Increase/establish low-income housing and new market tax credits.***

Transportation

Transportation accounts for as much as 30 percent of greenhouse gas emissions. Therefore, smart growth solutions that promote walkability and reduce vehicle use or incentivize nonmotorized and low/zero emission vehicles can have a very significant climate benefit. The Complete Streets approach seeks to equitably include active and nonmotorized transportation choices on all rights-of-way, thereby encouraging people to get out of their cars to the greatest extent possible. By removing vehicle travel lanes, "road diets" improve vehicle and pedestrian safety and, at the same time, enable transportation corridors to become multimodal, improving mobility and access. Vehicle use can be further reduced through disincentives such as reducing the convenience of parking in urban cores and reducing parking requirements for various land uses. Rail, multimodal, and transit-oriented development is needed both in downtown areas and outside downtown areas. As with Complete Streets, a key consideration is ensuring convenience and connectivity that encourages people to consider alternatives to conventional automobile travel.

Design and Planning Solutions

- ***Stress equity and connectivity*** in transportation planning, including equitable access to rail, transit, and dedicated bicycle commuting options.
- ***Use complete streets principles*** to provide safe, connected, and convenient pedestrian and bicycle routes, including routes that connect to rail and bus routes.
- ***Incorporate green infrastructure in all transportation projects.***
- ***Use "road diets"*** to improve safety and reconfigure recaptured roadway areas for pedestrian and bicycle use.
- ***Plan and design charging stations*** to support increased use of electric vehicles as well as designing for other technologies that support connected and autonomous vehicles.
- ***Promote transit-oriented development.***

Policy Recommendations

- ***Require transit-oriented development with multimodal green and Complete Streets.***
- ***Include affordable housing as a substantial component*** in transit-oriented development
- ***Reframe transit access as a civil right and focus on transit desert communities*** that have increasing demand and limited transit access.
- ***Provide financing tools to allow equitable access*** to new transportation modes and technologies.
- ***Anticipate and plan for the infrastructure needs*** of electric bikes, buses and cars, ride sharing, and autonomous vehicles.
- ***Provide incentives for biking and carpooling.***

- ***Develop and design technologies that create net-zero-carbon streets.***
- ***Promote transportation modes and transit-oriented development that are regional*** in scope and limit destruction of the natural environment and wildlife habitat.
- ***Develop transportation models*** that integrate pedestrian access and movement, multimodal transportation, and appropriate parking patterns.

Agriculture

Conventional—and unsustainable—development patterns of urban and suburban sprawl are causing significant loss of farmland across the United States and around the globe. Changing weather patterns, severe weather events, and competition for water resources are putting additional stress on agricultural systems and directly affecting the global food supply. In addition, various agriculture practices reduce soil fertility, causing soil erosion, and polluting groundwater and surface water resources while releasing carbon dioxide into the air. Clearly, design and planning for climate change and resilience must address current and potential impacts on agriculture and food security as well as soil health. Agricultural systems and food security must also be viewed through the lens of environmental justice; low-income and underserved communities typically suffer from "food deserts"—a lack of convenient or affordable access to healthy food choices.

Design and Planning Solutions

- ***Conserve farmland and protect soils*** that are deemed prime farmland.
- ***Address food deserts and equitable access to healthy food*** in community and transportation planning and zoning.
- ***Include opportunities for urban and suburban agriculture*** in community planning.
- ***Promote healthy soil education and practices,*** restoring the ability of soil to sequester carbon.

Policy Recommendations

- ***Incentivize urban and suburban agriculture.***
- ***Protect current farmland and prime farmland soils*** through zoning, incentives, and promotion of local produce and other farm income opportunities.
- ***Identify and address food deserts*** by providing incentives for locating fresh healthy food options in underserved areas and promoting food co-ops.
- ***Promote healthy food education.***
- ***Adopt agricultural policies and farm insurance programs that encourage conservation farming practices*** that build soil health, increase food's nutritional value, and sequester carbon.

