

THE 2024 REGIONAL TRANSPORTATION PLAN/SUSTAINABLE COMMUNITIES STRATEGY  
OF THE SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS



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July 6, 2023

# Connect SoCal 2024

Climate Resilience

*The capacity of the SCAG region's built, social, economic and natural systems to anticipate and effectively respond to changing conditions, acute shocks, and chronic stressors by creating multiple opportunities for a sustainable, thriving and equitable future.*

## Resilience & Conservation Subcommittee Broad Principles

- 1. Prioritize the most vulnerable populations and communities subject to climate hazards:** Help the people, places, and infrastructure that are most at risk for climate change impacts, recognizing that disadvantaged communities are often overburdened
- 2. Build strong partnerships:** Coordinate across multiple sectors, scales, and stakeholders to ensure all people have access to the fundamental physical, health, and social benefits of our natural and built systems
- 3. Apply ecosystem-based approaches:** Incorporate ecosystem resilience, protection of ecosystem services, and sustainable resource management
- 4. Maximize mutual benefits:** Support resilience and conservation initiatives across built, social, economic, and natural systems, such as disaster preparedness, to ensure synergies across systems and reduce/avoid impacts of maladaptation.

## Draft Plan Goals - COMMUNITY

- Reinforce vibrant, human-centered communities in urban, suburban, and rural settings to increase mobility options and reduce travel distances.
- Produce and preserve a diversity of housing types to improve affordability, accessibility, and choices for all.
- Foster inclusive communities free from barriers that restrict access to opportunity, and actively seek to reduce racial and economic disparities.



## Draft Plan Goals - ENVIRONMENT

- Develop communities that are resilient and can mitigate, adapt to, and respond to chronic and acute stressors and disruptions, such as climate change.
- Integrate the region's development pattern and transportation network to improve air quality, reduce greenhouse gas emissions, and enable more sustainable use of energy and water.
- Conserve and restore the region's natural and agricultural resources.



# Climate Resilience Expert Panel



Lisa Beyer  
Urban Water Infrastructure Manager  
World Resources Institute



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Alison Kearns  
Planning and Implementation  
Branch Chief  
FEMA District #9



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David Sumi  
Resource Specialist  
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## NATURE BASED SOLUTIONS (NBS) FOR URBAN RESILIENCE

