



Resilient Fairfax

*Climate Adaptation and
Resilience Plan*

Public Meeting

October 14, 2021



Office of Environmental and Energy Coordination

CADMUS

WSP

 inspiregreen™

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

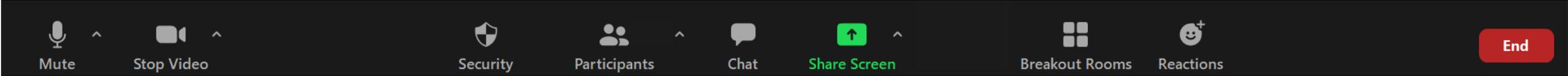
- **Meeting Goals**

- **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**

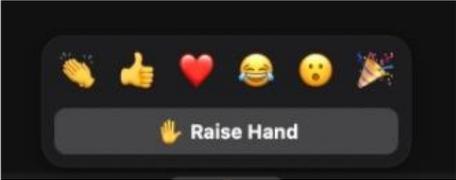
- Speak openly and honestly
- Listen carefully and respectfully to each person
- Ask questions
- Keep comments brief and stay focused on task
- If you are a member of a Resilient Fairfax Advisory Group, let the general public speak first
- If you have already spoken, please give others the opportunity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

Zoom Technology Review



Start/Stop Video

Chat



Mute/Unmute

View Participants

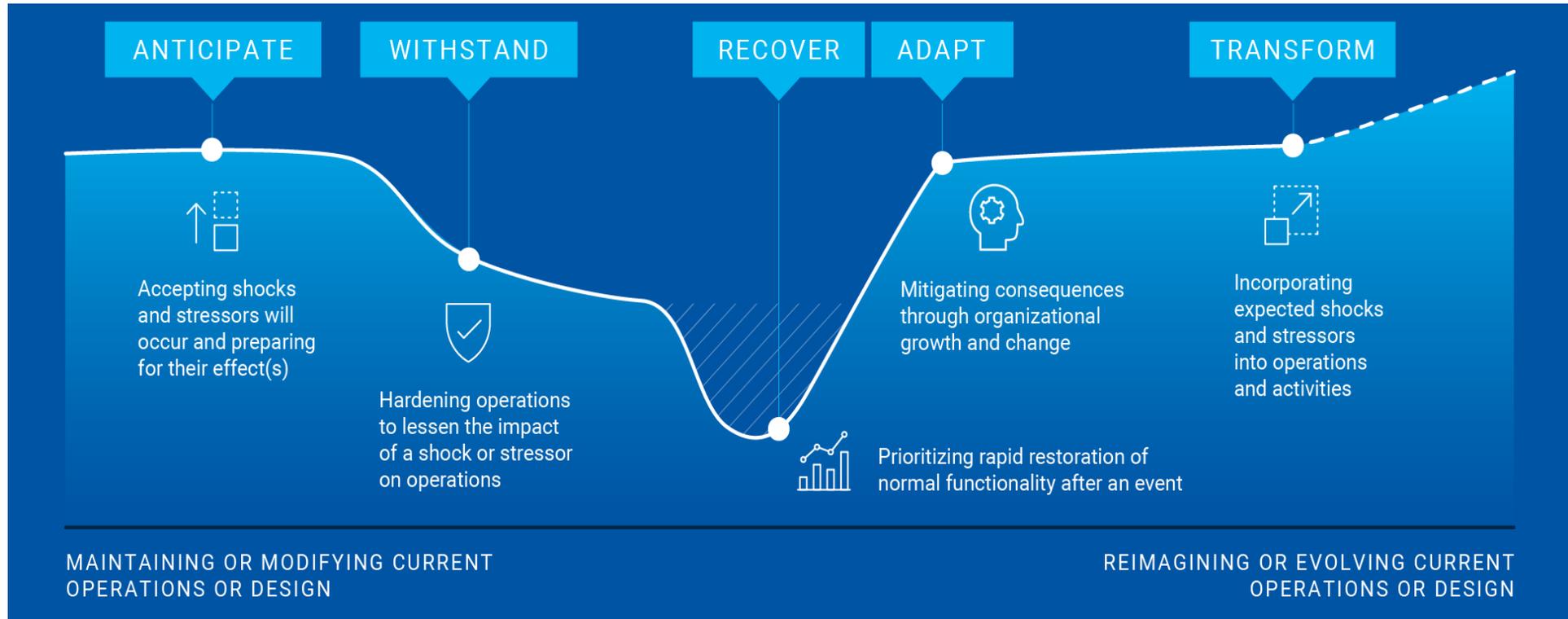
Click to Raise/Lower Hand



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

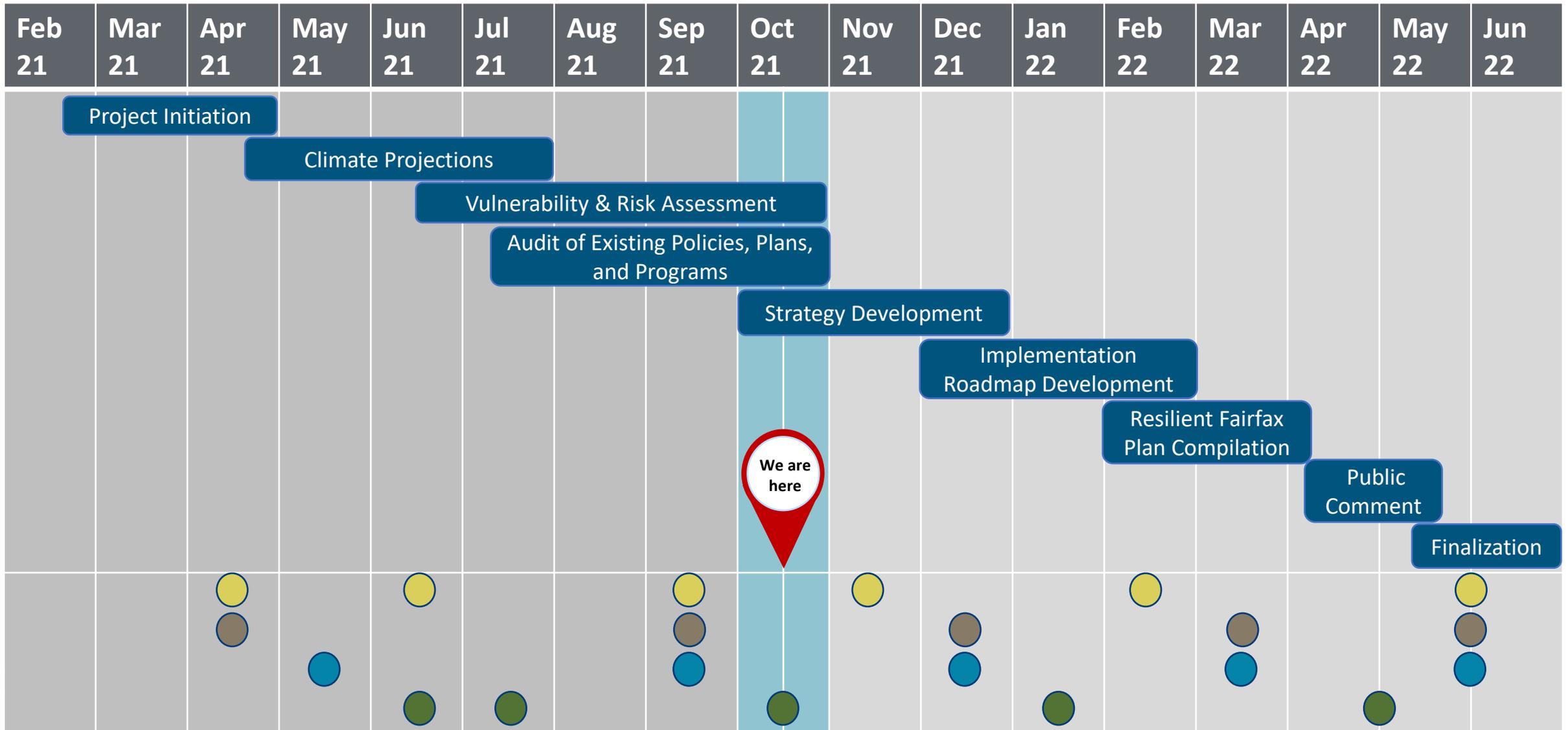
Purpose and Background

Resilient Fairfax's purpose is to determine:

