Resilient Fairfax
*Climate Adaptation and Resilience Plan*

Public Meeting

October 14, 2021
Welcome!
Resilient Fairfax
Agenda I

I. Welcome & Background
II. Warmer, Wetter, Weirder: what can we expect?
III. Buildings
IV. Infrastructure
V. Natural Areas
VI. Residents
VII. Intro to the Climate Viewer
VIII. Next Steps
Goals & Participation Process

• Meeting Goals
  • Share (early) findings and gather public feedback on the following:
    • What climate hazards will we face?
    • Where are we vulnerable?
    • What are we already doing about it?
    • What more should be done?

• Ground Rules
  • Speak openly and honestly
  • Listen carefully and respectfully to each person
  • Ask questions
  • Keep comments brief and stay focused on task
  • If you are a member of a Resilient Fairfax Advisory Group, let the general public speak first
  • If you have already spoken, please give others the opportunity to speak before you go again
  • Explore differences respectfully and look for common ground
Zoom Technology Review

NOTE: Recording in progress
What is resilience?

- **Climate Resilience** is the ability of communities to prepare for, respond to, and recover from climate hazards.
  - **Short term**: better prepares communities for extreme weather events.
  - **Long term**: enables communities to adapt and thrive within a changing climate.
Resilient Fairfax vs CECAP

**Resilient Fairfax:**
Climate Adaptation and Resilience Plan

*Adaptation & resilience to climate effects*
- Examples: Resilience to flooding, extreme temperatures, extreme weather, health hazards, precipitation pattern changes
- Led by government, because responsible for infrastructure and service upgrades

**CECAP:**
Community-Wide Climate & Energy Action Plan

*Reducing emissions that contribute to global change*
- Examples: Transition to renewable energy, energy efficiency, waste reduction, alternative transportation
- Community-led plan, because 95% of emissions are from the community
Purpose and Background

Resilient Fairfax's purpose is to determine:

• What climate conditions and hazards will our county face?
  o Climate Projections Report
  o Temperatures, precipitation, flooding, storm severity, drought

• Where are we vulnerable?
  o Climate Vulnerability and Risk Assessment
  o Homes, businesses, neighborhoods, infrastructure, services & operations, people in path of climate effects

• How are we currently doing in terms of resilience?
  o Audit of Existing Policies, Plans, and Programs
  o Which programs are working well? Where do we have gaps?

• Which strategies will strengthen our resilience?
  o Adaptation and Resilience Strategies
  o Physical upgrades, policies, design standards, services, staffing, procedural changes, agency coordination, etc.

• What is the path to implementation?
  o Implementation Roadmap
  o Funding sources, staffing, timelines
## Project Timeline

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<tbody>
<tr>
<td>Project Initiation</td>
<td>Climate Projections</td>
<td>Vulnerability &amp; Risk Assessment</td>
<td>Audit of Existing Policies, Plans, and Programs</td>
<td>Strategy Development</td>
<td>Implementation Roadmap Development</td>
<td>Resilient Fairfax Plan Compilation</td>
<td>Public Comment</td>
<td>Finalization</td>
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**Project Process**

- **Engagement**
  - Public Engagement
  - Planning Team (PT)
  - Infrastructure Advisory Group (IAG)
  - Community Advisory Group (CAG)

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*Office of Environmental and Energy Coordination*
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In the coming decades, Fairfax County will experience **Warmer, Wetter, Weirder** climate conditions.
First, let’s look at historic trends...
Warmer: Future Projections

Now future projections...

