



GLOBAL COVENANT
of MAYORS for
CLIMATE & ENERGY

@Mayors4Climate



Climate Risk and Vulnerability Assessment



Climate Risk and Vulnerability Assessment (CRVA)

Mandatory:

- Identification and description of previous **major climate hazards** and **associated impacts**.
- Identification of most significant climate hazards and description of associated risks, expected future impacts, and the sectors, assets, and services most affected.
- Identification of factors that will most affect **adaptive capacity** and description of how each factors supports or challenges it.

Recommended:

- Information on vulnerable population groups most affected by climate hazards.



MWCOG Draft CRVA



Climate Hazards

The potential occurrence of a natural or human-induced physical event or trend or physical impact that may cause loss of life, injury or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems, and environmental resources. The term hazard usually refers to climate-related physical events or trends or their physical impacts.

GCoM Framework Requirements:

- Provide type of **Climate Hazards**
- Current and Future **Risk Level** of each hazard
- **Intensity** and **Frequency** of past/current hazards and expected change in Intensity and Frequency for future hazards
- Description of **Impacts** experienced in the past (required only for past/current hazards) and list of impacted **sectors** and the **magnitude** of impact for each sector (for both past/current and future hazards)



MWCOG Climate Hazards

- **Coastal Flooding**
- **Flooding (Flash and Riverine)**
- **Extreme Heat Days**
- **Drought**
- **Extreme Winter Conditions**
- **Lightning / Thunderstorm**




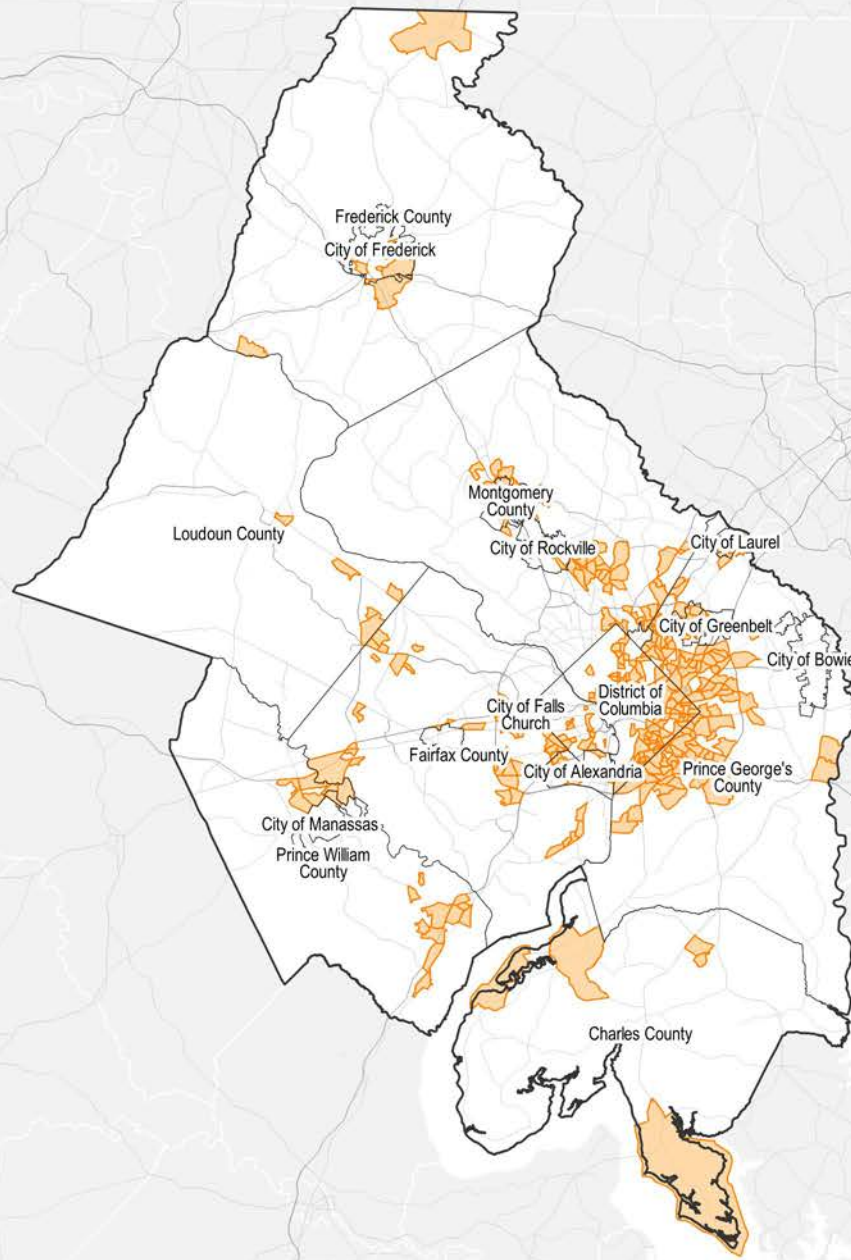
Risk Level of Climate Hazards

	Probability	Consequence	Risk Level
Flooding (Flash and Riverine)	3	3	9
Extreme Heat Days	3	2	6
Drought	2	3	6
Coastal Flooding	3	2	6
Lightning/ Thunderstorm	2	2	4
Extreme Winter Conditions	2	2	4