SCAG Energy & Environment Policy Committee

Lisa Beyer, ASLA, PLA, Urban Water Infrastructure Manager, WRI

July 6, 2023



# Urban Community Resilience Assessment

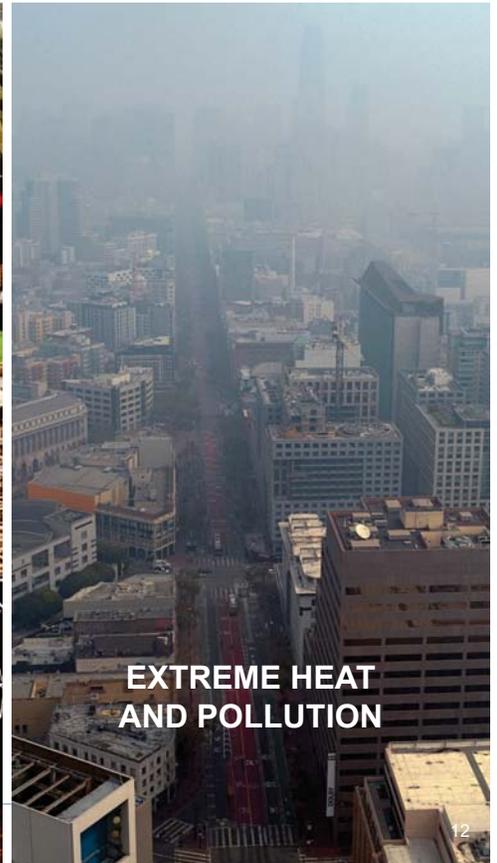
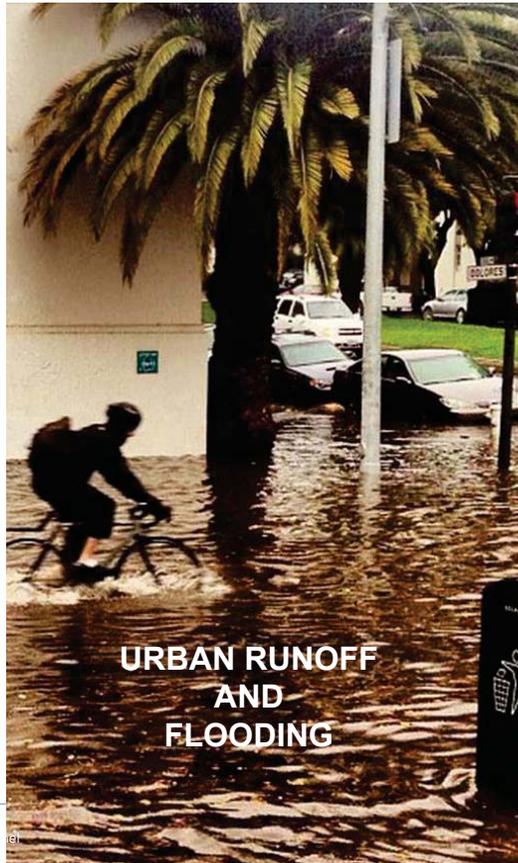
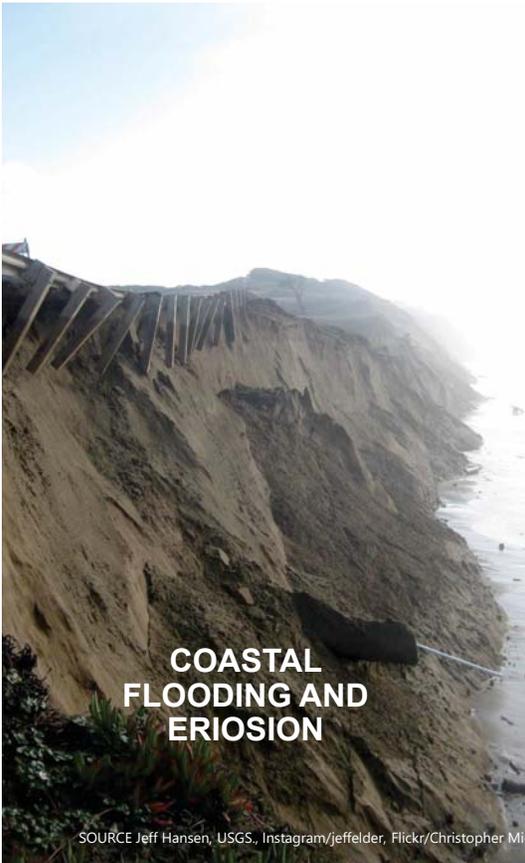
Amplifying vulnerable communities' voices in adaptation decision-making to advance effective, equitable and resilient urban development