Community Engagement Guidelines

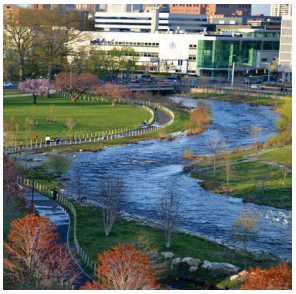
The importance of proactive communications and public engagement cannot be overstated. Outreach conducted early and often can help overcome potential barriers to acceptance and successful implementation.

- ***Understand community needs and motivations.*** Design and planning have to align with a community's vision of itself and its future, as well as support concrete needs. Outreach can successfully elicit these motivations and help energize new community visions.
- ***Community campaigns/surveys.*** Direct in-person outreach is critical. However, there is high value in well-designed surveys, advertising, and other educational approaches.
- ***Citizen science.*** Often undervalued, citizen science can provide critical insights. Development processes must insure that citizen science data—both quantitative and qualitative—is intentionally incorporated into decision-making platforms at all levels.
- ***Demonstration, positive models, and success stories.*** Presenting relevant experiences, examples, and models can go a long way to generate public support.
- ***Highlight what will be gained and what could be lost.*** Public outreach should be frank about both advantages and trade-offs. Soft-pedaling toward generating the trade-offs can undermine credibility. For example, climate-smart design could produce gentrification as an unintended consequence. Frank discussion on the front end can and should lead to strategies to avoid unintended negative consequences.
- ***Address social and racial equity issues.*** Climate-smart design and planning should benefit all populations within a community and should respect historical, existing, and desired uses.
- ***Foster ownership of community assets.*** The most successful development projects evoke pride and a sense of identity within the community.
- ***Early engagement and education.*** K-12 education and engagement can yield dividends by creating engaged and informed citizens.

Conclusion

This report is a call to action. We can create more resilient and climate smart communities by designing and planning in concert with natural systems, by applying transit-oriented development and smart growth strategies, and by addressing environmental justice and equity issues. The design and planning solutions outlined in this report are already being applied successfully in communities across the country. Our challenge is to put these approaches into practice as standard operating procedure for communities of all sizes and for all types of development. The policies recommended in this report will help provide the public policy framework needed to enable that transformation.

This report is also an invitation to collaboration. We must join together to advocate better public policy to guide land design and development. And we must continue to work together to share knowledge and advance the art and science of resilient design and planning. To that end, ASLA has created a forum for sharing and discussing models and best practices. Join the dialogue and contribute your expertise at **https://climate.asla.org** .

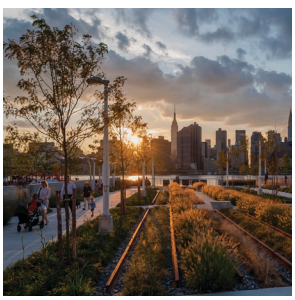












ASLA

Appendix I:

Blue Ribbon Panelists

Armando Carbonell, FAICP

Senior Fellow and Chair,
Department of Planning and Urban Form,
Lincoln Institute of Land Policy

"Armando Carbonell has led the urban planning program at the Lincoln Institute of Land Policy in Cambridge, Massachusetts since 1999. After attending Clark University and the Johns Hopkins University, Carbonell spent the early part of his career as an academic geographer.

"Carbonell went on to initiate a new planning system for Cape Cod, Massachusetts, as the founding executive director of the Cape Cod Commission, created by the Massachusetts legislature in 1990.

In 1992 he received a Loeb fellowship in the Graduate School of Design at Harvard University.

"Carbonell later taught urban planning at Harvard and the University of Pennsylvania, served as an editor of the British journal *Town Planning Review*, and consulted on master plans in Houston, Texas and Fujian Province, China. The Massachusetts Chapter of the American Planning Association awarded him the distinguished leadership/service award for professional planner for "Distinguished practice, teaching, and writing" in 1999.

"From 2011 to 2013 he was honorary professor at the University of Manchester, England. He is the author or editor of numerous works on city and regional planning and planning for climate change, including *Regional Planning in America: Practice and Prospect* (2011) with Ethan Seltzer, ed.; *Resilient Coastal City Regions: Planning for Climate Change in the United States and Australia* (2012) with Ed Blakely, ed.; *Planning for States and Nation-States in the U.S. and Europe* (2015) with Gerrit-Jan Knaap and Zorica Nedovic-Budic, eds.; and *Nature and Cities: The Ecological Imperative in Urban Design and Planning* (2016) with Frederick Steiner and George Thompson, eds. Carbonell is a fellow of the American Institute of Certified Planners, fellow of the Academy of Social Sciences (UK), and lifetime honorary member of the Royal Town Planning Institute (UK)."