- **What climate conditions and hazards will our county face?**
 - **Climate Projections Report**
 - Temperatures, precipitation, flooding, storm severity, drought
- **Where are we vulnerable?**
 - **Climate Vulnerability and Risk Assessment**
 - Homes, businesses, neighborhoods, infrastructure, services & operations, people in path of climate effects
- **How are we currently doing in terms of resilience?**
 - **Audit of Existing Policies, Plans, and Programs**
 - Which programs are working well? Where do we have gaps?
- **Which strategies will strengthen our resilience?**
 - **Adaptation and Resilience Strategies**
 - Physical upgrades, policies, design standards, services, staffing, procedural changes, agency coordination, etc.
- **What is the path to implementation?**
 - **Implementation Roadmap**
 - Funding sources, staffing, timelines



Project Timeline





Agenda II

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Climate Change in Fairfax

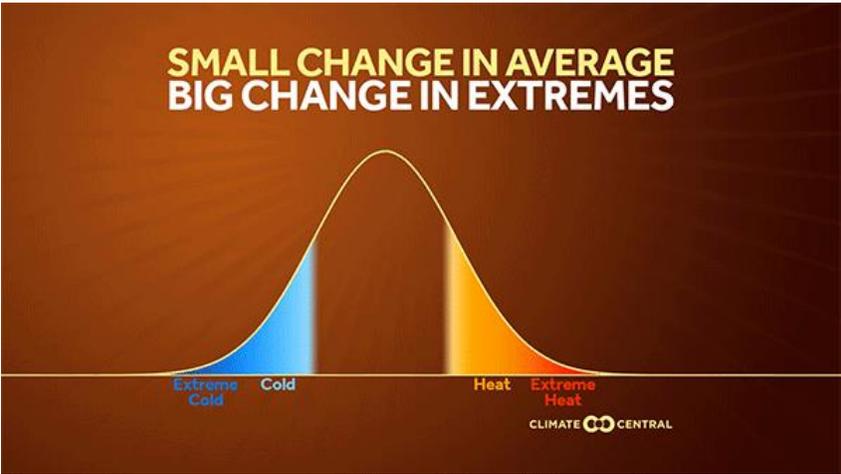
In the coming decades, Fairfax County will experience