**Warmer annual & seasonal temperatures**

Annual temperatures projected to **rise 4.4 – 8°F by 2085**

**More extremely hot days**

- # of days at or above 95°F projected to **increase from 7 to 28-36 days by 2050.**

**Milder winters**

- # of days below freezing projected to **decrease from 86 days to 62-67 days by 2050.**
Warmer: Urban Heat Island Effect

- In addition to increasing temperatures county-wide...
- The Urban Heat Island Effect makes some parts of the county hotter than others.
  - Places with a lot of asphalt, dense buildings, and other dark-colored infrastructure absorb heat & stay hotter (20+ degrees) than other areas.
  - Places with ample green space, tree canopy, and light-colored infrastructure reflect and dissipate heat, staying much cooler than other areas.
- Where is this data from? Fairfax County partnered with NASA Develop for this heat study, using LANDSAT8 land surface temperature data from 2013-2020.
- What does this mean? As temperatures rise for all of us, some neighborhoods in the county will continue to face even hotter temperatures.
- What about vulnerable populations? Some people may be more sensitive to heat due to health conditions, disability, age, inability to afford air conditioning, outdoor occupations, and other factors.
  - Exposure: Which areas are hottest?
  - Sensitivity: Where are the most sensitive populations?
  - Vulnerability: Which areas are BOTH exposed and sensitive?
Heat Impacts

- Health Impacts: Heat stroke/exhaustion, respiratory illnesses, vector borne diseases
- Societal: Increased rate of crime and homicide
- Infrastructure: Rail buckling, softening asphalt
- Environmental: Worsening air quality, decreased water quality
- Energy: Higher emissions, blackouts

Warmer: Impacts
There are 4 major types of climate-related flooding in Fairfax County

<table>
<thead>
<tr>
<th>Inland Flooding</th>
<th>Coastal Flooding</th>
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<tbody>
<tr>
<td>1. STORMWATER ISSUES</td>
<td>3. SEA LEVEL RISE</td>
</tr>
<tr>
<td>Heavy rain overwhelms stormwater</td>
<td>Rising sea means a rising Potomac River</td>
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<tr>
<td>infrastructure</td>
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<tr>
<td>2. FLOODPLAINS</td>
<td>4. COASTAL STORM SURGE</td>
</tr>
<tr>
<td>Heavy rain makes rivers and streams</td>
<td>Hurricanes, tropical storms, etc. push water on shore</td>
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- Inland Flooding:
  - Stormwater Issues: Heavy rain overwhelms stormwater infrastructure.
  - Floodplains: Heavy rain makes rivers and streams overflow.

- Coastal Flooding:
  - Sea Level Rise: Rising sea means a rising Potomac River.
  - Coastal Storm Surge: Hurricanes, tropical storms, etc. push water on shore.
First, let’s look at historic trends...

Increase in heavy precipitation events

Observed Change in Total Annual Precipitation
Falling in the Heaviest 1% of Events

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<td>30–39</td>
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<tr>
<td>40+</td>
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Change (%)

-0.45 0.45 0.50 0.55


Over last ~60 years, **27% increase** in heaviest precipitation events

Steady increase in sea level

Office of Environmental and Energy Coordination
Wetter: Future Projections

Now future projections...

Increase in annual and seasonal precipitation

- Increase in annual and seasonal precipitation

Increase in coastal flooding

- Increase in coastal flooding

Rain events are projected to continue to become **heavier** (by 8 – 20%)

By 2050, our area is projected to see a **3-foot sea level rise** (which means Potomac River rise)

Map of 3 feet of sea level rise for Fairfax County. (2050 relative to 1991-2009) Source: NOAA

Projections of relative sea level rise for Washington DC tide gauge. Source: NOAA

Projected seasonal precipitation
Wetter: Impacts

Extreme Precipitation / Flooding Impacts

Health Impacts
Disaster-related injuries or death, mental health impacts, mold exposure

Infrastructural
Road closures, public transit disruptions, displaced commuters

Energy
Fallen tree lines causing power outages, damage to above-ground equipment

Environmental
Streambank erosion, contamination runoff, polluted water supply, habitat

Societal
Disruption to vital services, property damage, decrease property value
Weirder ... what can we expect?