Mark Dawson, FASLA

Managing Principal, Sasaki Associates Inc.

"Mark Dawson is a landscape architect and principal with Sasaki Associates and member of the Sasaki Associates executive committee. He is responsible for the strategic direction of the firm and landscape practice. Dawson's specialty is planning and designing award-winning urban landscapes.

"Dawson views the cities in which he lives and works as vital and dynamic ecosystems. By considering and synthesizing the complexities of social, economic, environmental, and cultural influences, he creates coherent, enduring, sustainable civic designs. As a part of his work, Dawson speaks to communities about the importance of public open space infrastructure, and how their voice in the process ensures social dialog and contribution, environmental stewardship, and has lasting positive contribution to economic wellness and revitalization of urban centers.

"Dawson holds a bachelor's of landscape architecture from Utah State University and is a fellow of American Society of Landscape Architects. He actively serves such nonprofits as The Waterfront Center, and is past president of the Landscape Architecture Foundation. In the past he has participated as a board member for the Watertown Boys & Girls Club as well as the Utah State University College of Humanities and Social Sciences academic advisory council. Dawson was awarded the distinguished alumni award from the department of landscape architecture and environmental planning at Utah State University, and has lectured widely on lasting and resilient planning and design at colleges and universities throughout the country."

Tim Duggan

Founder, Phronesis

"In 2010 Tim Duggan, ASLA, founded Phronesis, with offices in Kansas City, Missouri, and New Orleans, as a nimble landscape architecture and urban design studio focused almost entirely on creating regenerative infrastructure and community systems within the public realm.

Duggan's landscape architecture career began in the Midwest, where he collaborated on a wide range of projects from post-disaster community planning initiatives to complex green infrastructure urban design strategies.

"Most recently, Duggan developed over 200 LEED Platinum landscapes with his role as director of innovations for the Make It Right Foundation. He managed the foundation's transformative community projects based in New Orleans, Kansas City, Newark and the Fort Peck Indian Reservation while working extensively with local community organizations and individuals.

"Duggan was named one of Metropolis magazine's 2012 Game Changers for his ambitious experiments in landscape design. He has served as a speaker and guest critic on sustainable site solutions at TEDxHarlem, Dwell on Design 2014, AIA 2011 National Conference, 2012 ASLA Annual Meeting and EXPO, GreenBuild 2009, National Black Caucus 2010, WEFTEC 2010, Reinvention New Orleans 2010, and has served as an adjunct professor and guest critic for Tulane University, Kansas State University, and the University of Missouri-Kansas City."

Ying-yu Hung, ASLA

Managing Principal,
SWA's Los Angeles Studio

"Ying-yu Hung, ASLA, is the managing principal of SWA's Los Angeles Studio. Throughout her practice, Hung has pushed the boundaries of her design with tenacity and creativity, willing to engage the practice of landscape architecture with new boundaries. Most recently she contributed to the SWA Resilient Cities initiative, an action-oriented approach to generate insights on what urban resiliency means for Miami. Various agencies representing regulatory oversight of Miami's urban network were represented at the charrette, including the state, city, and Miami-Dade County levels, as well as nonprofit organizations such as the Trust for Public Land.

"Hung is known for her ability to lead complex urban design and landscape architecture projects that require the balancing of development and environmental issues, and was a contributing author to the book *Landscape Infrastructure: Case Studies* by SWA. Hung is currently working to forge memorable public open space with communities in Southern California such as Los Angeles, Santa Monica, Glendale, Culver City, Beverly Hills, Hawthorne, and Lynwood. Committed to advancing the field through her teaching and lecture engagements, Hung challenges the next generation of designers to think more creatively about how the practice of landscape architecture can promote a more resilient urbanism, at once culturally resonant and environmentally sound."