Warmer, Wetter, Weirder

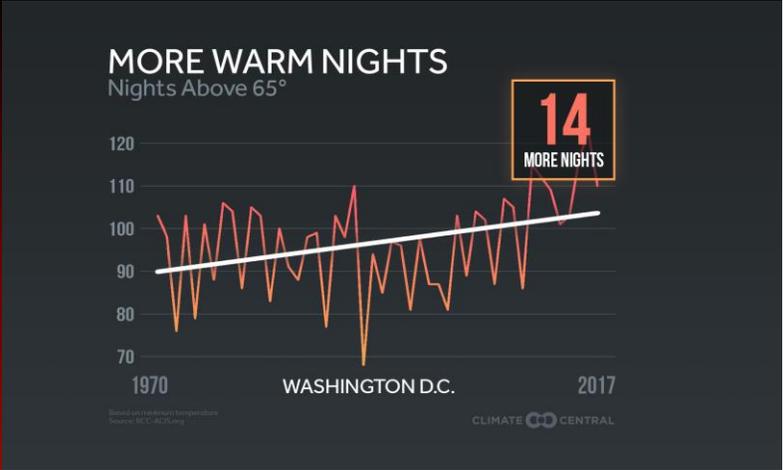
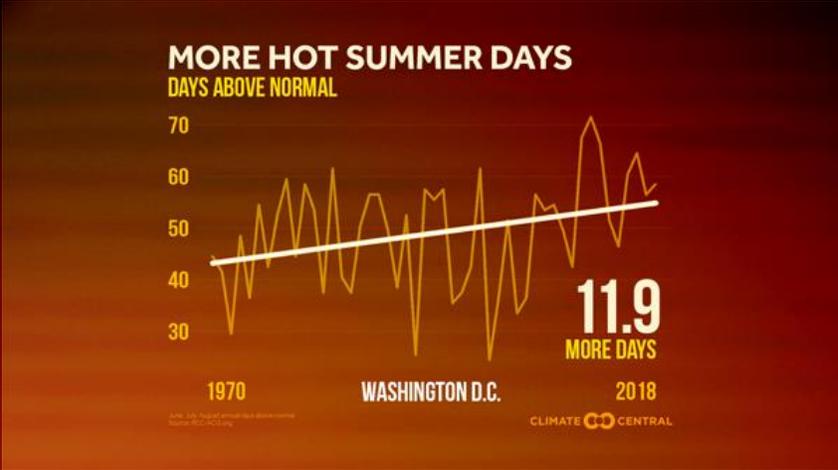
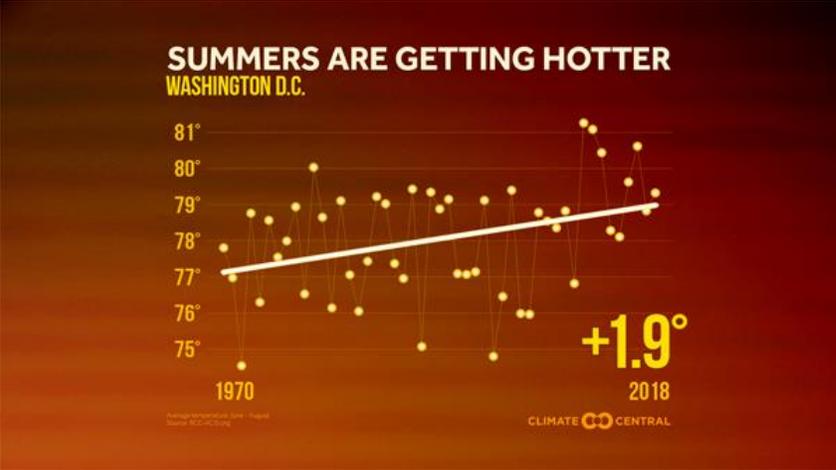
climate conditions.