IMAGE: WRI

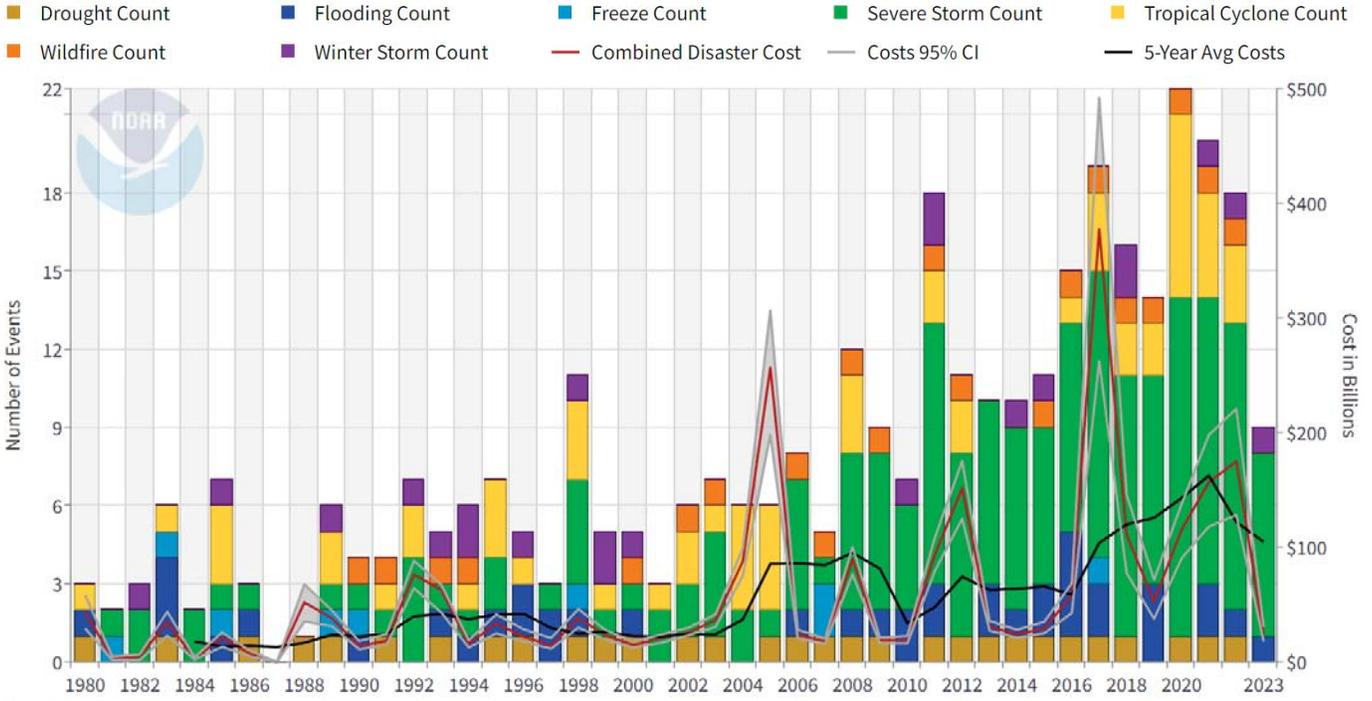
## Cities **4** Forests



# CLIMATE IMPACTS ON CITIES



### United States Billion-Dollar Disaster Events 1980-2023 (CPI-Adjusted)



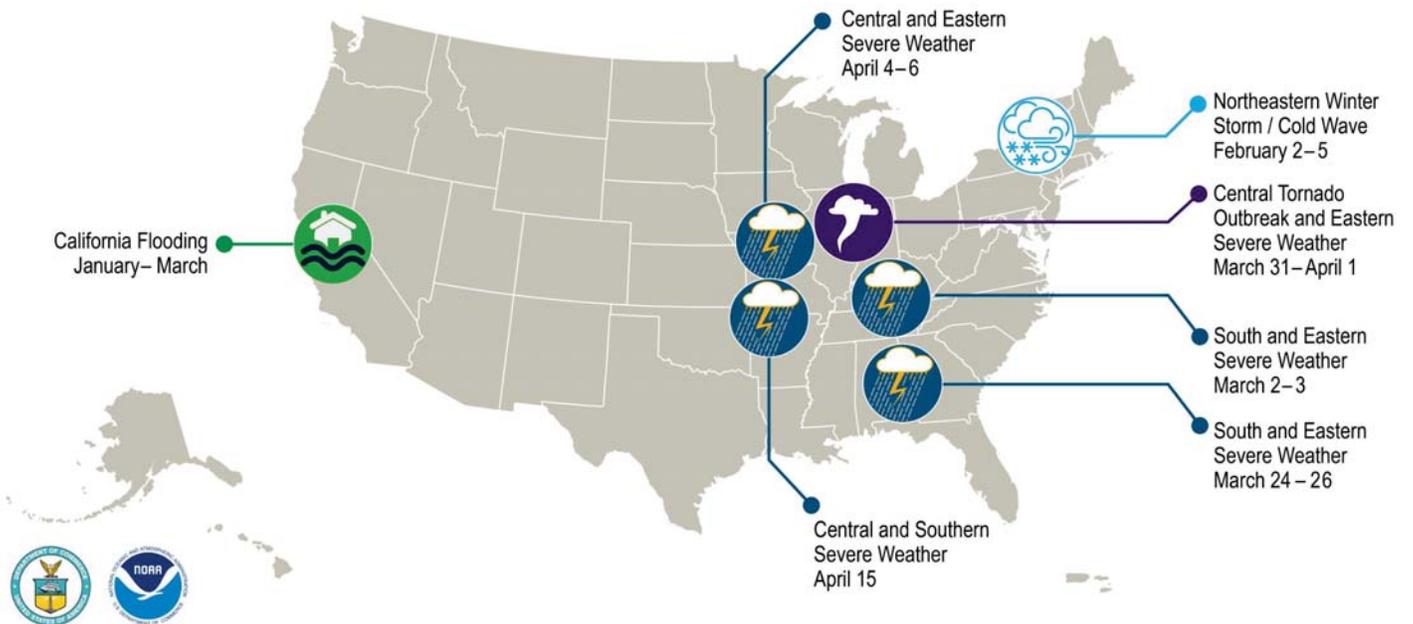
Updated: June 8, 2023

Powered by ZingCha

Image: NOAA National Centers for Environmental Information (NCEI) U.S. Billion-Dollar Weather and Climate Disasters (2023). <https://www.ncdc.noaa.gov/billions>

### U.S. 2023 Billion-Dollar Weather and Climate Disasters

- Drought/Heat Wave
- Flooding
- Hail
- Hurricane
- Severe Weather
- Tornado Outbreak
- Wildfire
- Winter Storm/Cold Wave



This map denotes the approximate location for each of the 7 separate billion-dollar weather and climate disasters that impacted the United States through April 2023.

Image: NOAA National Centers for Environmental Information (NCEI) U.S. Billion-Dollar Weather and Climate Disasters (2022). <https://www.ncdc.noaa.gov/billions>