**Equity Emphasis Areas
National Capital Region**

 Equity Emphasis Areas










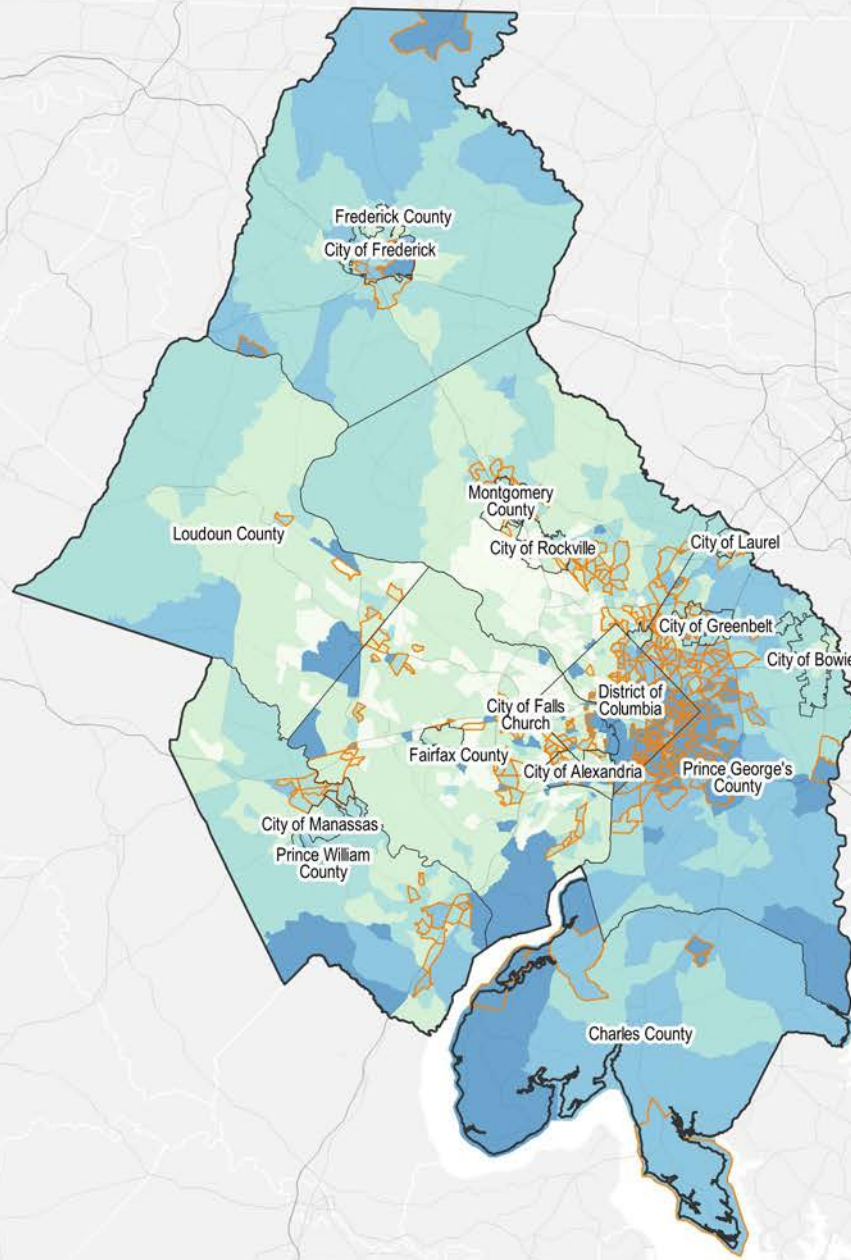
Equity Emphasis Areas National Capital Region