Warmer: Historic Trends



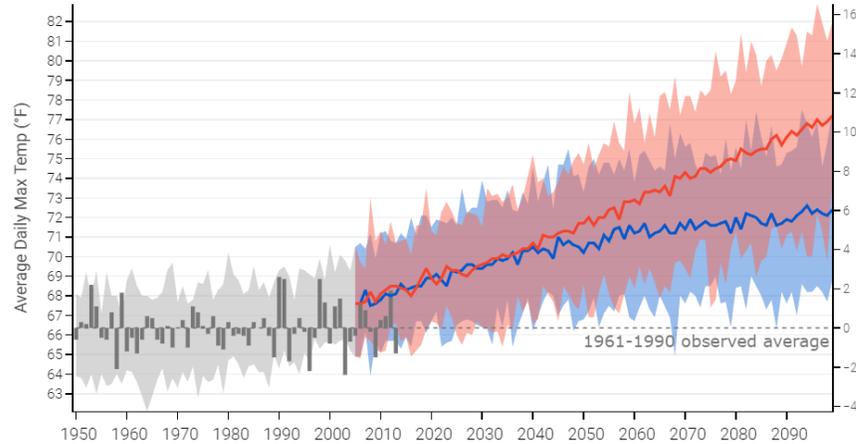
First, let's look at historic trends...



Warmer: Future Projections

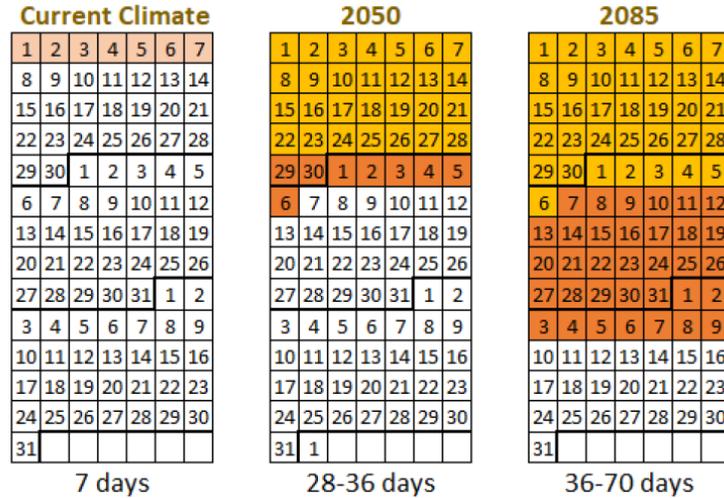
Now future projections...

Warmer annual & seasonal temperatures



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

More extremely hot days

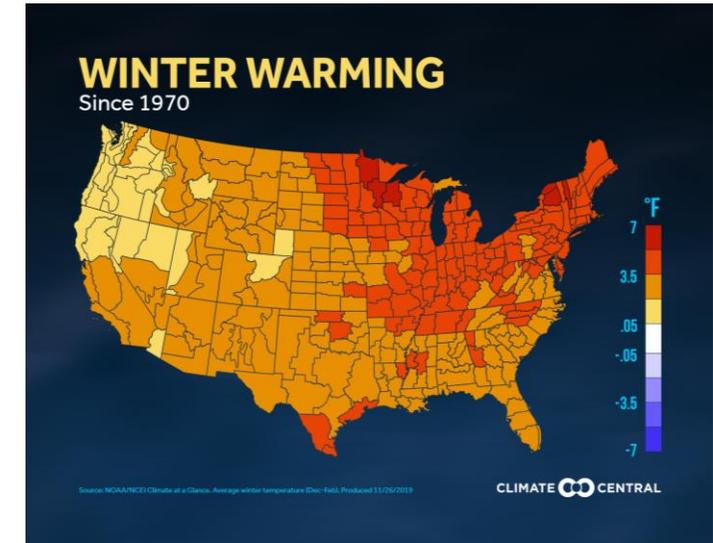


Observations Lower Scenario Higher Scenario

of days at or above 95°F

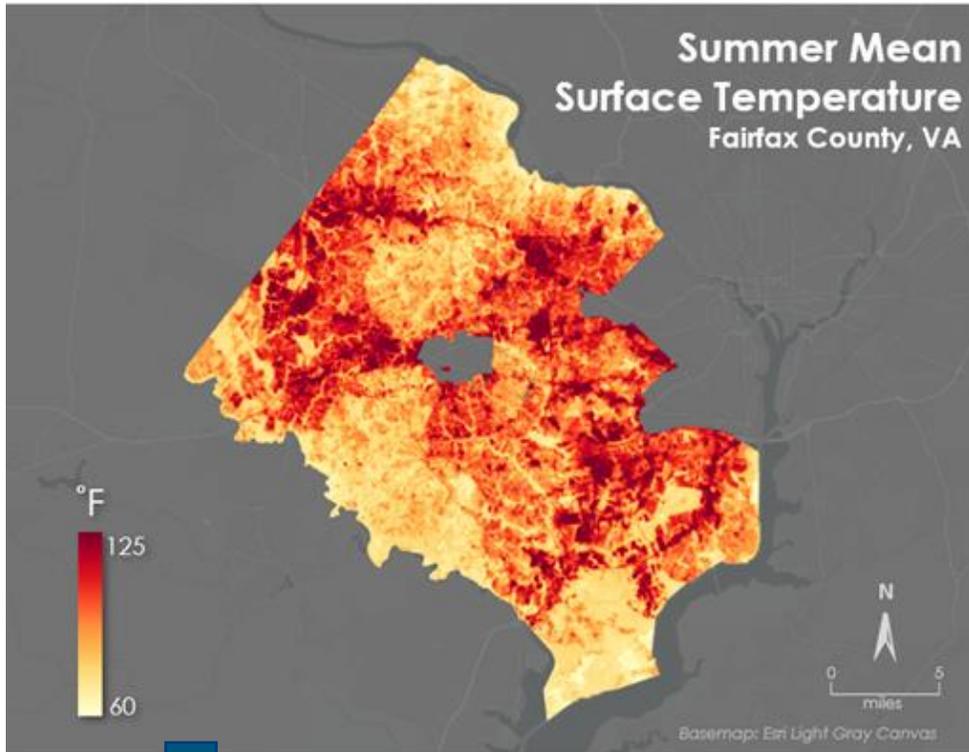
of days at or above 95°F projected to increase from **7** to **28-36** days by 2050.