## Billion-dollar weather and climate disasters frequency mapping: 1980-2020

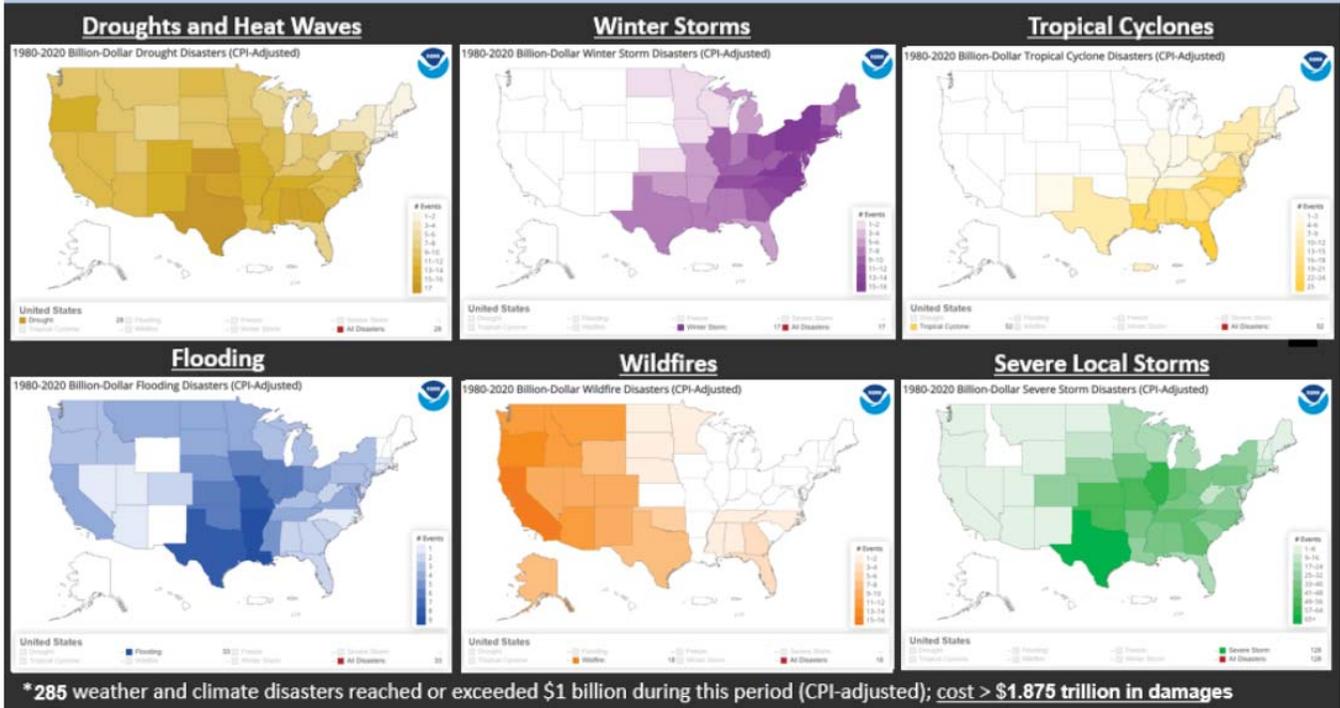


Image: NCEI Billion-dollar Disasters <https://www.ncdc.noaa.gov/billions>

NATURE BRINGS SOLUTIONS

# NATURE BASED SOLUTIONS

1969  
**DESIGN WITH NATURE**  
Landscape Infrastructure

Image: Architecture Archives at University of Pennsylvania

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## MULTIPLE TERMS FOR NATURE BASED SOLUTIONS



SOURCE: Cohen-Shacham et al. 2016; UNEP et al. 2014; EC 2015; Lo 2016; WWF 2017; USACE n.d.; EcoShape 2018; WBCSD 2017; dsd.gov.hk, UACDC

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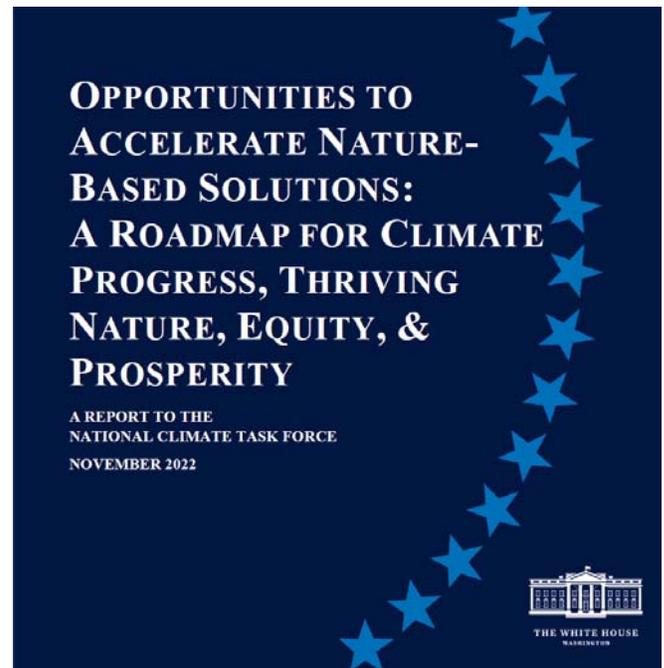
# CALL TO ACTION



Who we are ▾ Where we work ▾ What we do ▾



The natural world is the centre of life on Earth. Ecosystems – from forests, grasslands and peat bogs to oceans, rivers, savannahs and mountains – provide a vast range of services vital to the survival of humanity. They provide food and fresh water, protect us from disasters and disease, prop up the global economy, and crucially play a central role in tackling the climate crisis.