 Equity Emphasis Areas

Healthy Places Index


Healthy Places Index Score

-  0 - 20
-  20 - 40
-  40 - 60
-  60 - 80
-  80 - 100




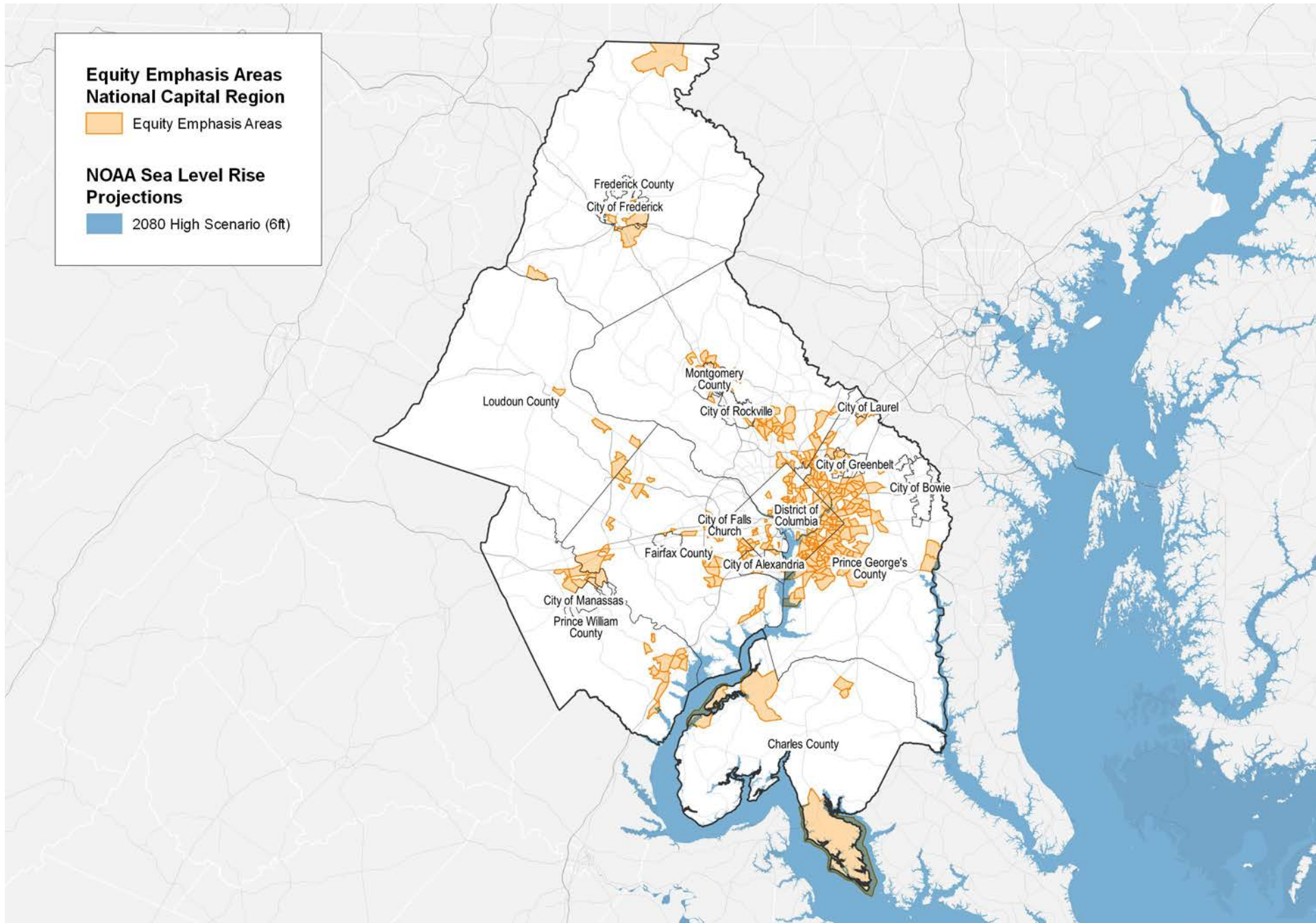


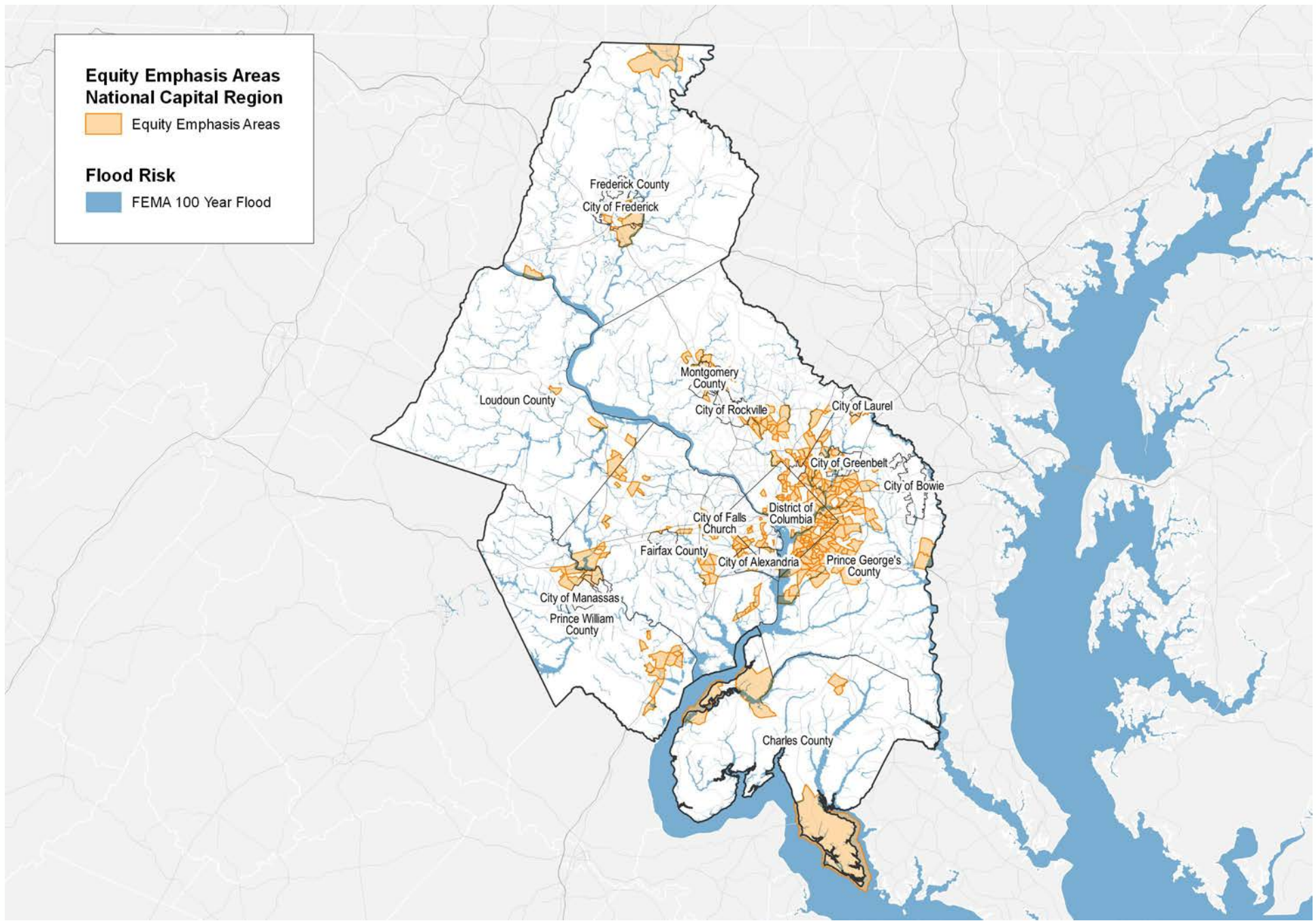