More extreme and episodic weather events

- Unseasonably warmer/cooler temperatures
- More frequent and severe storms like tropical storms, hurricanes, derechos, and nor’easters
- Periods of no precipitation followed by sudden, very intense precipitation
Agenda III

I. Welcome & Background

II. Warmer, Wetter, Weirder: what can we expect?

III. Buildings

IV. Infrastructure

V. Natural Areas

VI. Residents

VII. Intro to the Climate Viewer

VIII. Next Steps
Structure of today’s discussion:

1. Buildings

2. Infrastructure

3. Natural Areas

4. Residents
# Buildings: What’s vulnerable?

<table>
<thead>
<tr>
<th>Warmer</th>
<th>Wetter</th>
<th>Weirder</th>
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<tbody>
<tr>
<td><img src="image1.png" alt="Warmer Image" /></td>
<td><img src="image2.png" alt="Wetter Image" /></td>
<td><img src="image3.png" alt="Weirder Image" /></td>
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- **What’s exposed?** Warming temperatures will impact all buildings in the County, especially those located in Urban Heat Islands.
  - **Effects:** Hot buildings can cause danger to human health if poorly ventilated or no AC, blistering & cracking of roofs, damage to foundations, increased AC use.

- **What’s exposed?** Homes, businesses, and facilities across the County can be impacted by extreme precipitation, sea level rise, and storm surge.
  - **Effects:** Flooding can cause building damage, HVAC disruptions, mold exposure, decreased property value, and danger to human safety.

- **What’s exposed?** All buildings in the county are exposed to severe storms.
  - **Effects:** Strong storms can cause building damage, power outages, fallen trees, disruption of essential services, and danger to human health and safety.
Buildings: what are we doing to prepare?

**Examples of policies and programs already in place in Fairfax County**

**Participation in NFIP/CRS**
- Fairfax participates in the Community Rating System for the National Flood Insurance Program
- The county exceeds standards for flood mitigation, so residents get discounted flood insurance.

![NFIP/CRS Logo]

**Building Floodplain Regulations**
- New construction and substantial improvements must elevate to at least 18” above Base Flood Elevation (BFE)
- Must be at least 15 feet from floodplain boundary.

**C-PACE**
- Funding for substantial sustainability improvements to commercial buildings
- Fairfax’s C-PACE program is the **first in Virginia to include resiliency**
- Can address risks from flooding, high winds, or extreme temperatures

![Diagram of BFE Levels]

- BFE
- Below BFE
- At BFE
- Above BFE

*Virginia PACE Authority*
Buildings: What else can we do? What are others doing?

**Examples of policies and programs from elsewhere**

**Construction Guidelines**
- Resilient Design Guidelines
  - E.g., elevation standards, energy storage requirements

**Retrofits**
- Residential Flood Retrofits Programs
- Assistance for home flood upgrades

**Guidance to Homeowners**
- Guides, landing page for retrofit support
How can existing strategies be improved/expanded/accelerated?

What other strategies are you interested in seeing the County implement?

What strategies from other jurisdictions can be adapted to Fairfax?
Agenda IV

I. Welcome & Background
II. Warmer, Wetter, Weirder: what can we expect?
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<table>
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<th>Warmer</th>
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</table>
| • **What's exposed?** Above-ground infrastructure will be affected by extreme heat, primarily in Urban Heat Islands  
  • **Effects:** Warming can cause rail buckling, softening asphalt, energy demand overload, wastewater treatment issues | • **What's exposed?** Both above and below-ground infrastructure can be exposed to flooding  
  • **Effects:** Overwhelmed stormwater infrastructure and other flooding can cause road flooding, transit station flooding, increased risk of sanitary sewer overflow, water leaks into energy lines | • **What's exposed?** All above-ground infrastructure can be exposed to severe storms.  
  • **Effects:** Strong storms can cause storm damage to critical facilities/infrastructure, power outages, disruption of essential services, transportation disruptions and travel delay |

*Credit: WMATA*
Infrastructure: What are we already doing to prepare?

