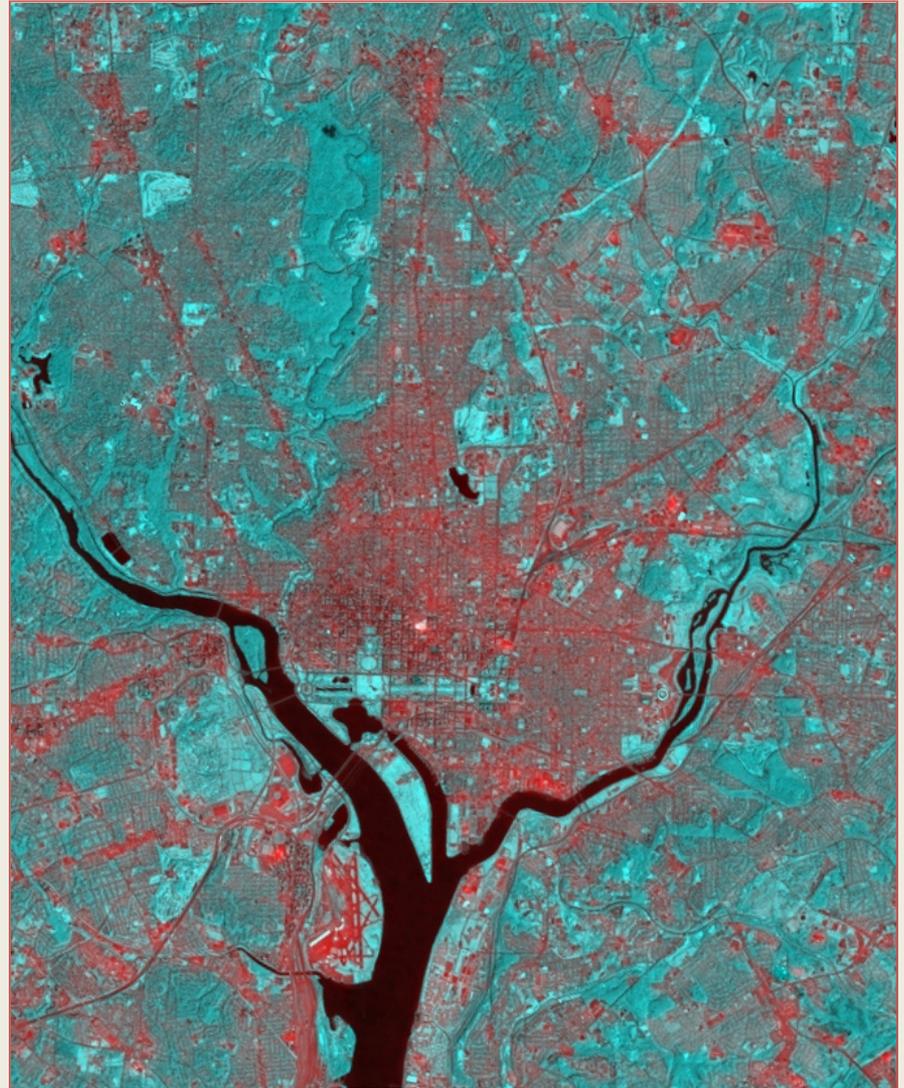


# Adaptation in Washington, DC

National Adaptation  
Forum

Denver, CO

April 2-4, 2013



# Adaptation in Washington, DC

## The District is on the Road to Mitigating GHGs

- GHGs Per Capita From 18 Tons to 14.5 Tons
- Have Exceeded 2015 Goals for Gov't and Community Reductions

Changes in Community Wide Emissions, Population and Work Force between 2006 and 2011					
	Sectors	2006	2011	% Change	% of Total Reductions
metric tons of CO <sub>2</sub> e	Residential	1,517,010	1,379,313	-9.08%	10.8%
	Non-Residential	6,020,070	5,027,438	-16.49%	77.6%
	GSA Facilities	441,167	360,776	-18.22%	6.3%
	Transit	131,275	112,236	-14.50%	1.5%
	VMTs	1,915,532	1,884,803	-1.60%	2.4%
	Solid Waste	185,991	167,097	-10.16%	1.5%
	<b>Totals</b>	<b>10,211,045</b>	<b>8,931,663</b>	<b>-12.53%</b>	<b>100%</b>
	Population	583,978	617,996	5.83%	
	Work Force	687,600	727,800	5.85%	

# Adaptation in Washington, DC

Many of the Mitigative Measures in our CAP also have Adaptation and Resiliency Co-Benefits