**Equity Emphasis Areas
National Capital Region**

 Equity Emphasis Areas

**NOAA Sea Level Rise
Projections**


 2080 High Scenario (6ft)







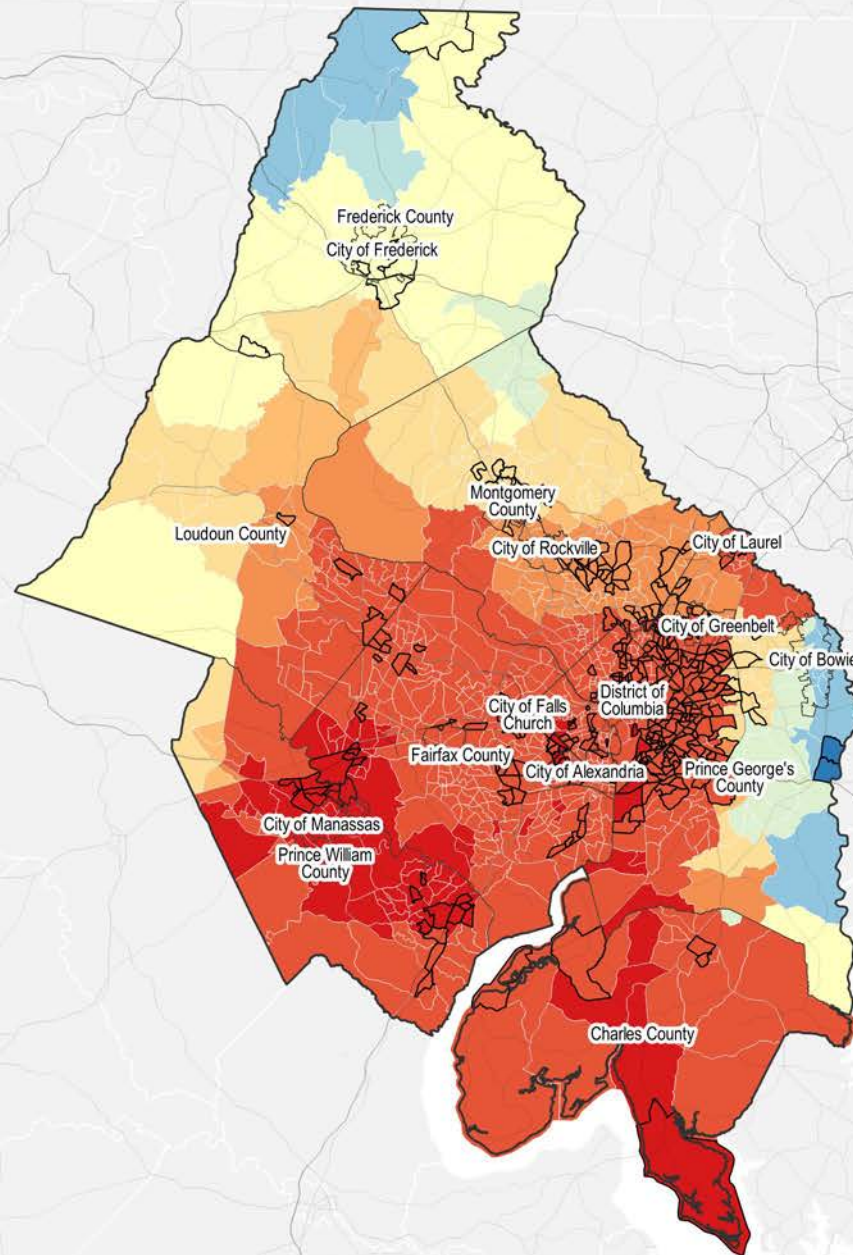
Equity Emphasis Areas National Capital Region