Milder winters

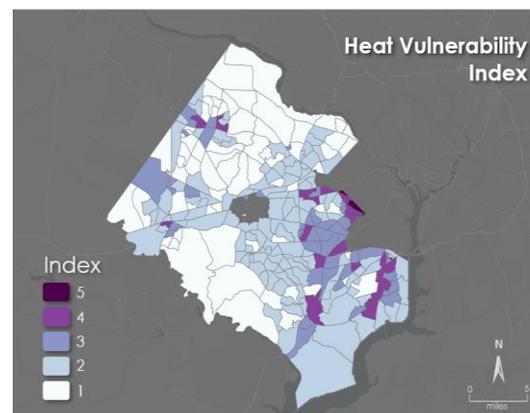
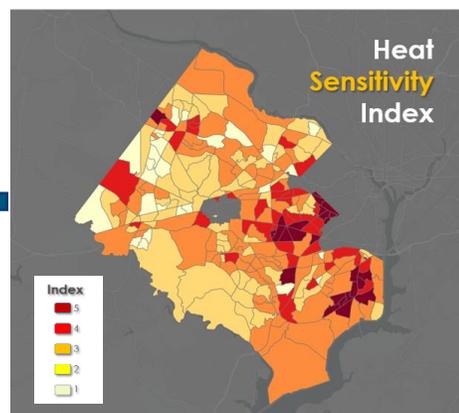
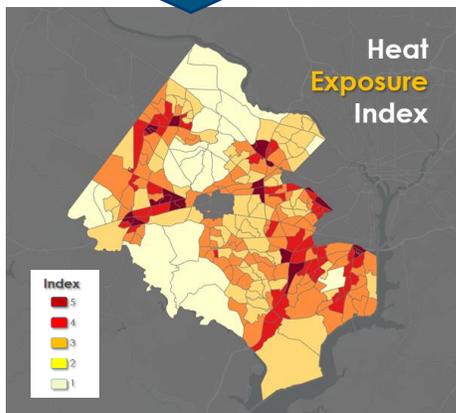


of days below freezing projected to decrease from **86** days to **62-67** days by 2050