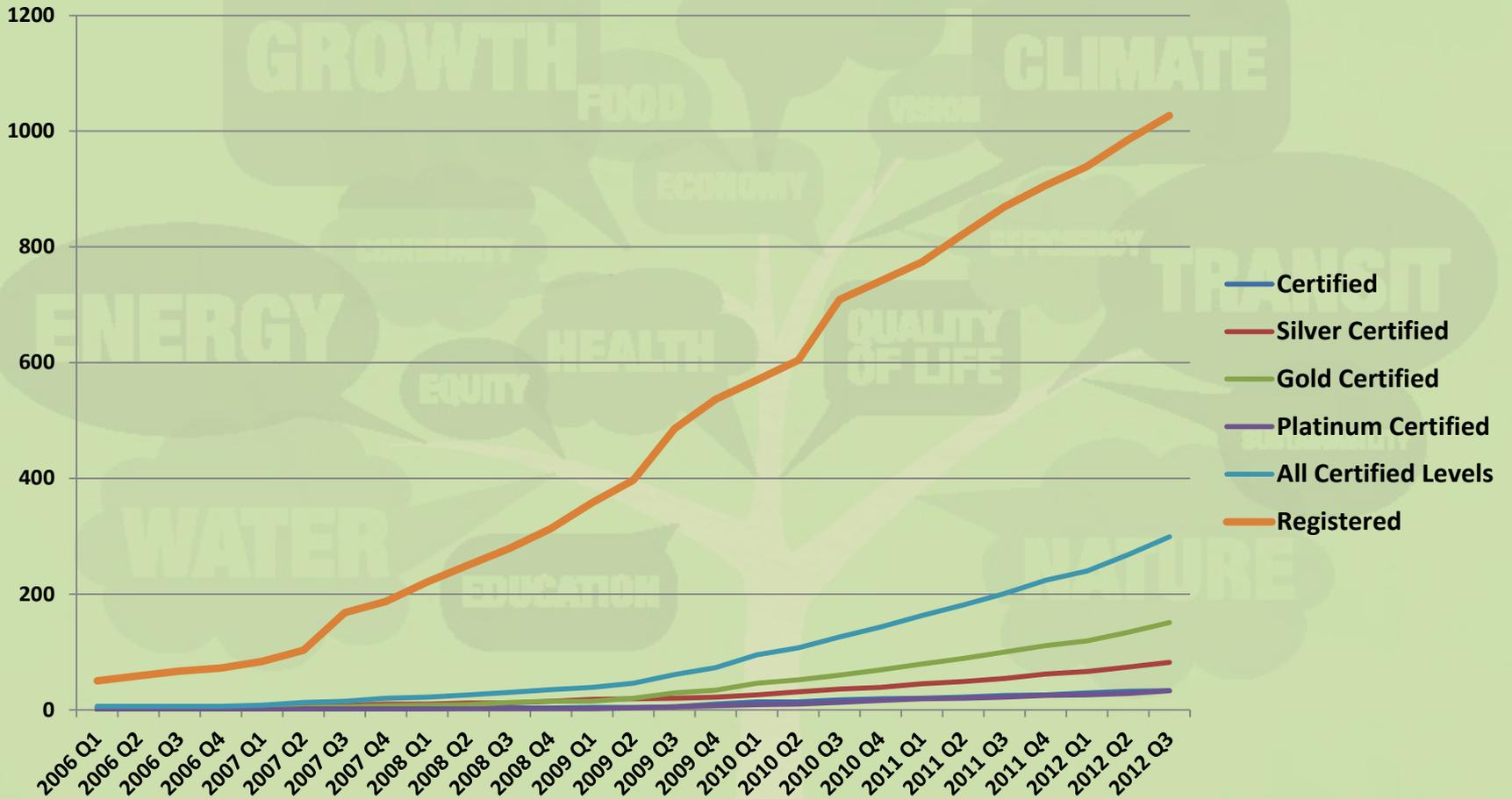


Emissions Reduction Measures between 2006 and 2011		
	2006	2011
Government Green Power Purchases (%)	5%	50%
Community Green Power Purchases	0.7%	8.5%
Installed Solar Systems	21*	439
Installed Solar Capacity (mW)	55*	3,475
LEED Certified Buildings	6	240
ENERGY STAR Buildings	27	211
Bikeshare Members	0	19,200
Hybrid Cars	923	8,280
Tree Canopy (acres)	13,791	14,608
Green Roofs (square feet)	194,592	1,333,490

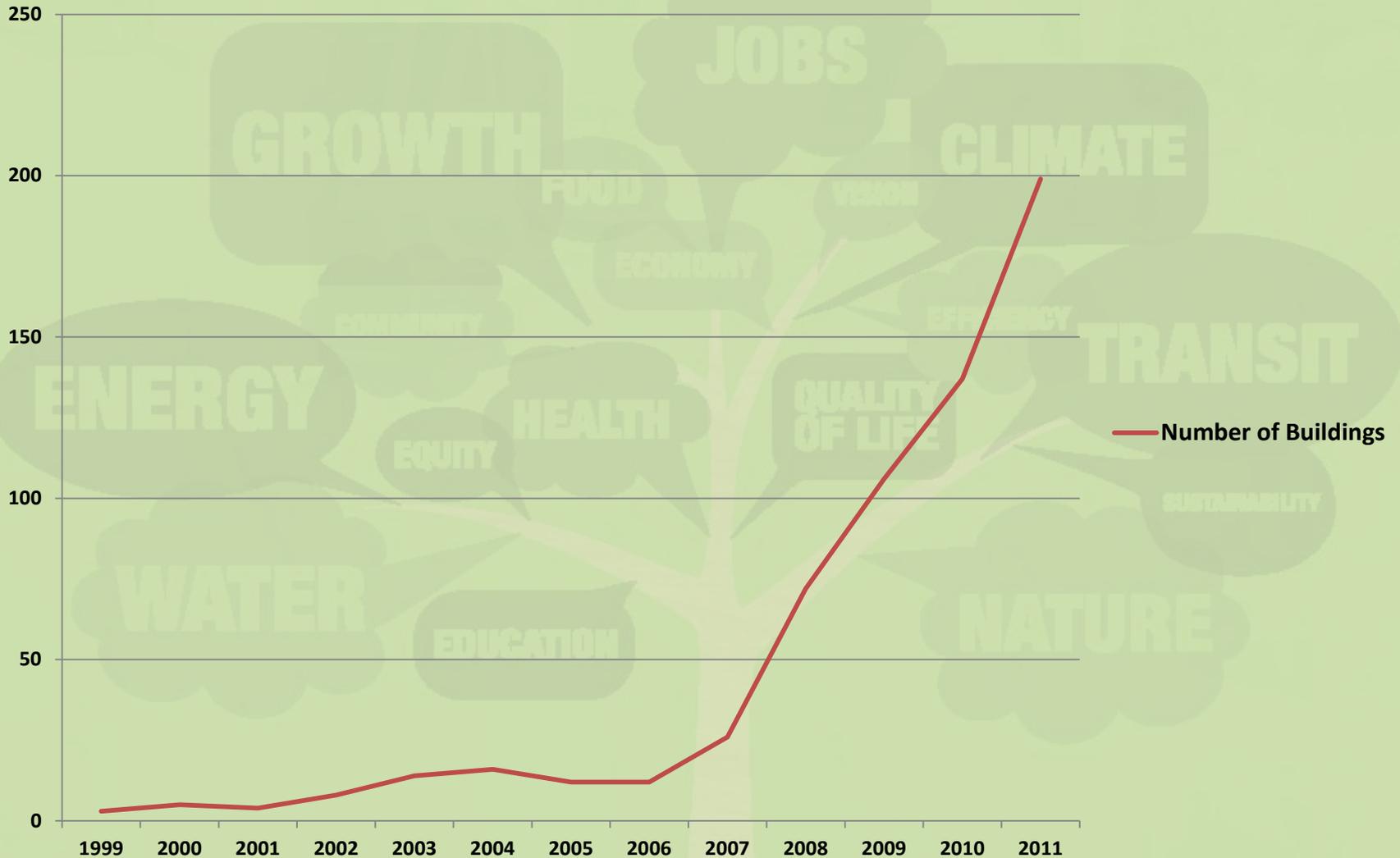
\* These solar projects refer to projects funded through DDOE's Renewable Energy Incentive Program.

More information can be found at [www.greendashboard.dc.gov](http://www.greendashboard.dc.gov)