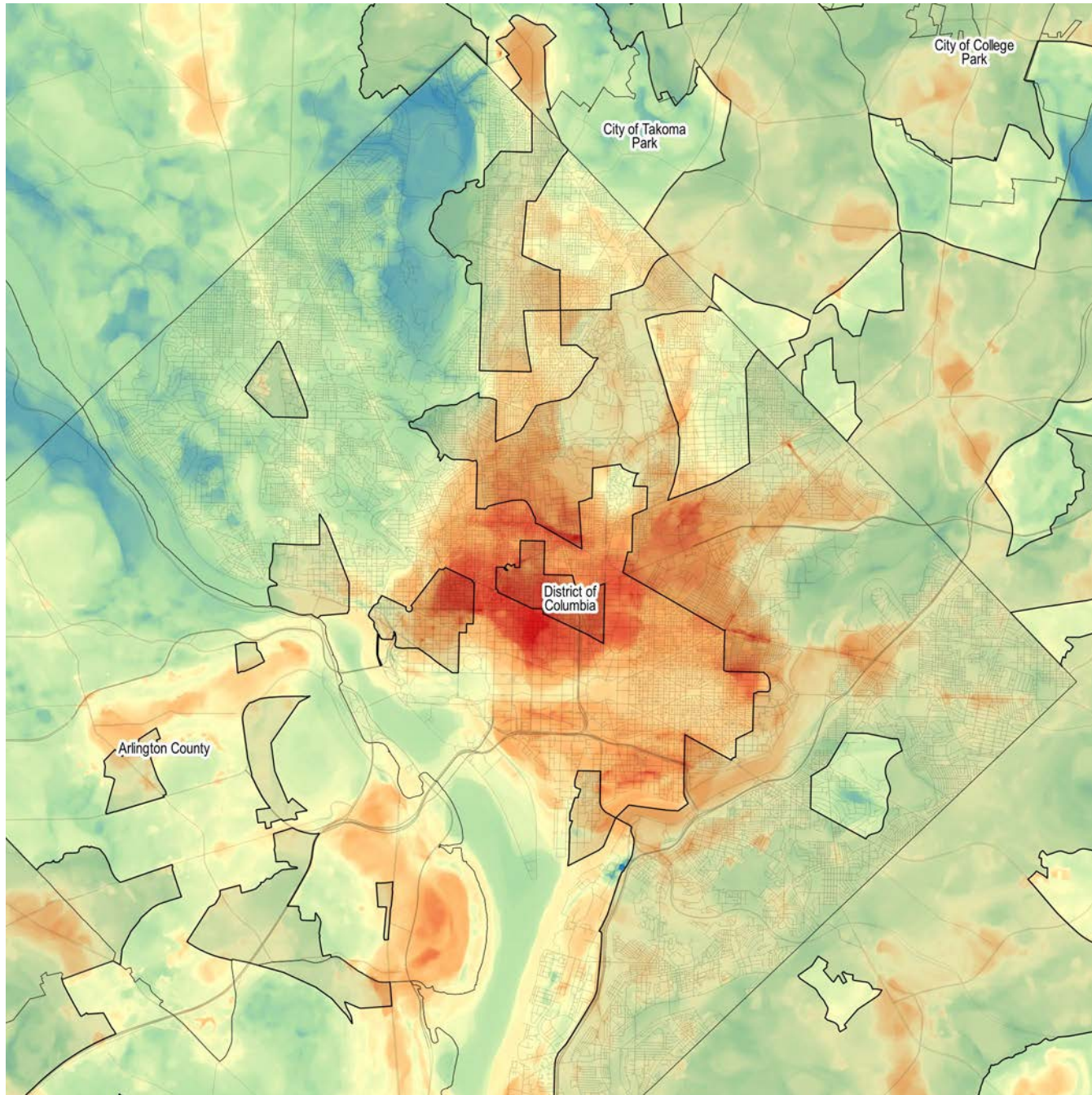
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CDC Extreme Heat Days