Dwane Jones, PhD

Director of the Center for Sustainable Development + Resilience at the University of the District of Columbia

"Dwane Jones, PhD, is the director of the Center for Sustainable Development + Resilience at the University of the District of Columbia. The Center is a division of the College of Agriculture, Urban Sustainability, and Environmental Sciences (CAUSES). He is a nationally recognized expert in low-impact development. His research interests include Complete Streets, active transportation, public health, and social interaction in public spaces. Jones conducts research and teaches courses in urban sustainability, environmental sustainability, sustainability entrepreneurship, public policy and health, and green infrastructure. He has degrees in urban planning, environmental planning, and urban design."

Diane Jones Allen, ASLA

Program Director for Landscape Architecture, the College of Architecture Planning, and Public Affairs at the University of Texas at Arlington

"Diane Jones Allen, ASLA, has 30-plus years of experience in professional practice focusing on land planning, and varied scales of open space and park design, including community development work. She is currently the program director for

landscape architecture at the College of Architecture Planning, and Public Affairs at the University of Texas at Arlington.

"Jones Allen was a tenured professor of landscape architecture at the School of Architecture and Planning at Morgan State University in Baltimore. In Baltimore, she was a member of the Urban Design Architecture Review Panel, for which she provided design guidance on major master planning and development projects in the city.

"Jones Allen is principal landscape architect with DesignJones LLC in New Orleans. DesignJones LLC received the 2016 American Society of Landscape Architects (ASLA) Community Service Award. She is also on the board of the Landscape Architecture Foundation (LAF) and actively participates on its climate change and diversity committees. Her research and practice is guided by the intersection of environmental justice and sustainability in African American cultural landscapes, including "nomadic" responses to "transit deserts," places of increasing transportation demand and limited access, as discussed in her book *Transit Desert: Race, Transit Access, and Suburban Form*, published by Routledge."

Adam Ortiz

Director for the Department of the Environment for Prince George's County, Maryland

"As director for the Department of the Environment for Prince George's County, Maryland, Adam Ortiz heads a 300-person, $160 million agency dedicated to recycling, composting, clean water, renewable energy, and humane animal care. Since his assignment in 2012, the county moved from eleven to first in the state for waste diversion, including an award-winning food scrap compost program that has been recognized by the *Washington Post*. He launched an innovative public-private partnership stormwater retrofit program that is restoring local streams while creating green jobs, an effort recognized by the Aspen Institute, *Governing* magazine, the Clinton Global Initiative and the White House. Previously, Ortiz served three terms as mayor of Edmonston, Maryland, a diverse, working class town outside of Washington, D.C. His accomplishments included a 70 percent drop in crime, the end of devastating flooding, an inclusive immigrant-engagement effort, and building the East Coast's greenest street. The Edmonston Green Street is a model of sustainability utilizing natural bioretention for polluted stormwater in an urban setting, high efficiency LED streetlights powered by wind energy, native plants and trees, improved bike and pedestrian safety, with more than 60 percent local minority contracting, and has received recognition as a Champion of Change by the White House and a Bright Idea Award from Harvard's Kennedy School of Government, among other organizations.

"Before his government service, Ortiz worked as a Soros Justice Fellow to abolish the death penalty for juveniles, culminating in the landmark 5-4 United States Supreme Court decision, Roper v. Simmons. He was also deputy director for Amnesty International's Midwest office (2000-2002) working to abolish the death penalty, police brutality, prison conditions, fairness for asylum seekers, and release of prisoners of conscience.

"As a volunteer, Ortiz is a member of the local government advisory council to the EPA Administrator and served as president of the Maryland Mayor's Association (2009-2010). Ortiz was born and raised in New York's Hudson Valley and has a bachelor's degree in public policy from Goucher College in Towson, Maryland."

Vaughn B. Rinner, FASLA

2018 Immediate Past President, American Society of Landscape Architects

"Vaughn Rinner, FASLA, is known and respected as an articulate, diplomatic, and credible spokesperson for the profession of landscape architecture. A pragmatic visionary, she combines the abilities to listen, synthesize, and facilitate with the insight to move forward and take action. Her leadership style is collaborative, demonstrating her firm belief that we must work together to support the growth and future of the profession.