Warmer: Urban Heat Island Effect

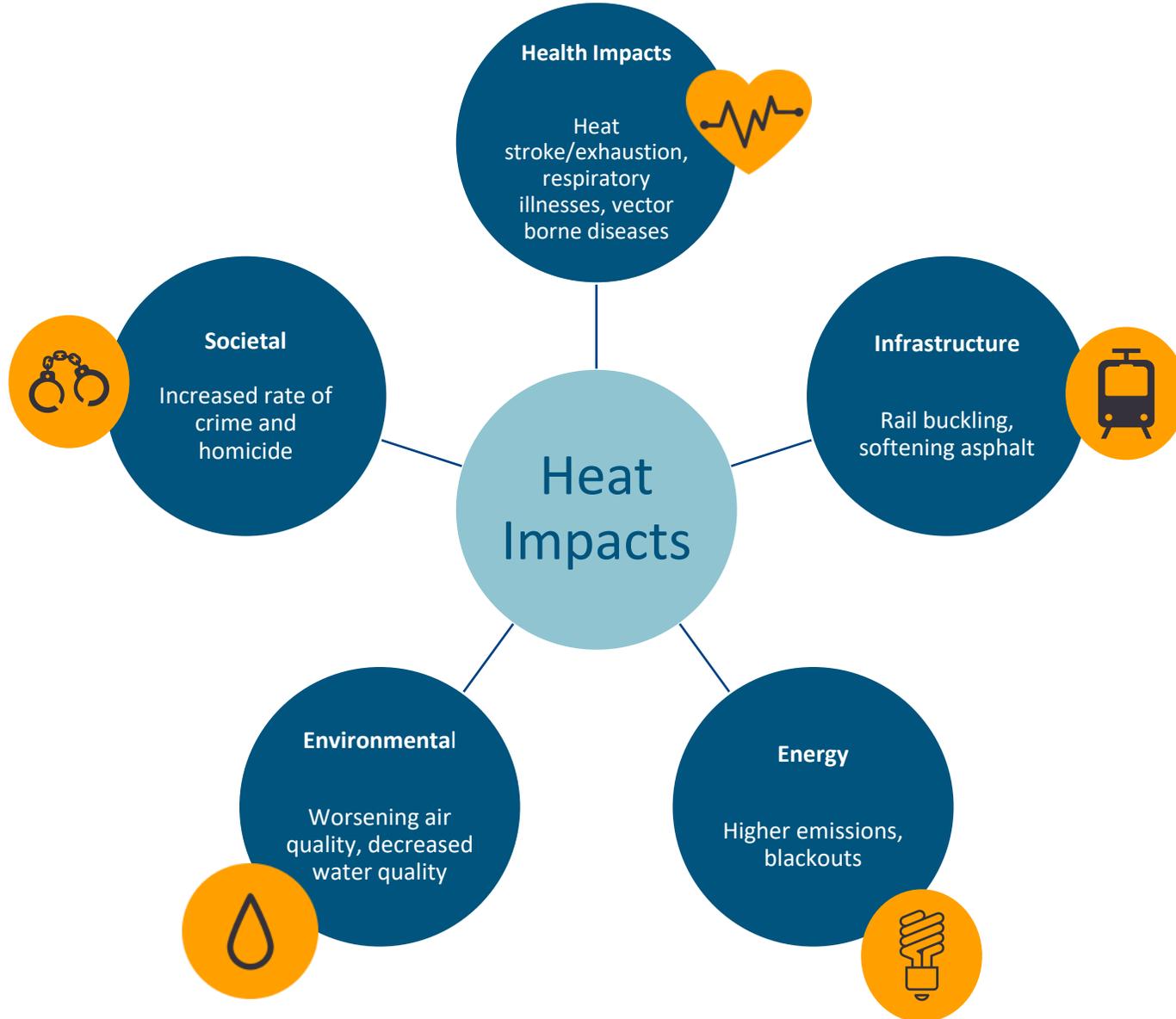


- **In addition to increasing temperatures county-wide...**
- **The Urban Heat Island Effect** makes some parts of the county hotter than others.
 - Places with a lot of asphalt, dense buildings, and other dark-colored infrastructure absorb heat & stay hotter (20+ degrees) than other areas.
 - Places 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?

Warmer: Impacts



Wetter: Flooding Types

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

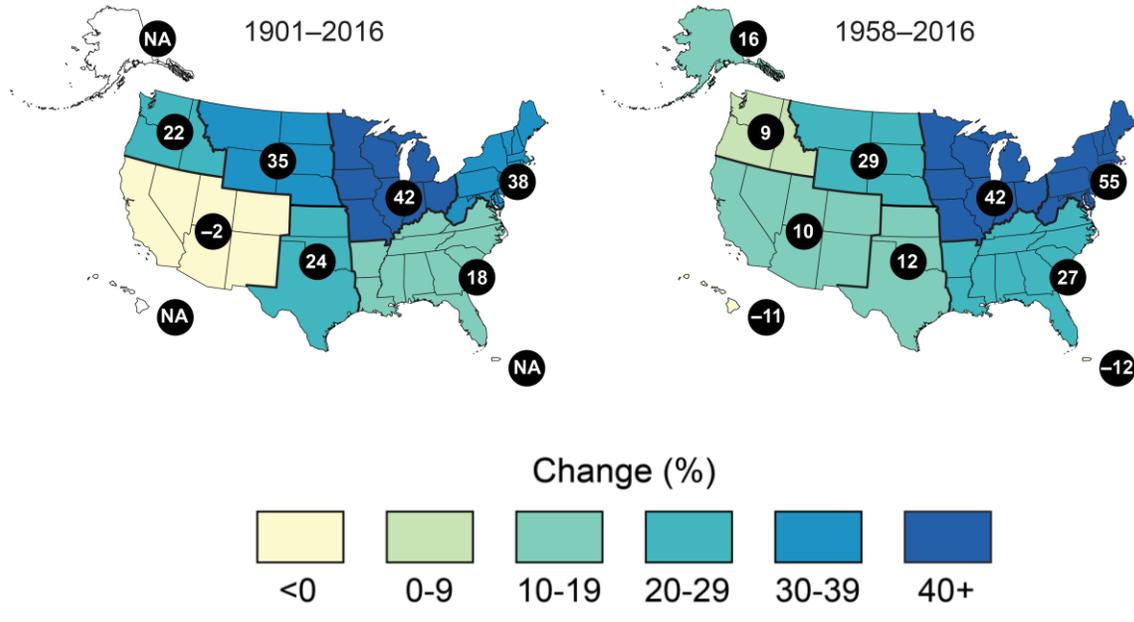
Inland Flooding		Coastal Flooding	
1. STORMWATER ISSUES Heavy rain overwhelms stormwater infrastructure	2. FLOODPLAINS Heavy rain makes rivers and streams overflow	3. SEA LEVEL RISE Rising sea means a rising Potomac River	4. COASTAL STORM SURGE Hurricanes, tropical storms, etc. push water on shore
			

Wetter: Historic Trends

First, let's look at historic trends...