2016 Extreme Heat Days

-  1 - 2 Days
-  3 - 4 Days
-  4 - 5 Days
-  5 - 6 Days
-  6 - 7 Days
-  7 - 8 Days
-  8 - 9 Days
-  9 - 10 Days
-  10 - 11 Days
-  11 - 12 Days










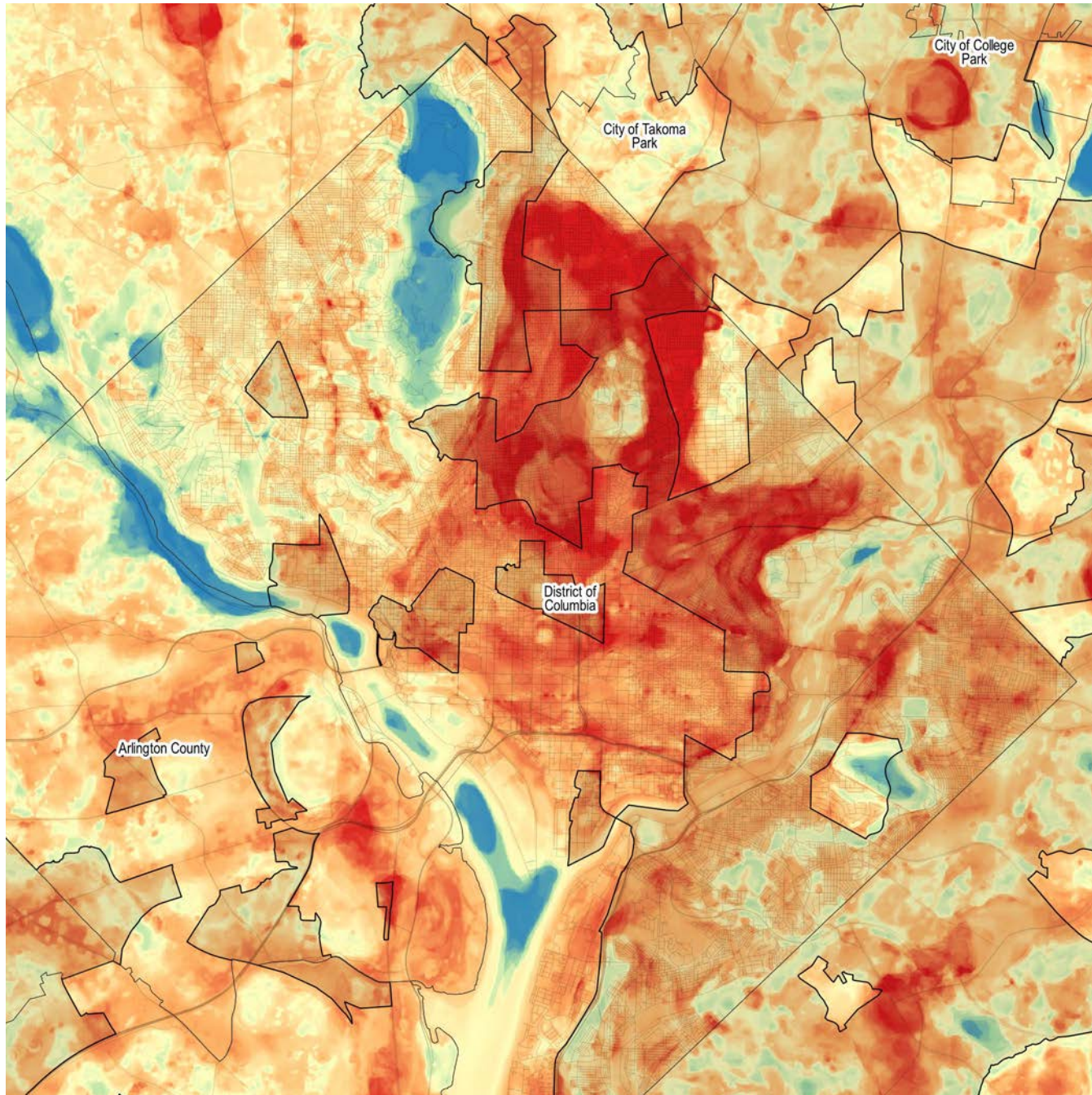
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 Equity Emphasis Areas