SOURCE: <https://www.unep.org/news-and-stories/story/why-nature-holds-key-meeting-climate-goals>, <https://www.whitehouse.gov/wp-content/uploads/2022/11/Nature-Based-Solutions-Roadmap.pdf>

## DEFINITION OF NATURE BASED SOLUTIONS

“Actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits.”

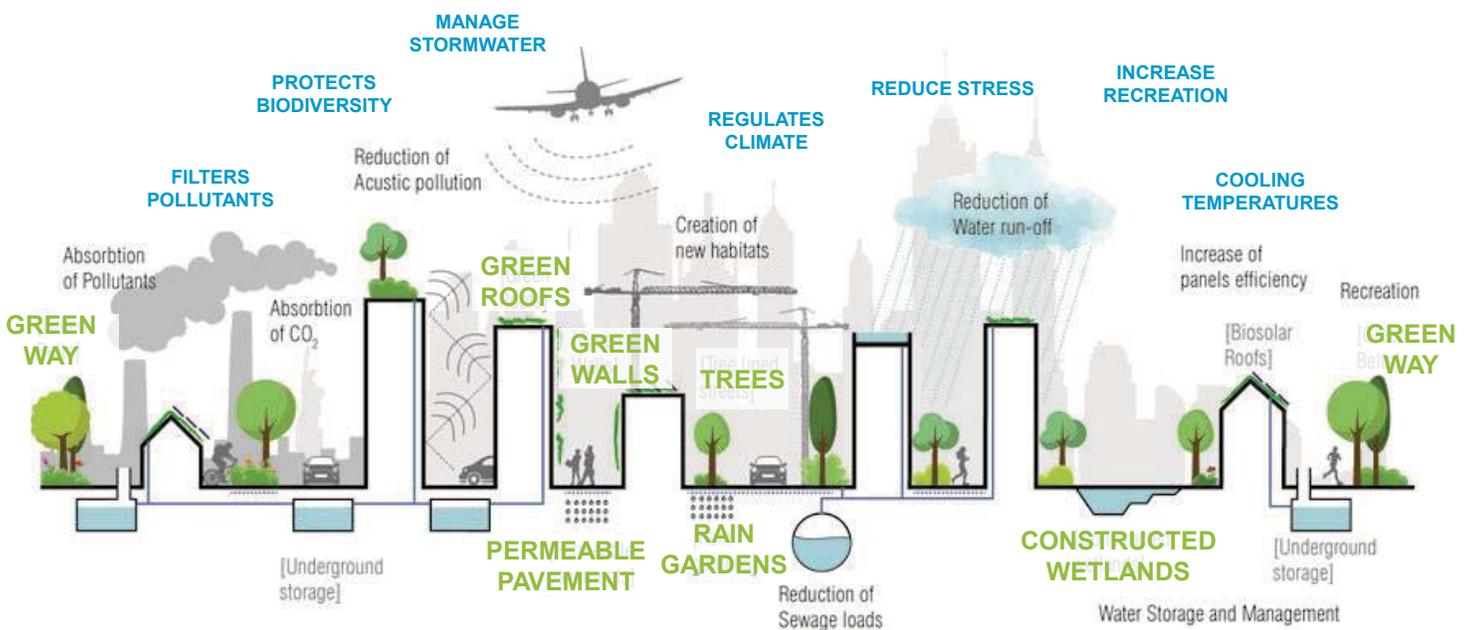
(International Union for the Conservation of Nature).