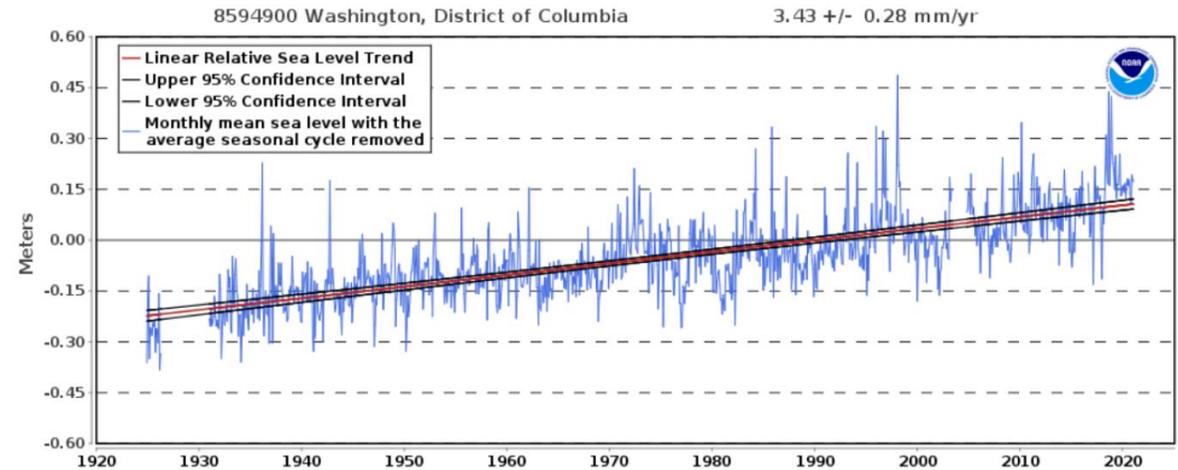
Increase in heavy precipitation events

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



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

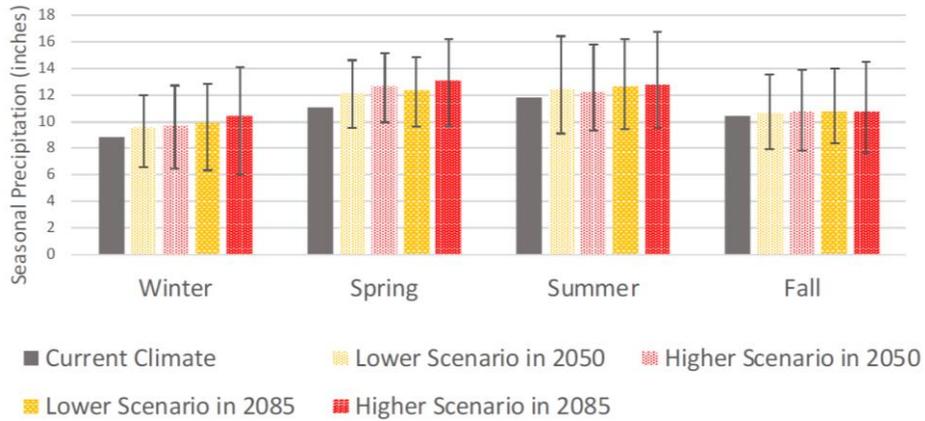
Steady increase in sea level



Wetter: Future Projections

Now future projections...

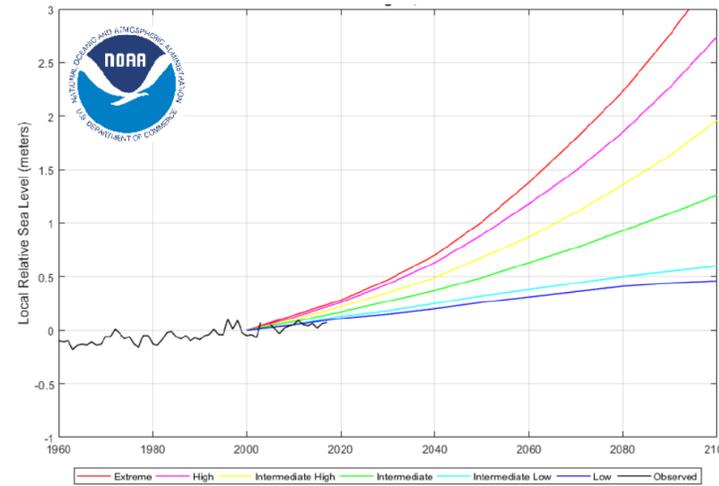
Increase in annual and seasonal precipitation