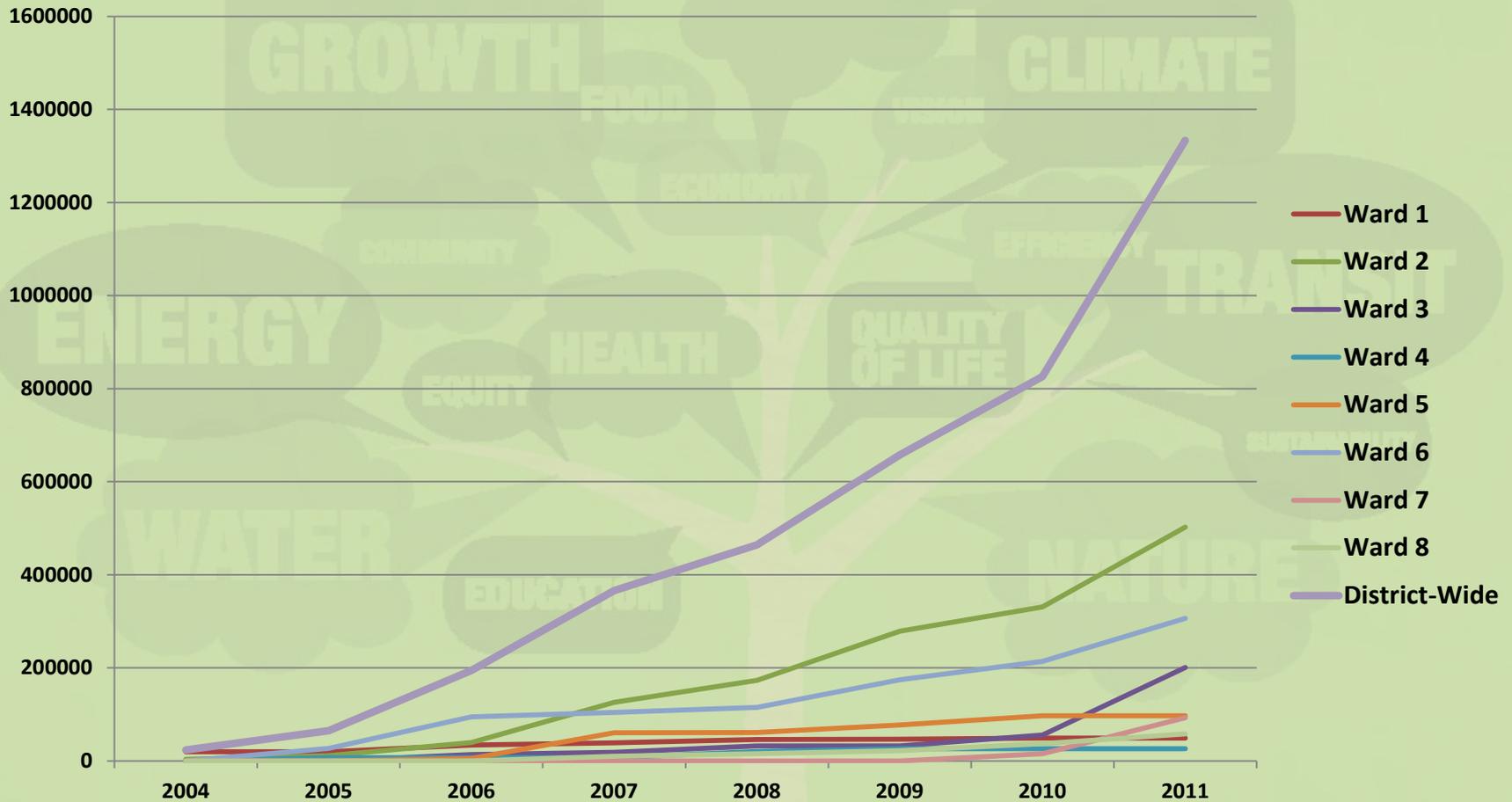
# LEED Project Construction



# Energy Star Certified Buildings



# Green Roof Installation



# Adaptation in DC – Basic Assumptions

## Impacts of Climate Change Already Being Felt in the District Include:

- Increased Temperatures Citywide
- Sea Level Rise Along Our Rivers
- Flooding from Intense Precipitation
- More Frequent and Severe Storms



# Adaptation in DC – Basic Assumptions

## The Adverse Effects of Climate Change Will Impact:

- Social Systems
  - Human Health and Economy
  - Emergency Preparedness
- Built Systems
  - Public and Private Property
  - Infrastructure
- Natural Systems
  - Ecological Resources and Ecosystems

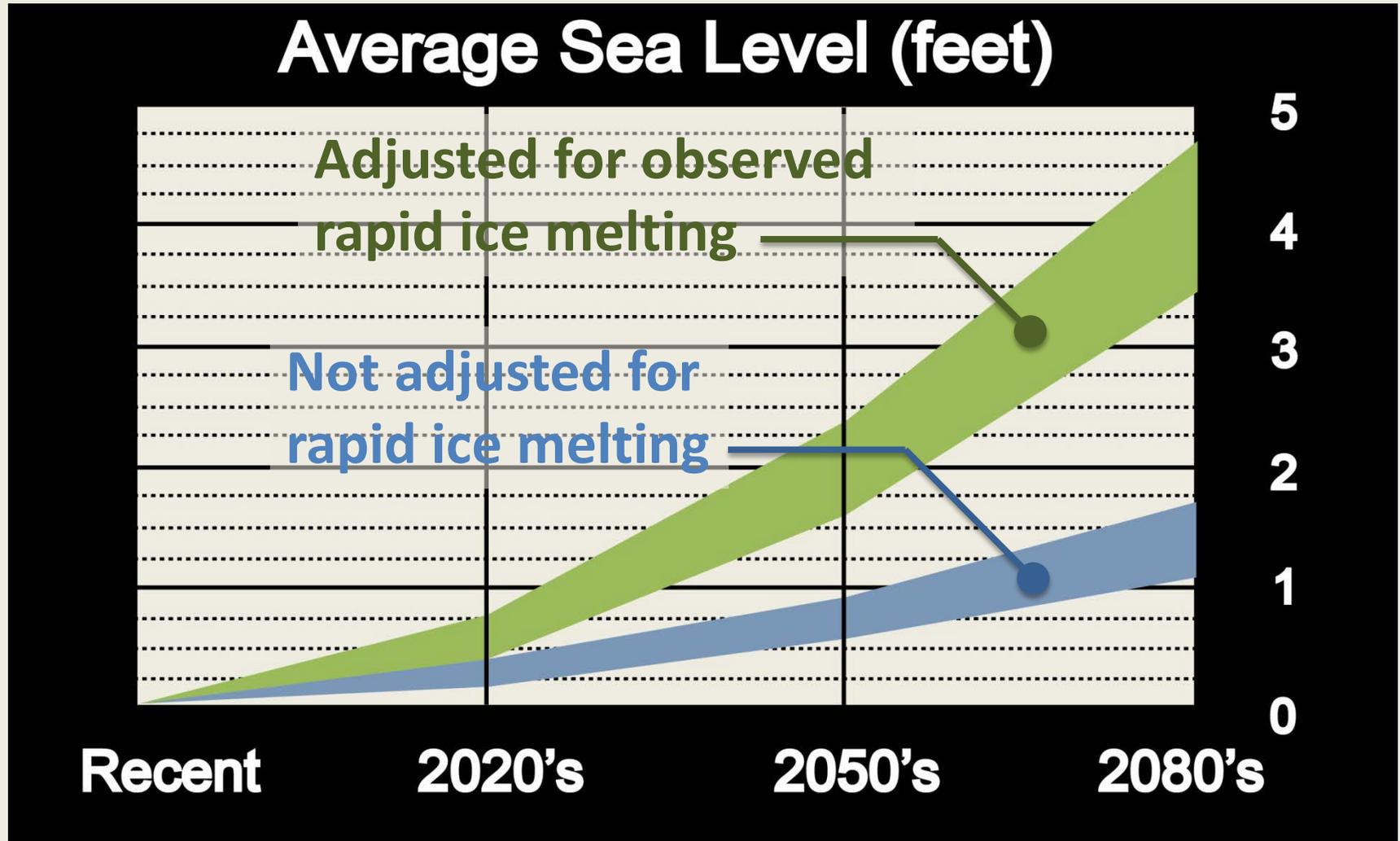


# Adaptation in DC – Basic Assumptions

## Really? Climate change in DC?

- **Warmest year on record (US) – 2012**
- **Earliest Spring flowering season (Eastern US) – 2012**
- **Hottest June day (DC) – June 29, 2012, at 104 degrees F**
- **Hottest Month (DC) – July 2011**
- **Most 90+ degree days in a month (DC) – 25 in July 2011**
- **Longest period of 80+ degree temperatures (DC) – July 21 to 24, 2011**
- **Most nights above 80 degrees (DC) – 7 in 2011**
- **Warmest low temperature (DC) – 84 degrees, July 23 – 24, 2011**
- **Earliest 100 degree reading in a day (DC) – before 12:00pm, July 6, 2010**
- **Most 90+ degree days in a year (DC) – 67 in 2010**
- **Earliest last freeze (DC) – February 27, 2010**
- **Longest period without 2” of snow (DC) – 1-26-11 to present**