"A graduate of Iowa State University, Rinner has worked for 40 years in both small landscape

architectural firms and as a partner in interdisciplinary firms. Her management of a wide variety of project types has given her a broad understanding of the issues landscape architects face in both private and
public practice.

"Rinner's sustained involvement in ASLA has been an integral part of her landscape architecture practice. She completed a term as vice president for finance and investments after serving as chair of the finance and audit committees, helping to lead the Society through challenging financial times. Since relocating to Seattle, she is leading the advocacy efforts for the Washington ASLA Chapter. In acknowledgment of her dedicated service to the Society, she was honored to receive the 2014 ASLA President's Medal."

Nancy C. Somerville, Hon. ASLA, Hon. AIA

Executive Vice President and CEO,
American Society of Landscape Architects

As CEO of the American Society of Landscape Architects (ASLA), Somerville guides the advocacy, public awareness, education, and professional practice programs of the Society. She is a frequent spokesperson on active transportation, green infrastructure, and other environmental and land use issues critical to the creation of healthy and resilient communities. During Somerville's tenure, ASLA's environmental leadership and community involvement have garnered awards and recognition from the District Office of the Mayor, the DowntownDC BID, the District Department of Energy and the Environment, the National Park Service, and the Kresge Foundation. Somerville was elected to membership in Lambda Alpha International, the honorary land economics fraternity, in 2004; received the Civic Award of Excellence from Green Roofs for Healthy Cities in 2008; won the *Washington Business Journal*'s Healthiest CEO competition in 2013; received the Chairman's Award for service from the Renewable Natural Resources Foundation in 2016; is an honorary member of ASLA and the American Institute of Architects; and in 2017 was among the first class of individuals to earn the SITES AP designation.

Prior to joining ASLA as CEO in 2000, Somerville spent 18 years with the American Institute of Architects, where she served as managing director and vice president of program areas including membership, government affairs, chapter relations, community development, and continuing education. A native of the Washington, D.C., area, she holds a B.A. from Princeton University and an M.A. from Stanford University.

Jalonne L. White-Newsome, PhD

Senior Program Officer, Environment ,
The Kresge Foundation

"Jalonne L. White-Newsome is senior program officer at the Kresge Foundation, responsible for the environment program's grant portfolio on climate resilient and equitable water systems. Dr. White-Newsome also leads the foundation's work addressing the intersection of climate change and public health.

"Before joining Kresge in early 2016, White-Newsome served as director of federal policy at West Harlem Environmental Action Inc., where she was involved with leading national campaigns and a 42-member national coalition of environmental justice organizations. Her work helped ensure that the concerns of low-income communities of color were integrated into federal policy, particularly on clean air, climate change, and health issues. She is an adjunct professor at the George Washington University in Washington, D.C., and continues to engage in research on climate, health, and equity. She was recently appointed to be a member of the National Academy of Sciences Board on Environmental Change and Society, and is serving as a lead author for the human health chapter for the Fourth National Climate Assessment.

"A native of Detroit, White-Newsome earned a doctorate in environmental health sciences from the University of Michigan School of Public Health; a master's degree in environmental engineering from Southern Methodist University; and a bachelor's degree in chemical engineering from Northwestern University. She serves on the board of the U.S. Climate Action Network, and is a steering committee member of the Health Environmental Funders Network. Jalonne is a 2017 PLACES Fellow with The Funders Network."

Appendix II:

Introduction Notes

[1] D.L. Hartmann et al., "Observations: Atmosphere and Surface," in ***Climate Change 2013: The Physical Science Basis,*** Cambridge University Press, Cambridge, United Kingdom, 2013, pp. 208-222.

[2] Kossin et al., "Extreme Storms" in ***Climate Science Special Report: Fourth National Climate Assessment, Volume I,*** U.S. Global Change Research Program, Washington, D.C., 2017, pp. 257-276.

[3] Wehner et al., "Droughts, Floods, and Wildfires" in ***Climate Science Special Report: Fourth National Climate Assessment, Volume I,*** U.S. Global Change Research Program, Washington, D.C., 2017, pp. 231-256.

[4] Revi et al.,"Urban Areas" in ***Climate Change 2014: Impacts, Adaptation, and Vulnerability*** Cambridge University Press, Cambridge, United Kingdom, 2017, pp. 535-612.