Examples of policies and programs already in place in Fairfax County

**Drinking Water Infrastructure**
- Conversion of Vulcan’s quarry to Fairfax Water reservoir = additional 17 billion gallons of extra water storage

**Energy System**
- Back-up power at all wastewater pump stations in case of severe storms
- Incentivizes for energy storage through Solarize Fairfax

**Stormwater Management**
- Huntington Levee: Levee constructed parallel to Cameron Run to minimize flooding and protect property
**Infrastructure: What else can we do? What are others doing?**

**Examples of policies and programs from elsewhere**

**Consider Climate Impacts**
- Integrate climate projections and impacts into planning, design, and standards
- Deeper dive into certain infrastructure vulnerabilities
  - E.g., CREAT tool for water utilities

**Infrastructure Upgrades**
- Design to absorb shocks and maintain functionality
  - E.g., Energy storage to support grid resilience and provide reliable power during outages
- Design to adapt to changing conditions
  - E.g., shading structures at bus stops to shade commuters during high heat

**Operations & Maintenance**
- Resiliency & redundancy in operations
  - Back-up power at additional critical facilities
- Redundancy in infrastructure systems
  - E.g. diversifying transportation modes
How can existing strategies be improved/expanded/accelerated?
What other strategies are you interested in seeing the County implement?
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Agenda V

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V. **Natural Areas**
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## Natural Areas: What’s vulnerable?

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<td><img src="image3" alt="Weirder Image" /></td>
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<tr>
<td>• <strong>What's exposed?</strong>: Most water bodies, wetlands, and environmentally sensitive areas in the county are exposed to the Urban Heat Island effect</td>
<td>• <strong>What's exposed</strong>: nearly 30% of county parks are located in floodplains</td>
<td>• <strong>What's exposed</strong>: all natural areas are exposed to severe storms</td>
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<td>• <strong>Effects</strong>: Warming can decrease water quality, shift harvesting, affect crop viability, stress trees, and increase survivability of pests and weeds</td>
<td>• <strong>Effects</strong>: Flooding in natural areas may cause streambank erosion, contamination runoff (i.e., polluted water supply), habitat disruption (e.g., coastal inundation of coastal environments)</td>
<td>• <strong>Effects</strong>: Stronger storms and severe winds can cause breakage and uprooting of trees, sediment deposition, crop damage, and erosion.</td>
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Natural Areas: what are we doing to prepare?

Examples of policies and programs already in place in Fairfax County

**Protection of Water Bodies**
- Stream corridors, riparian buffers
- Stormwater regulations
- Chesapeake Bay Preservation Ordinance & Resource Protection Areas

**Tree Conservation**
- Tree canopy covers roughly 57% in Fairfax County
- Tree Conservation Ordinance
- Plan includes actions to continue to improve and expand urban forest

**Outreach, Education, Assistance**
- Plant Nova Natives
- Rain barrel workshops
- Native Seedling Sale
- Conservation Assistance
- Stream monitoring
- Invasive plant removal
- Watch the Green Grow
Natural Areas: what else can we do?

Examples of policies and programs from elsewhere

**Protect/Conserve**
- Continue expanding restoration and education efforts
- Pursue potential wetland restoration opportunities

**Design Strategies**
- Calculate cumulative development impacts rather than case-by-case
- Compile existing green infrastructure programs and policies into a Green Infrastructure Strategic Plan
- Green Area Ratio
  - E.g., DC: zoning regulation that sets landscape standards

**Incentives**
- Stormwater credits
  - E.g., Milton, MA provides discount on stormwater fee for mitigated impervious surface

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**Town of Milton Stormwater Credit Policy**

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<thead>
<tr>
<th>Impervious Area Mitigated*</th>
<th>Discount / Credit</th>
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<td>10 - 19%</td>
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<td>40 - 49%</td>
<td>20%</td>
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<tr>
<td>50% or more</td>
<td>25%</td>
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➢ How can existing strategies be improved/expanded/accelerated?
➢ What other strategies are you interested in seeing the County implement?
➢ What strategies from other jurisdictions can be adapted to Fairfax?
Agenda VI

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II. Warmer, Wetter, Weirder: what can we expect?

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VI. Residents

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VIII. Next Steps
Residents: Who’s vulnerable?