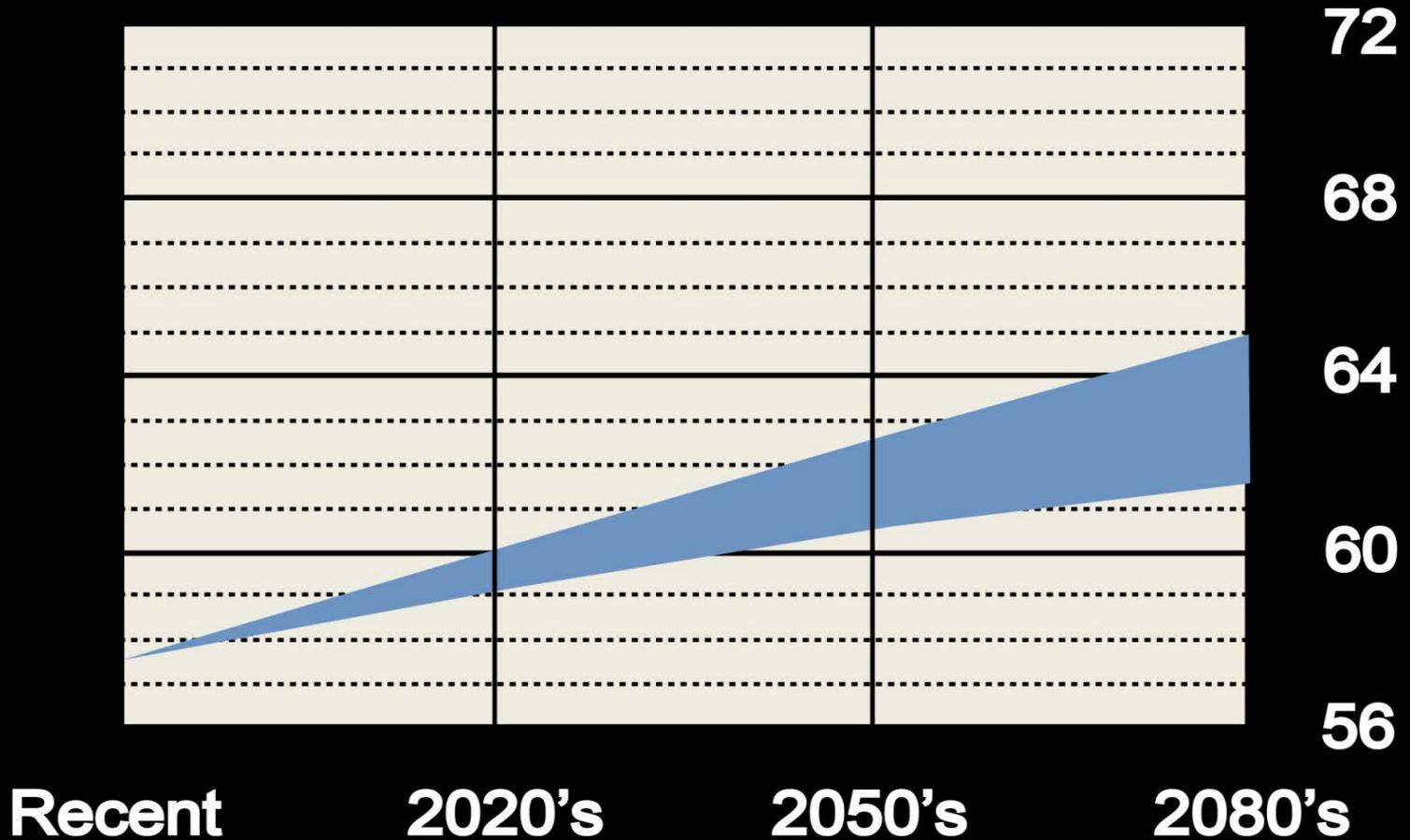
# What is projected for DC?



*Sea level rise is projected to accelerate this century*

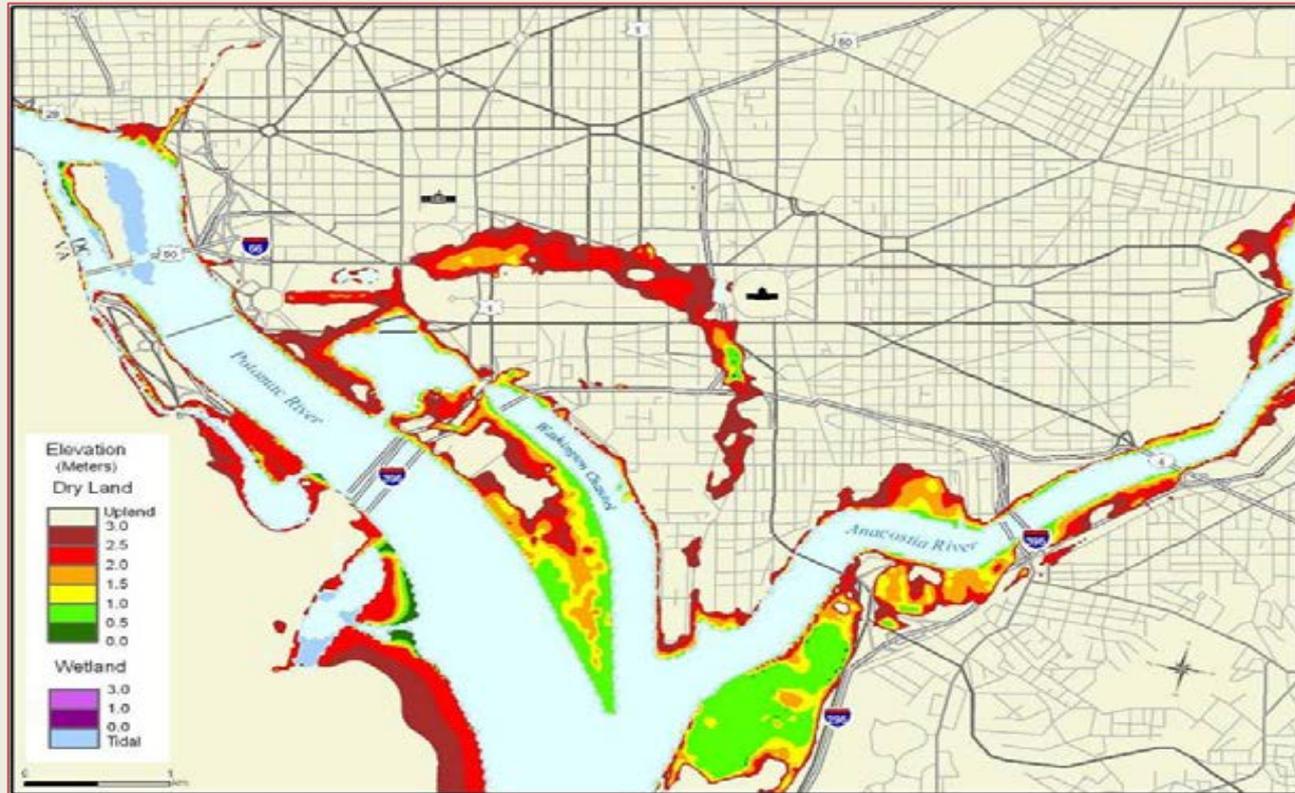
# What is projected for DC?