[5] Oppenheimer et al., "Emergent Risks andKey Vulnerabilities," in ***Climate Change 2014: Impacts, Adaptation, and Vulnerability*** Cambridge University Press, Cambridge, United Kingdom, 2017, pp. 1039-1099.

[6] Porter et al., "Food Security and Food Production Systems" in ***Climate Change 2014: Impacts, Adaptation, and Vulnerability*** Cambridge University Press, Cambridge, United Kingdom , 2017, pp. 485-533.

[7] Revi et al., "Urban Areas," in ***Climate Change 2014,*** p. 520.

[8] Revi et al.,"Urban Areas," in ***Climate Change 2014,*** pp.550-563.

[9] www.asla.org/climatepolicies.aspx

Recommended Resources

Books:

- ***After Nature: A Politics for the Anthropocene,*** Jedediah Purdy. Harvard University Press, 2015.
- ***Cities and Climate Change: Responding to an Urgent Agenda,*** edited by Daniel Hoornweg, Mila Freire, Marcus Lee, Perinaz Bhada-Tata, and Belinda Yuen. The World Bank, 2011.
- ***Climate Design: Design and Planning for the Age of Climate Change,*** Peter Droege. ORO Editions, 2009.
- ***Climate of Hope, How Cities, Businesses, and Citizens Can Save the Planet,*** Michael Bloomberg and Carl Pope. St. Martin's Press, 2017.
- ***The Community Resilience Reader: Essential Resources for an Era of Upheaval,*** edited by Daniel Lerch. Island Press, 2017.
- ***Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming,*** edited by Paul Hawken. Penguin Books, 2017.
- ***Energy Democracy: Advancing Equity in Clean Energy Solutions,*** edited by Denise Fairchild and Al Weinrub. Island Press, 2017.
- ***How to Thrive in the Next Economy: Designing Tomorrow's World Today,*** John Thackara. Thames & Hudson, 2015.
- ***Local Climate Action Planning,*** Michael Boswell, Adrienne Greve, and Tammy Seale. Island Press, 2011.
- ***Natural Capitalism: Creating the Next Industrial Revolution,*** Paul Hawken, Amory B. Lovins and L. Hunter Lovins. Little, Brown and Company, 1999.

- ***Nature and Cities: The Ecological Imperative in Urban Design and Planning,*** edited by Frederick Steiner, George Thompson, and Armando Carbonell. Lincoln Institute of Land Policy, 2016.
- ***Resilient Cities: Overcoming Fossil Fuel Dependence,* Second Edition,** Peter Newman, Timothy Beatley, and Heather Boyer. Island Press, 2017.
- ***Resilient Coastal City Regions: Planning for Climate Change in the United States and Australia,*** edited by Edward Blakely and Armando Carbonell. Lincoln Institute of Land Policy, 2012.
- ***Urbanism in the Age of Climate Change,*** Peter Calthrope. Island Press, 2010.

Articles: Rising Seas

- ***"The Dutch Have Solutions to Rising Seas. The World Is Watching,"*** Michael Kimmelman. ***The New York Times,*** June 15, 2017. www.nytimes.com/interactive/2017/06/15/world/europe/climate-change-rotterdam.html.

Articles: Resilience and Adaptation

- ***"Building Resilience? There's a Standard for That,"*** Laurie Mazur. *Planetizen*, July 31, 2017. www.planetizen.com/node/94011/building-resilience-theres-standard
- ***"How to Turn Neighborhoods into Hubs of Resilience,"*** Taj James and Rosa González, ***Yes Magazine,*** April 14, 2017. www.yesmagazine.org/planet/how-to-turn-neighborhoods-into-hubs-of-resilience-20170414
- ***"A Policy Approach Toward Climate Justice,"*** Jalonne L. White-Newsome. ***The Black Scholar,*** Vol. 46, Issue 3, 2016.
- ***"Protecting Communities from Climate Change (Hint: It's Not Just About Seawalls),"*** Jeni Miller. ***CoLab Radio,*** April 25, 2016. colabradio.mit.edu/protecting-communities-from-climate-change-hint-its-not-just-about-seawalls
- ***"This is How We Can Tackle Climate Change, Even with a Denier in Chief,"*** Laurie Mazur, ***The Nation,*** December 12, 2016. www.thenation.com/article/this-is-how-we-can-tackle-climate-change-even-with-a-denier-in-chief

Articles: Environmental Justice

- ***"Climate Change, Heat Waves, and Environmental Justice: Advancing Knowledge and Action,"*** Jalonne L. White-Newsome, et al., ***Environmental Justice,*** Vol. 2, no. 4, December 2009.

