Adapting to Climate Change and Building Urban Place Resilience in Urban Parks

Presented at the



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Outline

- Climate Change Impacts-Severe Weather
 Impacts in Urban Area
- Resilience in Urban Areas Defined
- Mitigation of Severe Weather Events in Urban Areas
- Parks Agencies Resources and Expertise
- Case Studies- Parks, Open Space



Climate Change=Urban Place Change

- Warming of the earth documented
- Almost 1.5° C or about 3.5° F
- Significance at 2.00 C: massive greenhouse gas due to permafrost melt

http://www.climate-lab-book.ac.uk/



Temperature Increase at Night



Copley INDIANA UNIVERSITY

Severe Weather Impacts in Urban Areas

- Event attribution as science
- Intense rainstorms, severe droughts and heat waves are becoming more frequent.
- Rising seas are damaging homes and infrastructure near the water.
- Some populations of animals are starting to die out.
- Plant populations migrating or dying out







Understanding and confidence in science varies by event

Understanding of effect of climate change on event type

Source: National Academy of Sciences Attribution of Extreme Weather Events in the Context of Climate Change



Sources: Historic flooding in South Carolina in October 2015. SOURCE: Chuck Burton/Associated Press; Image Courtesy Of National Parks Service; The frozen Great Lakes during February 2014 (NASA image); National Academy of Sciences Attribution of Extreme Weather Events in the Context of Climate Change

Capabilities to predict and plan for...

Event Type	Simulation Capabilities	Observational Quality	Physical Mechanisms	
Extreme cold events	•	•	•	
Extreme heat events	•	•	•	
Droughts	0	0	0	
Extreme rainfall	0	0	0	
Extreme snow and ice storms	o	0	o	
Tropical cyclones	0	0	0	
Extratropical cyclones	0	0	0	
Wildfires	0	•	0	
		Source: National Acad Weather B	Source: National Academy of Sciences Attribution of Extreme Weather Events in the Context of Climate Change	

Resilience in Urban Areas

- Resilience has a broad focus of many factors
- Defining resilience often is location based
- Rockefeller Foundation 100 Resilient Cities
- CRI: 12 goals, 52 indicators, 4 dimensions
- Critics indicate this is a limiting approach to resilience



Defining Resilience for Urban Parks



Resilient + sustainable + livable

- Take the concepts of resilience, sustainability and livability beyond metaphorical status...make them operational by being specific
- Acknowledge and confront the differences between resilience, restoration and resistance
- Build communities and social movements that include and engage people where they live
- Mindfully create mosaics of communities and design elements that together add up to resilience + sustainability + livability

Source: David Thorpe; Sustainable Cities Collective

Source: David Maddox; The Cities We Want: Resilient, Sustainable, and Livable | The Nature of Cities

Mitigating Severe Weather Events in Urban Areas

- Severe weather urban threats
 - tidal, flooding, drought
- Parks- ephemeral wetlands, ponds, locations
- Urban forests and street trees
- Urban infrastructure and design
- Environmental- resource management
- Incident response capability
- Case study focus- flooding in urban and natural areas



Flooding in Boulder, CO

- Heavy rain- nearly a year's worth of rain in 5 days; 3x the max water flow planned for at 26000 cfs
- Rivers destroyed roads and bridges, flooded homes and businesses, and resulted in the evacuation of several towns.
- Result: few lives lost, most systems were maintained, and the response and recovery have been strong, well-coordinated and effective.



- What worked:
 - Specific alerts, and effective government coordination
 - Planning ahead makes a difference-
 - high hazard property acquisition
 - Lots of open space and water area acquisition,
 - critical facilities ordinance and multi use paths along creeks,
 - Public education



Damage to a home in Lyons, Colo., from the September 2013 flooding. Elaine Pittman

Flooding and the Netherlands



- Committed to 'Climate Proofing'
 - Structural adaption including measures to add parks, canals, open space where possible
 - Adaption of buildings, streets, utility placement, green buildings to allow for water flow
 - Rotterdam has built many small parks with ponds, water plazas, reclaiming dry to wet areas (ephemeral wetlands)
 - Increasing capacity of agencies for emergency response



Hurricane in SE Florida, USA

- 1992-strongest hurricane to hit USA
- Big Cypress National Preserve, Jefferson National Monument, and Biscayne and Everglades National Parks all in path of hurricane
- Public facilities, visitor centers, concessions all closed and employees evacuated
- After Hurricane Andrew passed, ICS was used by NPS for Recovery
 - Emergency needs of employees met
 - Employee safety
 - Prevent further damage
 - Secure, protect, and salvage all facilities
 - Rehabilitate facilities to permit normal use
 - Assess restoration needs of structures
 - Factual accounting and documentation
- SE Florida other than these parks was decimated





Figure 58. Storm-surge elevations, in feet above sea level, at selected points along the coast of Florida; < indicates less than. (Source: Data from U.S. Geological Survey files.)



http://www.trbimg.com/img-5163aad8/turbine/sfl-photos-hurricaneandrew-anniversary-pictur-025/650/650x366

Urban Area Resilience to Climate Change

Community resilience has been defined as the sustained ability of a community to withstand and recover from adversity (e.g., economic stress, pandemic influenza, manmade or natural disasters).

Indiana planning assessing and building on strengths of areas to build resilience.



Source: Grant application, Grand Challenge, Indiana University 2016