## Average Annual Temperature (°F)



*Average temperatures are projected to rise*

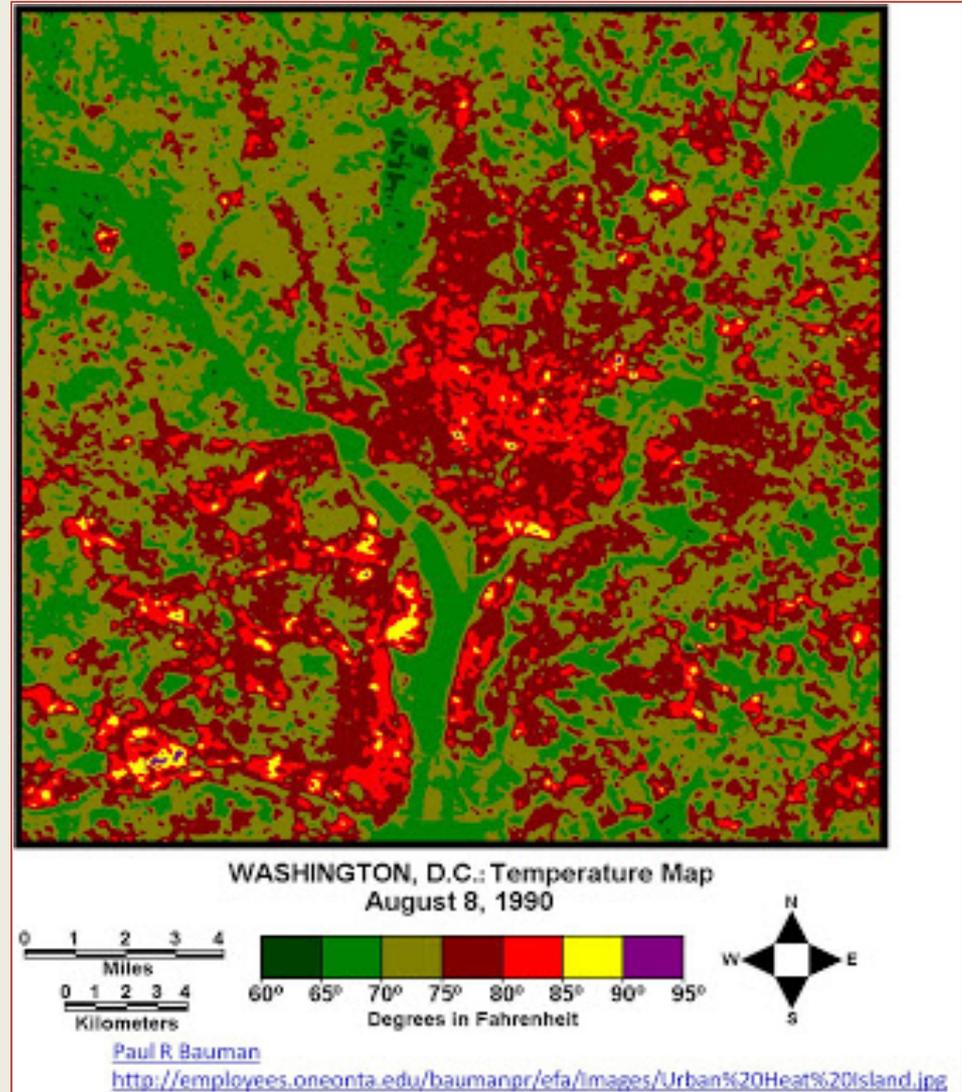
# Climate Change in DC – Major Phenomena



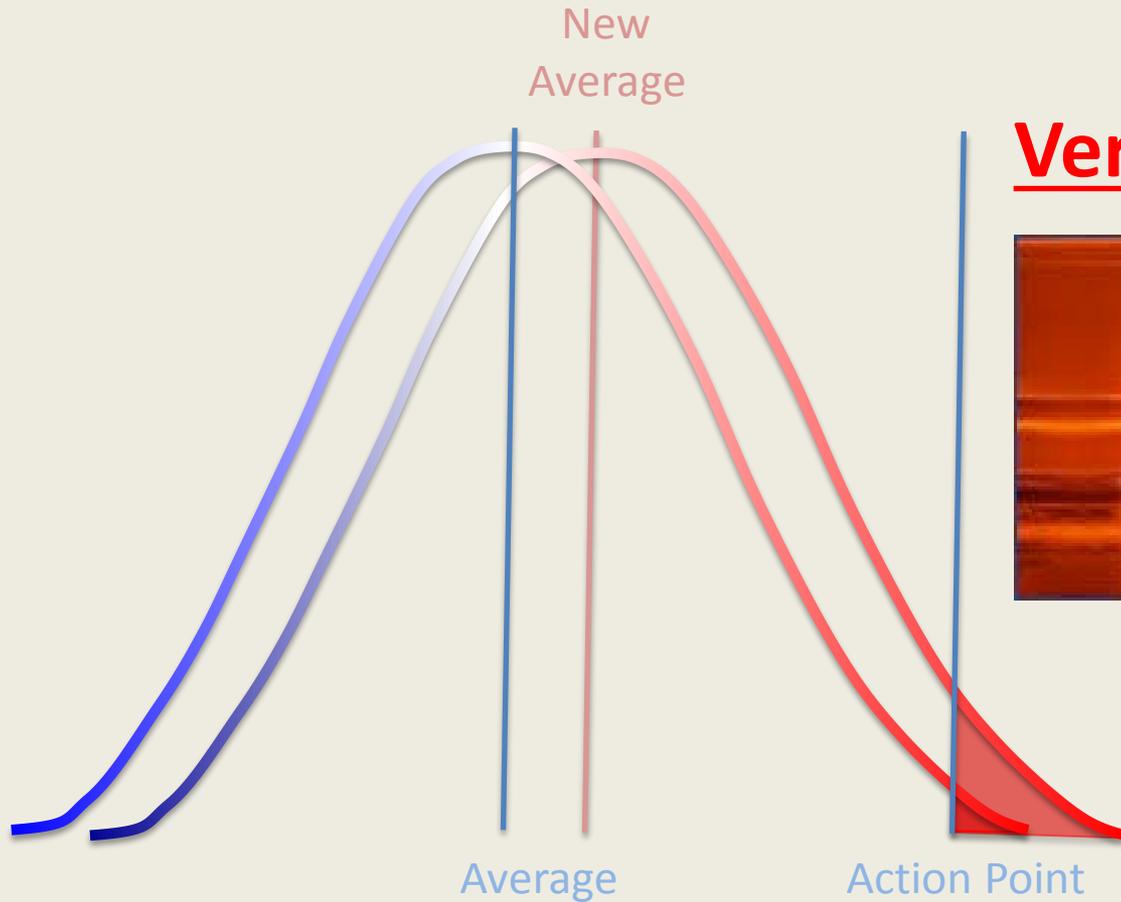
**The District's rivers are tidal, making them vulnerable to increased sea levels. This map indicates potential areas of submersion, but is probably out of date.**

# Climate Change in DC – Major Phenomena

The District is a dense, urban, southern jurisdiction where temperatures in the city core can be 35 F higher than in the surrounding suburbs.