# NATURE BASED SOLUTIONS TOOLS



## VALUE OF NBS

healthier cities, streams, air, people, and planet



# INFRASTRUCTURE BENEFITS OF NBS

NATURE-BASED SOLUTIONS		INFRASTRUCTURE BENEFITS							
TYPE	Protect, restore, manage, or create new...	Source Water Protection	Flood and Erosion Management			Water Security (Availability)	Food Security (Availability)	Carbon Sequestration	Fire-Risk Reduction
			Coastal	River	Urban				
Upland	Forest	X		X	X	X	X	X	X
	Agroforestry and Silvopasture	X				X	X	X	X
	Farmland Best Practices	X				X	X	X	
	Floodplains and Bypasses			X				X	
	River Beds and Banks			X					
	Sand Dams			X		X	X	X	
	Inland Wetlands	X		X	X	X		X	
Coastal	Mangroves		X					X	
	Salt Marshes		X					X	
	Coral and Oyster Reefs		X						
	Sandy Beaches and Dunes		X						
Urban	Open Spaces		X	X	X			X	X
	Distributed Bioretention				X				
	Constructed Wetlands		X		X	X		X	
	Permeable Pavements		X		X				
	Green Roofs				X				

## BRINGING NATURE INTO THE CITY

## NBS WATER MANAGEMENT STRATEGIES



**Sink it:** Allowing infiltration of water into the soils and subsurface zones;



**Slow It:** Temporarily retaining/detaining water and then slowly releasing it;



**Move it:** Conveying excess water from one site to another;



**Reuse it:** Capturing water for reuse in potable and non-potable uses; and



**Clean it:** Improving water quality.

SINK IT	SLOW IT	MOVE IT	REUSE IT	CLEAN IT
 <p>Forests capture and absorb water through their roots, helping prevent flooding.</p>	 <p>Detention basins temporarily store water and then slowly release it, reducing peak flows during extreme rain events.</p>	 <p>Creek daylighting connects former creek areas to existing water channels, relocating water to other parts of the watershed.</p>	 <p>Water can be captured and reused through rainwater harvesting.</p>	 <p>Wetlands capture water and improve its quality.</p>

## NBS HEAT MANAGEMENT STRATEGIES



**Lighten It:** Increase albedo by replacing low albedo surfaces such as dark pavements with high albedo surfaces such as blue-green infrastructure that reflect more heat back into the atmosphere;



**Cover it:** Create shade by increasing shade elements such as trees;



**Access it:** Provide access to shade by ensuring residents are able to access shade from their homes and jobs; and



**Cool it:** Increase evapotranspiration by providing vegetated surfaces where evapotranspiration can easily occur.

LIGHTEN IT	COVER IT	ACCESS IT	COOL IT
 <p>Green roofs generally have higher albedo than their grey infrastructure counterparts.</p>	 <p>Trees are an important source of shade in cities, helping mitigate the urban heat island effect.</p>	 <p>Greenways help connect humans and nature, and enable interaction with shade-creating elements such as trees.</p>	 <p>Forests carry out evapotranspiration, consuming heat and helping cool cities.</p>