Articles: Climate Change and Health

- ***"Assessing Heat-adaptive Behaviors Among Older, Urban-dwelling Adults,"*** Jalonne L. White-Newsome et al., ***Maturitas,*** Vol. 70, Issue 1, September 2011.
- ***"Climate Change and Health: Indoor Heat Exposure in Vulnerable Populations,"*** Jalonne L. White-Newsome et al., ***Environment Research,*** Vol. 112, January 2012.
- ***"Climate Change and Public Health,"*** Jalonne L. White-Newsome et al., ***Non-governmental Actions by Individuals, Civil Society Organizations, and the Private Sector,*** Oxford University Press, June 2015.

- ***"Strategies to Reduce the Harmful Effects of Extreme Heat Events: A Four-City Study,"*** Jalonne L. White-Newsome et al., ***International Journal of Environmental Research and Public Health,*** February 2014.
- ***"Survey of County-Level Heat Preparedness and Response to the 2011 Summer Heat in 30 U.S. States,"*** Jalonne L. White-Newsome et al., ***Environmental Health Perspectives,*** June 2014.
- ***"Validating Satellite-Derived Land Surface Temperature with In Situ Measurements: A Public Health Perspective,"*** Jalonne L. White-Newsome et al., ***Environmental Health Perspectives,*** August 2013.

Reports: Coastal Resilience

- ***Buy-in for Buyouts: The Case for Managed Retreat from Flood Zones,*** a Policy Focus Report in collaboration with the Sonoran Institute, Lincoln Institute of Land Policy, 2016.
- ***"Climate Change and the Resilience of New Orleans: The Adaptation of Deltaic Urban Form,"*** Armando Carbonell and Douglas Meffert, in ***Cities and Climate Change: Responding to an Urgent Agenda,*** edited by Daniel Hoornweg, Mila Freire, Marcus Lee, Perinaz Bhada-Tata, and Belinda Yuen. The World Bank, 2012.
- ***Lessons from Sandy: Federal Policies to Build Climate-Resilient Coastal Regions,*** Robert Pirani and Laura Tolkoff. Lincoln Institute of Land Policy, 2014. www.lincolninst.edu

Reports: Resilience and Adaptation

- ***Bounce Forward: Urban Resilience in the Era of Climate Change,*** a Strategy Paper from Island Press and the Kresge Foundation.
- ***CIRCLE-2 Adaptation Inspiration Book,*** edited by Marjolein Pijnappels and Philip Dietl, University of Lisbon, 2013. www.circle-era.eu/np4/552.html
- ***Innovation in Climate Adaptation,*** Knowledge for Climate, Climate Adaptation in the Netherlands, 2014. edepot.wur.nl/315807
- ***Planning for Climate Change in the West,*** a Policy Focus Report on urban form and GHG mitigation, Lincoln Institute of Land Policy, 2010. www.lincolninst.edu
- ***Understanding and Responding to Climate Change: Highlights of National Academies Report.*** National Academies Press, 2008
- ***Urban Planning Tools for Climate Change Mitigation,*** Patrick Condon, Duncan Cavens, and Nicole Miller, Lincoln Institute of Land Policy, 2009. www.lincolninst.edu

Video:

- ***An Inconvenient Sequel: Truth to Power,*** 2017
- ***An Inconvenient Truth,*** 2006
- **An Inconvenient Sequel,** 2017, TED talks, Al Gore.
  "Averting the Climate Crisis," June 2016
  "The Case for Optimism on Climate Change," February 2016.

Additional Information:

- e360.yale.edu/
- insideclimatenews.org

Photo sources: ASLA Honors and Awards program winners; iStock; Storyblocks; Jim Richards

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