# What can a few degrees warmer do?



## Very Likely Increase:



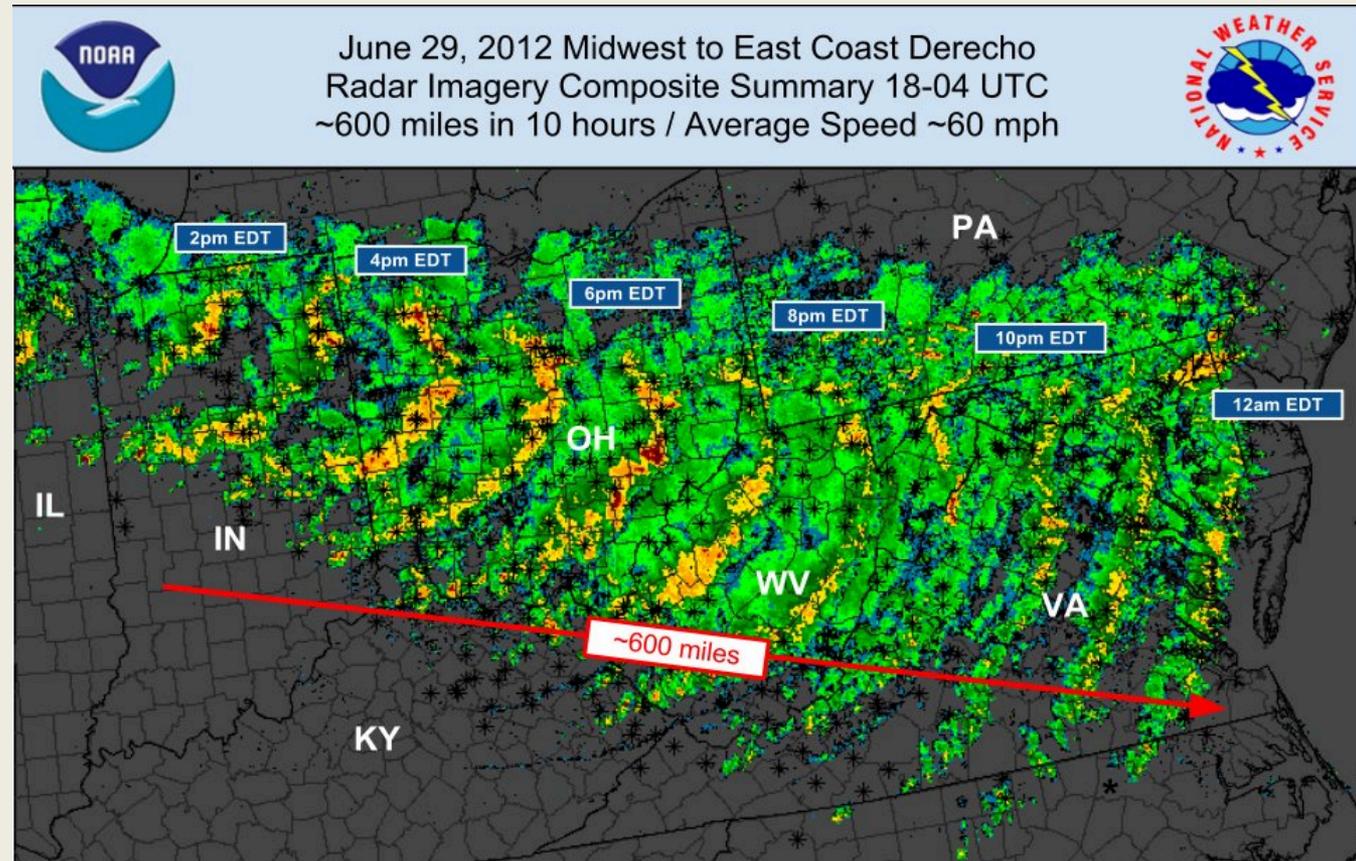
Days with  
Extreme  
Heat

By the 2050s, days over 90 F are projected to occur approximately 1.5 times more often

*A small average change can mean a big effect on extremes*

# Climate Change in DC – Major Phenomena

Severe storms have the potential to cause power outages, property damage, and injuries.



Over 800 preliminary thunderstorm wind reports indicated by \*  
Peak wind gusts 80-100mph. Millions w/o power.

Summary Map by G. Carbin  
NWS/Storm Prediction Center

# Adaptation in DC – The Case For Action

## Climate Mitigation & Adaptation Provide Co-Benefits

### District Policies & Programs -- Mitigative & Adaptive

- Increase Tree Canopy to 40%
  - Green Space and Tree Canopy Fosters Communities, Abates Heat Island Effect
- Green Roofs on Commercial and Private Property
  - Green Roofs Lower Energy Bills, Abate Heat Island Effect, Impound Storm Water
- Support for Active Transportation Infrastructure
  - Active Transportation Systems Connect Communities, Reduce Fuel Consumption
- Greening the Building Code
  - Building Codes Lower Energy Costs, Increase Occupant Comfort Levels, Increase Weather Resilience

# Adaptation in DC – The Case For Action

## Anticipatory Adaptation is Cost-Effective

- Increasing Tree Canopy Reduces Energy Demand As Energy Costs Increase
- Green Roofs Reduce Energy Demand As Energy Costs Increase
- Providing Active Transportation Infrastructure Saves Citizens Money on Autos, Fuel
- Greening Building Construction Lowers Demand for Energy, Severe Weather Impacts



# A VISION FOR A SUSTAINABLE DC



# Sustainable DC Plan

- The Sustainable DC Plan was released by Mayor Gray on February 20<sup>th</sup>, 2013
- The SDC team will develop a work-plan for the next two years
- The District will work with businesses and the community to implement short-term actions



# Sustainable DC: Solutions and Challenges



## Challenges

- Jobs and Economy
- Health and Wellness
- Equity and Diversity
- Climate and Environment



## Solutions

- Built Environment
- Energy
- Food
- Nature
- Transportation
- Waste
- Water

# SDC Implementation

- 32 goals, 31 targets, 143 actions
- Each action has a lead District agency as well as one or more partner agencies assigned to it
- Actions are short, medium, and long-term
- Some of these actions are already ongoing within DC government initiatives

# The Vision for 2032

---

**Built Environment:** Attract and retain **250,000** new residents and improve quality of life for existing residents in transit-oriented, walkable, and affordable communities. **ALL** new buildings will produce as much or more energy as they consume; existing buildings will be retrofitted to use **50%** less energy and water.

**Climate:** Reduce citywide greenhouse gas emissions by **50%** (and **80%** by 2050) while adapting to the hazards of climate change.