Washington, D.C. Urban Heat Island Assessment

Predicted Morning (6AM)
Ambient Temperatures

-  72 °F
-  74.5 °F
-  77 °F
-  79.5 °F
-  82 °F








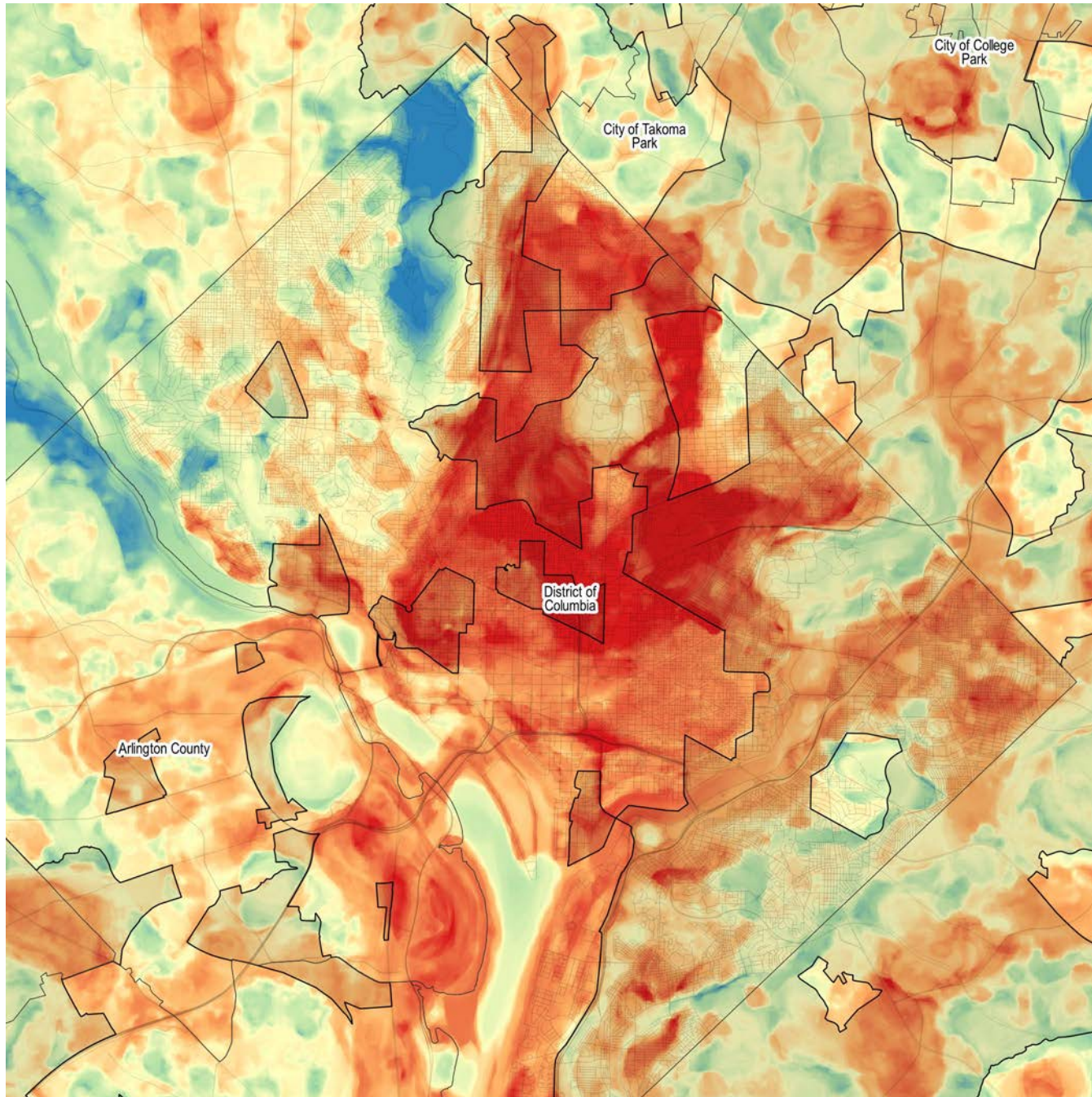
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 Equity Emphasis Areas


Washington, D.C. Urban Heat Island Assessment

Predicted Afternoon (3PM)
Ambient Temperatures

-  87 °F
-  89.5 °F
-  92 °F
-  94.5 °F
-  97 °F








Equity Emphasis Areas National Capital Region

 Equity Emphasis Areas

Washington, D.C. Urban Heat Island Assessment

Predicted Evening (7PM)
Ambient Temperatures

-  82 °F
-  84.5 °F
-  87 °F
-  89.5 °F
-  92 °F



Adaptive Capacity

The ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities or to respond to consequences.

Adaptive capacity is an indication of the redundancy, flexibility, and robustness of an asset or group.