- Older Adults (65+)
- People with Disabilities or Chronic Illnesses
- Infants & Young Children
- Populations without Access to Vehicle
- Populations with Low English Proficiency
- Pregnant Women
- People Who Live Alone or Are Bedridden
- Populations without Health Insurance
- People Experiencing Homelessness
- Low to Moderate Income Households
- People Without AC (or lack means to operate AC)
- People Who Work or Train Outdoors
- Populations of Color (due to systemic & historic policy, not the people themselves)
- Populations without Health Insurance
- Populations of Color (due to systemic & historic policy, not the people themselves)
Residents: How are they vulnerable?

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- **Who's exposed:** All county residents will experience increased heat, primarily those who are heat-vulnerable or in Urban Heat Islands
- **Effects:** Warming can increase heat-related illnesses, pollution, respiratory illnesses, prolong pollen season, crime, rising energy costs to meet cooling demand

- **Who's exposed:** All residents can be impacted by flooded buildings, roads, and other infrastructure
- **Effects:** Human health and safety risks, property damage, transportation disruption, blocked access to essential services, vector-borne diseases, mold exposure, financial impacts

- **Who's exposed:** All residents may be exposed to severe storms
- **Effects:** Property damage, human health and safety risks due to debris and power outages, increased need for emergency management services and response, sanitation and sewer backflow risk, mental health impacts, financial impacts
Residents: what are we doing to prepare?

Examples of policies and programs already in place in Fairfax County

- **Heating/Cooling Assistance**
  - The County provides financial and technical energy assistance to burdened households

- **Stormwater Management**
  - Virginia Conservation Assistance Program (VCAP)
    - Technical, educational, and financial assistance to property owners for conservation improvements
  - Neighborhood Prioritization
    - Proactively identifying and prioritizing neighborhoods for stormwater improvement projects

- **Community Emergency Response Guide & Fairfax Alerts**
  - Emergency planning guides, instructions, and alerts

Snakeden Branch at Lake Audubon
Residents: what else can we do?

**Government Support**
- Indoor Air Temperature Regulations
  E.g., Phoenix cooling ordinance requires landlords to provide cooling

**Enhance Social Resilience**
- Programs that build social resilience
  E.g., NYC Be-A-Buddy program
  E.g., Philadelphia, Phoenix have Heat Relief Network

**Promote Greater Education/Awareness**
- Community outreach activities in high vulnerability areas
- Youth climate education
  E.g., Climate change education in Boston Public Schools K-12 curriculum
Residents Discussion

➢ How can existing strategies be improved/expanded/accelerated?
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(Draft Version) Climate Viewer - Home
(Draft Version) Climate Viewer - Daytime Average Summer Temperatures
Agenda VIII

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VIII. Next Steps
<table>
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<tr>
<th>Date</th>
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<tr>
<td>Feb 21</td>
<td>Project Initiation</td>
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<td>Climate Projections</td>
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<td>Apr 21</td>
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**Project Process**
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  - Community Advisory Group (CAG)

**Office of Environmental and Energy Coordination**
Stay Engaged!

Share the Meeting Recording once posted:
  o Public Engagement with Resilient Fairfax | Office of Environmental and Energy Coordination (fairfaxcounty.gov)

Keep up with our progress!
  o Website: https://www.fairfaxcounty.gov/environment-energy-coordination/resilient-fairfax
  o Facebook: www.facebook.com/fairfaxcountyclimate
  o Twitter: @ffxgreen

Send us an email anytime
  o ResilientFairfax@fairfaxcounty.gov

Interested in other OEEC events? Come see us at a HomeWise event this weekend!
  • Pick up a FREE kit to boost your energy and water efficiency
  • George Mason Regional Library
  • Saturday October 16th, 2pm – 4pm
  • First 200 get free kits
Thank you!

OFFICE OF
Environmental and Energy Coordination
FAIRFAX COUNTY

CADMUS
WSP
InspireGreen
Polling: Who’s in the room?

Which district of Fairfax County do you reside in?

- Braddock
- Dranesville
- Hunter Mill
- Lee
- Mason
- Mount Vernon
- Providence
- Springfield
- Sully
- I don't live in Fairfax County