# The Vision for 2032

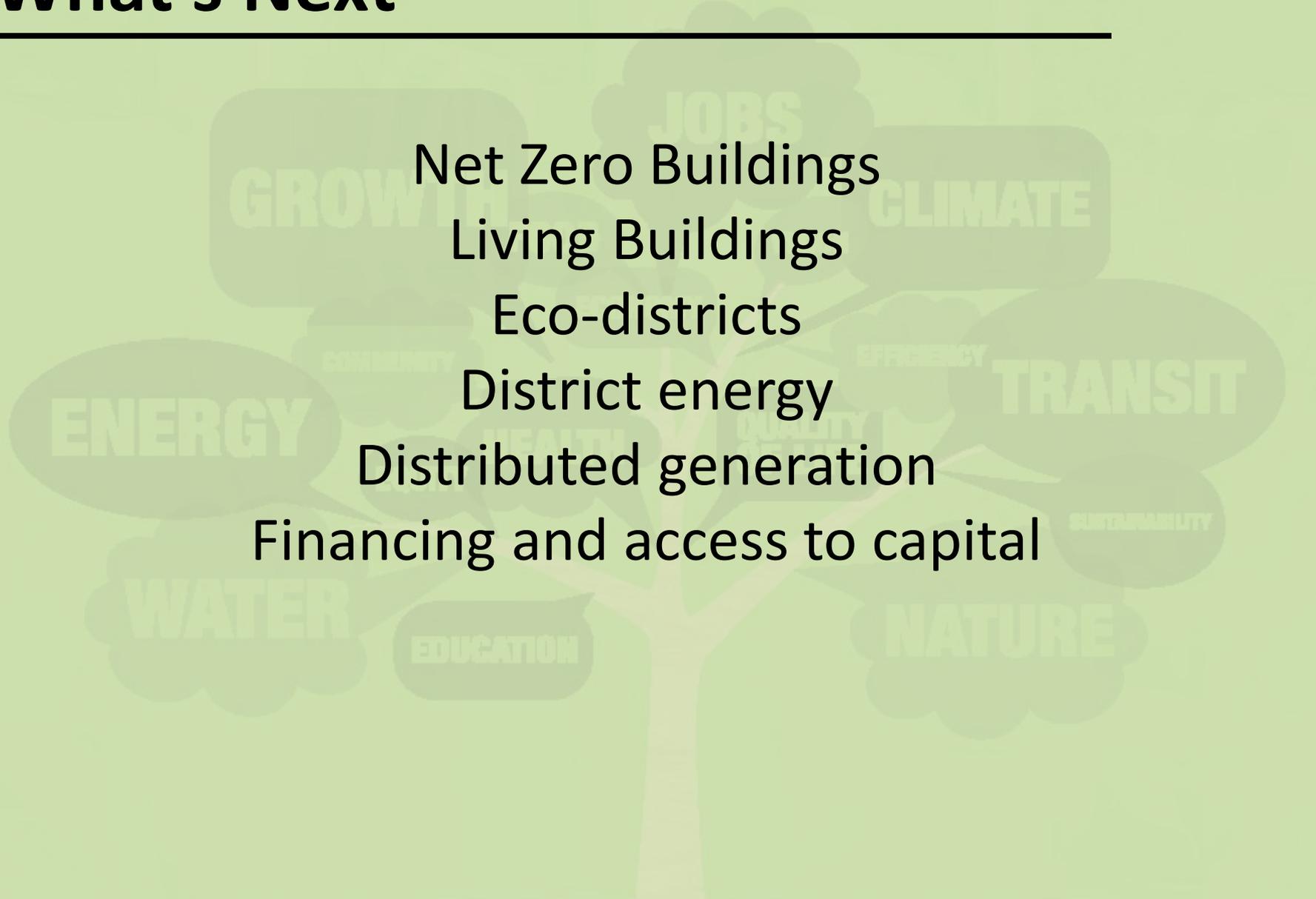
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## Other Goals:

- **Cut Citywide Energy Use by 50%**
- **Net-Zero Energy Use for All New Construction**
- **Retrofit 100% of Existing Commercial and Multi-Family Buildings to Achieve Net-Zero**
- **Achieve 40% Tree Canopy**
- **Increase Riverfront Wetlands by 50%**
- **Cultivate 20 Acres for Food Production**
- **Produce or Obtain 25% of Food from within 100 Mile Radius**

# What's Next

---



Net Zero Buildings  
Living Buildings  
Eco-districts  
District energy  
Distributed generation  
Financing and access to capital

The background features a stylized tree with a trunk and branches. The leaves and branches are filled with various sustainability-related terms in a light green, semi-transparent font. These terms include: JOBS, GROWTH, CLIMATE, ENERGY, WATER, EDUCATION, NATURE, TRANSIT, EFFICIENCY, COMMUNITY, and SUSTAINABILITY. The tree is set against a light green background with a darker green border at the top and bottom.

# Budget Challenge Projects

## 12 projects received \$4.5 million

Cool, Green, or Solar: Structural Assessment Survey

Waste Lifecycle Analysis

Saving Gas and Money with Anti-Idling Devices on Police Cars

Temporary Movable Parks

Sustainable Power Plant at Langston Dwellings

Compost Site Pilot Projects

Minimizing Food Deserts with an Urban Food Network

Tree Canopy Implementation Plans for Park and School Lands

Living Building Challenge

Green Purchasing Program

**Climate Adaptation Plan Study**

Implementing the Environmental Literacy Plan in DC Public Schools

# **Budget Challenge Project**

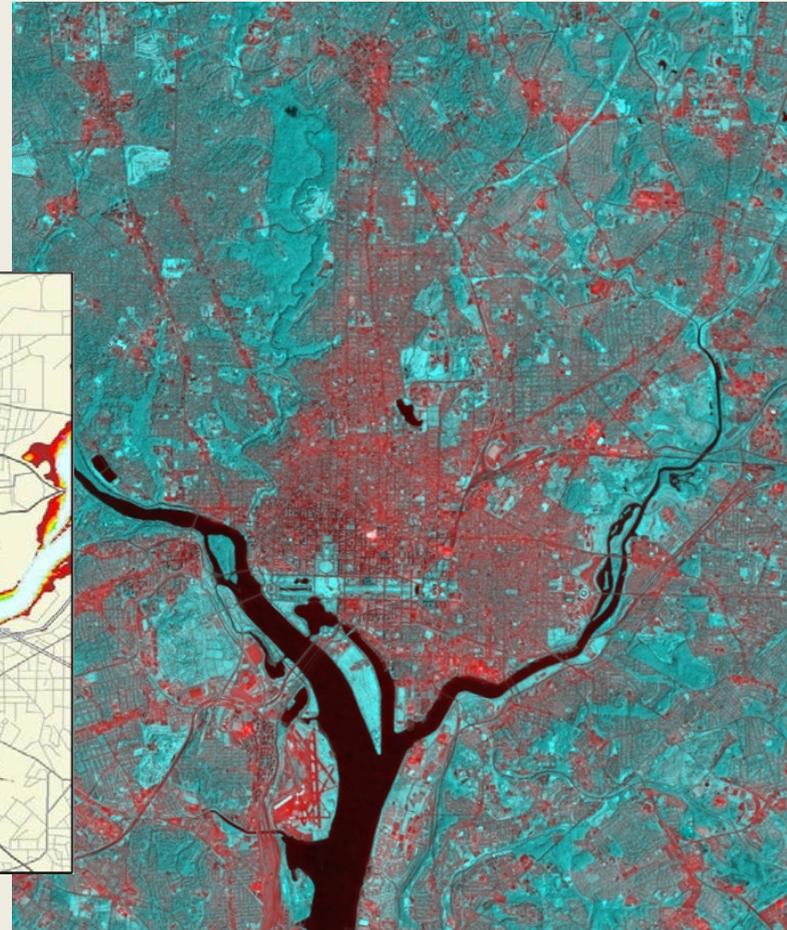
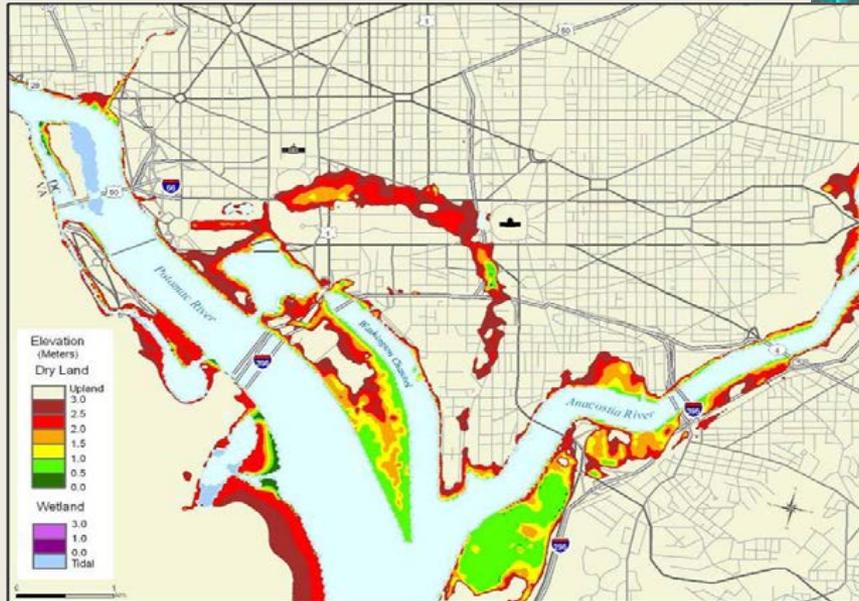
**\$290,000 For Climate Adaptation Study**