GCoM Framework Requirements:

- Selection of the **adaptive capacity factors** that are most relevant to the Region
- For each chosen factor, the **degree in which the factor challenges** the adaptive capacity of the region. (Regions may also highlight factors that support the adaptive capacity of the region, but the focus of this exercise is to identify areas in need of improvement)



Adaptive Capacity

Factor	Degree of Challenge
Infrastructure Conditions / Maintenance	High
Public Health	Moderate
Housing	Moderate
Poverty	Moderate
Access to Basic Services	Moderate
Access to Healthcare	Moderate
Environmental Conditions	Moderate
Economic Health	Low



Adaptation Goals



Adaptation Goals

Mandatory:

- Development based on the results of the climate risk and vulnerability assessment
- Goal statement including the **baseline year** as well as **delivery date**

Recommended:

- Stipulated plan to **track progress** toward the achievement of the goal

Optional:

- Assessment of adaptation goal robustness using the following criteria:
 - Completeness: a goal for every risk-imposing hazard
 - Internal coherence: alignment with identified risks
 - Quantification: measurable metrics/indicators



Adaptation Goals

Purpose: addresses the risks and vulnerabilities identified in the CRVA and sets the path for adaptation actions

Process: developed based on CRVA results, informs adaptation actions

Goal 1

- » *Reduce vulnerability to building energy supply disruptions*

Goal 2

- » *Preserve ability of health care providers to provide utilities during extreme heat events*

Goal 1

- » *Enhance and preserve existing urban forest resources*

Source: City and County of Denver Climate Adaptation Plan, 2014



Adaptation Goal Activity

Break out into groups to discuss potential adaptation goals for the Metro Washington Region for each of the main climate hazards.



- **Flooding (Flash and Riverine)**
- **Extreme Heat Days**
- **Drought**
- **Coastal Flooding**
- **Lightning / Thunderstorm**
- **Extreme Winter Conditions**



Thank you



Flooding (Flash and Riverine)

Probability	High
Consequence	High
Change in Intensity <i>(How strong?)</i>	
Change in Frequency <i>(How often?)</i>	
Timescale <i>(By when?)</i>	Immediately





Flooding (Flash and Riverine) - Impacts

Impacted Sectors, Assets, and Services	Magnitude of Future Impact
Transport	High
Water Supply and Sanitation	Moderate
Environment, Biodiversity, and Forestry	Moderate
Emergency Services	Moderate

Vulnerable Groups	Low-Income Households, Persons in Sub-Standard Housing
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Extreme Heat

Probability	High
Consequence	Moderate
Change in Intensity <i>(How strong?)</i>	
Change in Frequency <i>(How often?)</i>	
Timescale <i>(By when?)</i>	Short Term (by 2025)





Extreme Heat - Impacts

Impacted Sectors, Assets, and Services	Magnitude of Future Impact
Energy	High
Public Health	High
Transport	High
Environment, Biodiversity, and Forestry	Moderate
Information & Communications Technology (ICT)	Low

Vulnerable Groups	Elderly, Persons with Chronic Diseases, Low-Income Households, Marginalized Groups, Persons in Sub-Standard Housing
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Drought

Probability	Moderate
Consequence	High
Change in Intensity <i>(How strong?)</i>	
Change in Frequency <i>(How often?)</i>	
Timescale <i>(By when?)</i>	Medium Term (by 2050)





Drought - Impacts

Impacted Sectors, Assets, and Services	Magnitude of Future Impact
Water Supply and Sanitation	High
Food and Agriculture	High
Environment, Biodiversity, and Forestry	High
Public Health	Moderate
Emergency Services	Moderate



Coastal Flooding

Probability	High
Consequence	Moderate
Change in Intensity <i>(How strong?)</i>	
Change in Frequency <i>(How often?)</i>	
Timescale <i>(By when?)</i>	Medium Term (by 2050)



Coastal Flooding - Impacts

Impacted Sectors, Assets, and Services	Magnitude of Future Impact
Water Supply and Sanitation	Moderate
Transport	Moderate
Residential	Moderate
Commercial	Moderate
Emergency Services	Low



Lightning / Thunderstorms

Probability	Moderate
Consequence	Moderate
Change in Intensity <i>(How strong?)</i>	
Change in Frequency <i>(How often?)</i>	
Timescale <i>(By when?)</i>	Short Term (by 2025)





Lightning / Thunderstorms - Impacts

Impacted Sectors, Assets, and Services	Magnitude of Future Impact
Energy	Moderate
Food and Agriculture	Moderate
Water Supply and Sanitation	Moderate
Public Health	Low



Extreme Winter Conditions

Probability	Moderate
Consequence	Moderate
Change in Intensity <i>(How strong?)</i>	
Change in Frequency <i>(How often?)</i>	
Timescale <i>(By when?)</i>	Medium Term (by 2050)



Extreme Winter Conditions - Impacts

Impacted Sectors, Assets, and Services	Magnitude of Future Impact
Transport	High
Waste Management	Moderate
Public Health	Moderate