**BISHAN-ANG MO KIO PARK, SINGAPORE**



Source: Dreiseitl



Source: koreabridge.net

**CHEONGGYEcheon RIVER RESTORATION, SEOUL**



Source: Michael Sotnikov/Flickr



**ATLANTA'S HISTORIC 4TH WARD PARK**



Photo credit: HDR/Steve Carrell; Donita Pendered



**DC'S SIDWELL FRIENDS SCHOOL**

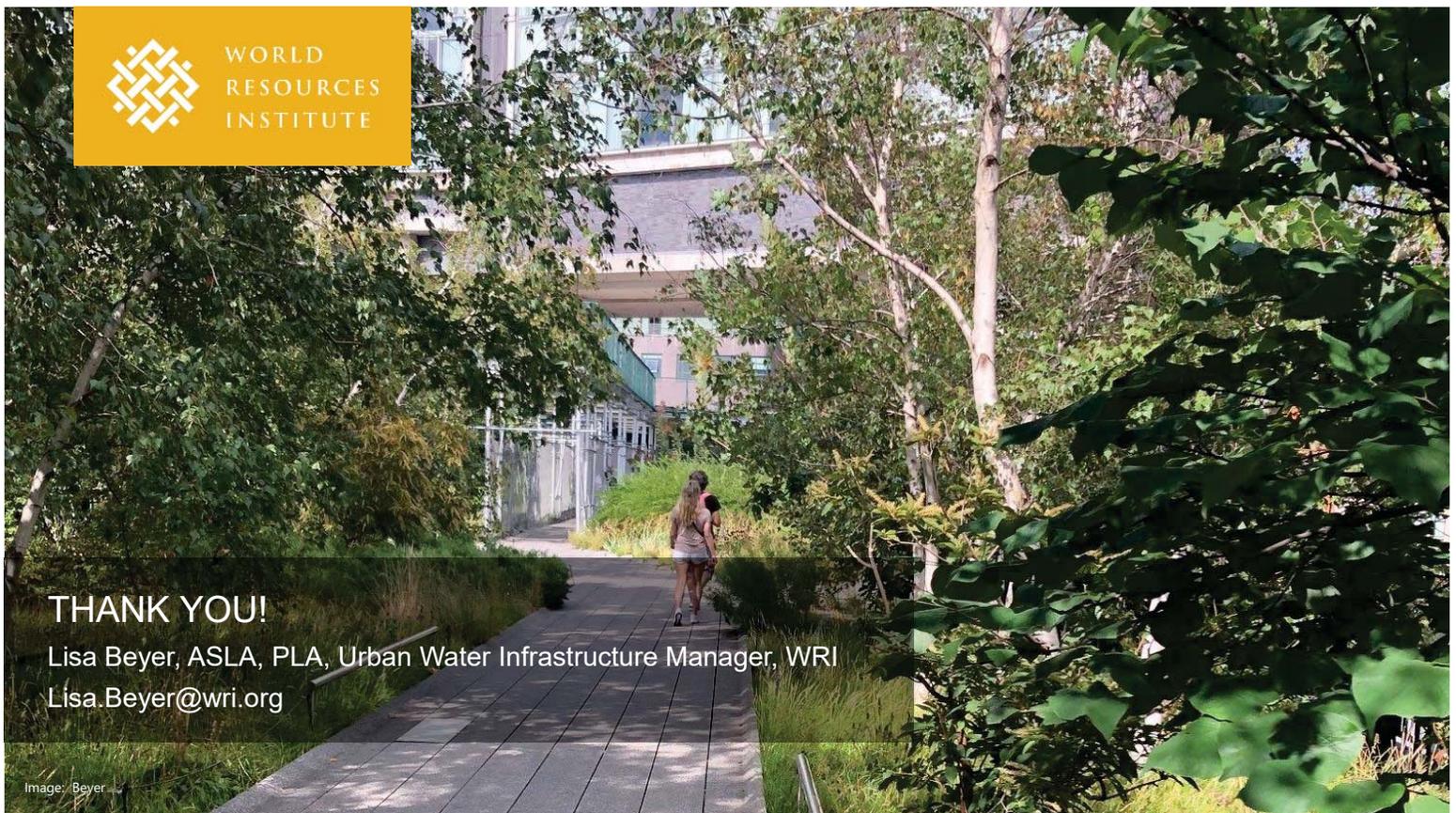


Photo Credit: Sidwell.Edu

# ADVANCING NATURE BASED SOLUTIONS

Keys to success:

- Raising awareness and cultivating champions
- Articulating a clear vision and set of shared goals for evaluation
- Building partnerships across institutions and with communities
- Embedding NBS in policies and planning frameworks
- Integrate NBS into public budgets
- Focus investments in areas of risk and vulnerability



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