**Three-Phase Study Will Collect Data and Analyze**

- 1) Emerging Climate Change Phenomena out to 2100**
- 2) The Anticipated Impacts to Social, Built, and Natural Systems from those Phenomena**
- 3) The Best-Practice Policies and Programs Needed to Address those Impacts**

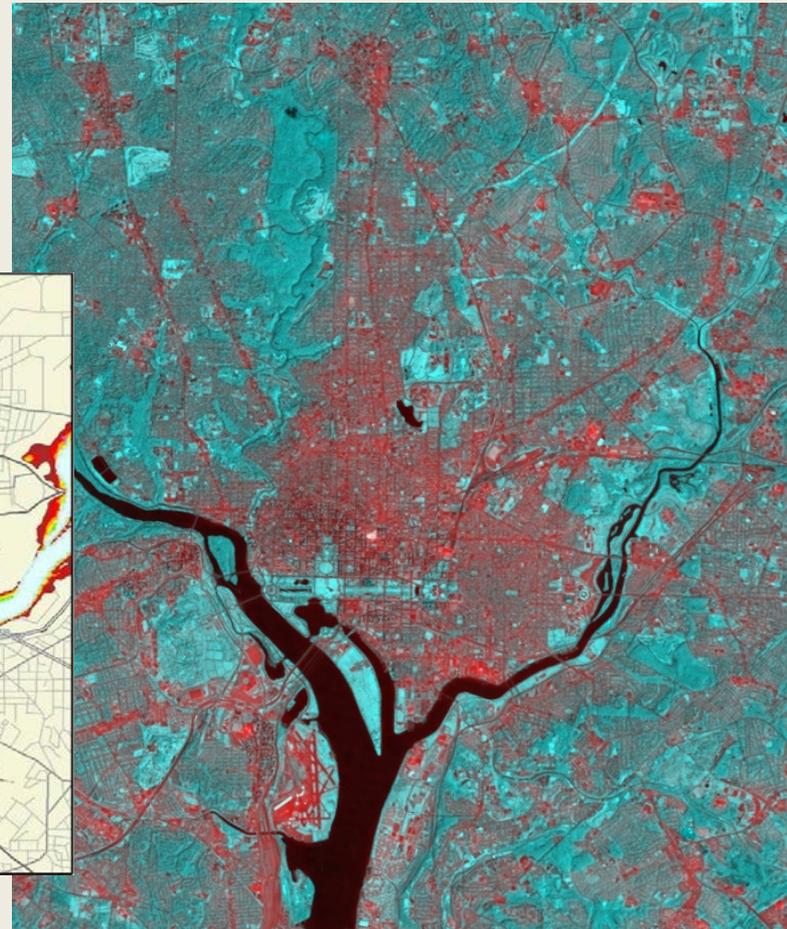
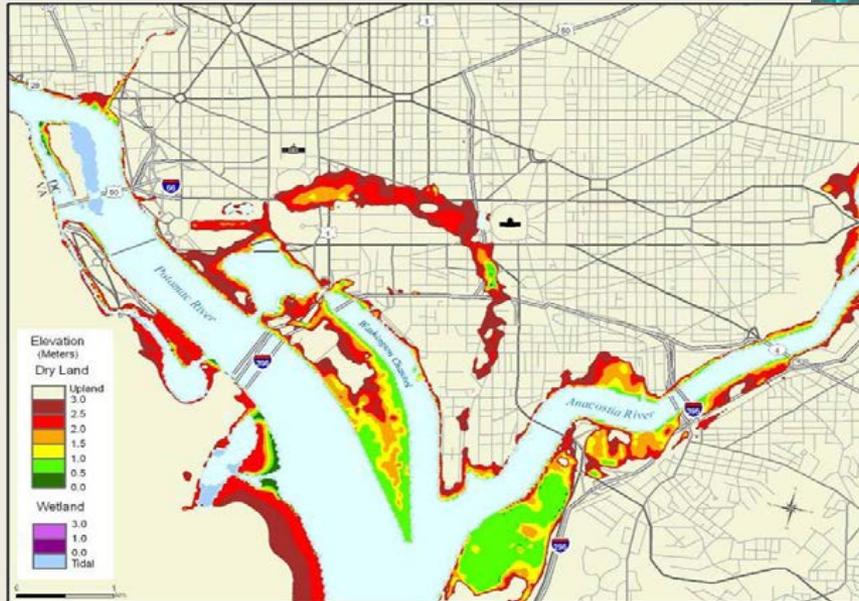
# Adaptation in Washington, DC

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# Adaptation in DC – Anticipated Impacts

## Human Health

- Heat-Related Illnesses
- Poor Air Quality
- Illness and Death From Extreme Weather
- Poor Water Quality
- Vector-Borne Diseases

# Adaptation in DC – Anticipated Impacts

## Local Economy

- Higher Energy Costs, Insurance Costs
- Loss of Income from Reduced Work Hours
- Employee Health Impacts
- Infrastructure Vulnerabilities or Failures
- Erosion of Waterfront Properties
- Extreme Weather Dissuasion of Tourism

# Adaptation in DC – Anticipated Impacts

## Urban Ecological Resources

- Increased heat, severe weather, altered precipitation patterns, droughts, salt water intrusion
- Loss of wetlands in tidal areas
- Altered up-stream flow due to reduced winter snowpack
- Species migration and reductions in diversity
- Opportunities for invasive species

# Adaptation in DC – Anticipated Impacts

## Infrastructure Systems

- Heat impacts on steel – railways and bridges
- Severe weather impacts on energy, communications transmission
- Shoreline erosion from sea-level rise impacts roads, bridges
- Higher temperatures result in increased energy demand, systemic stress to energy grid