Projected seasonal precipitation

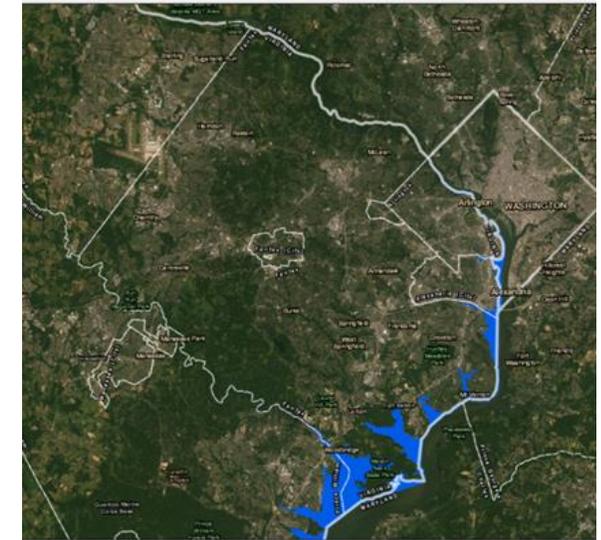
*Rain events are projected to continue to become **heavier** (by 8 – 20%)*

Increase in coastal flooding



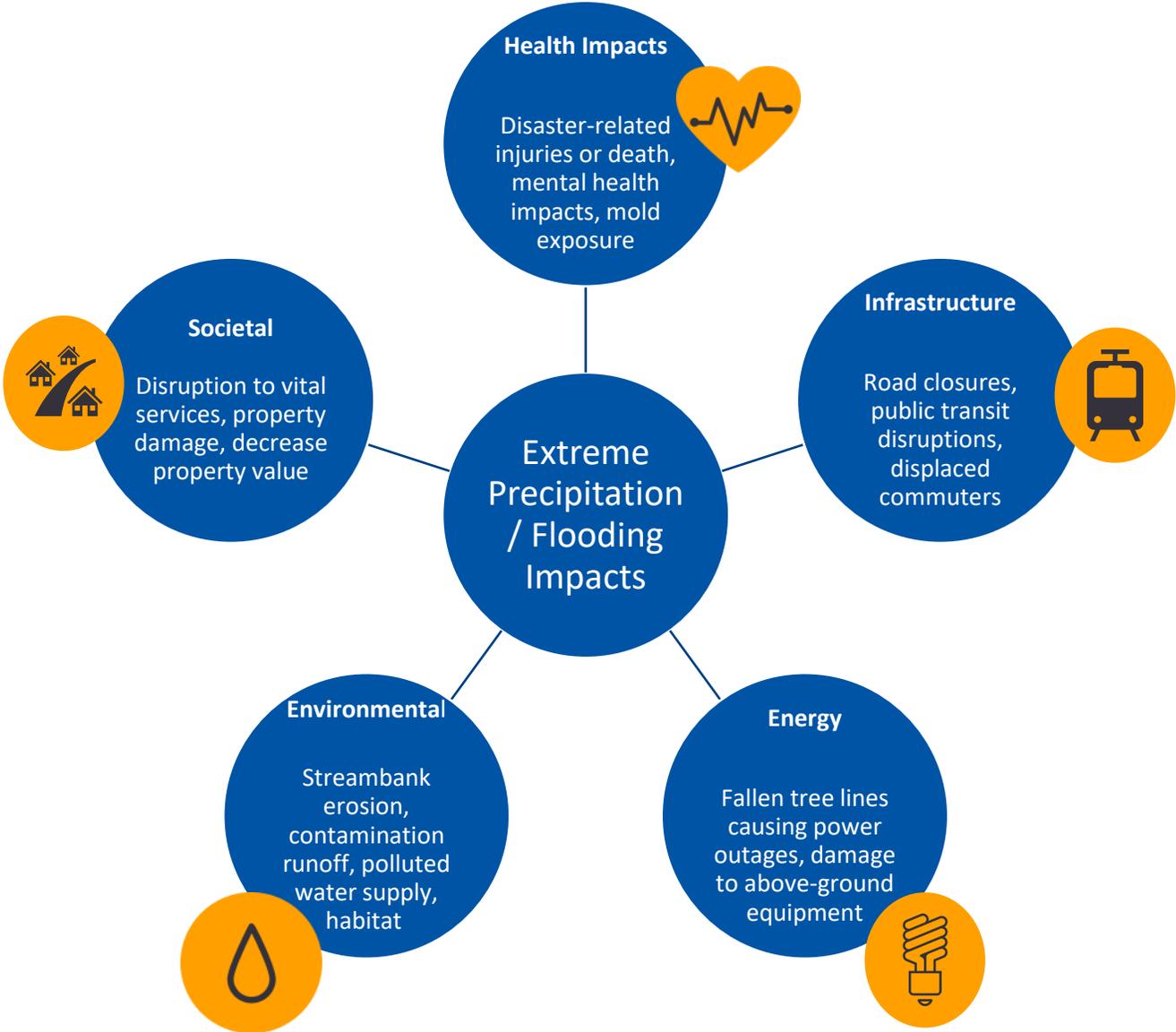
Projections of relative sea level rise for Washington DC tide gauge . Source: NOAA

*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

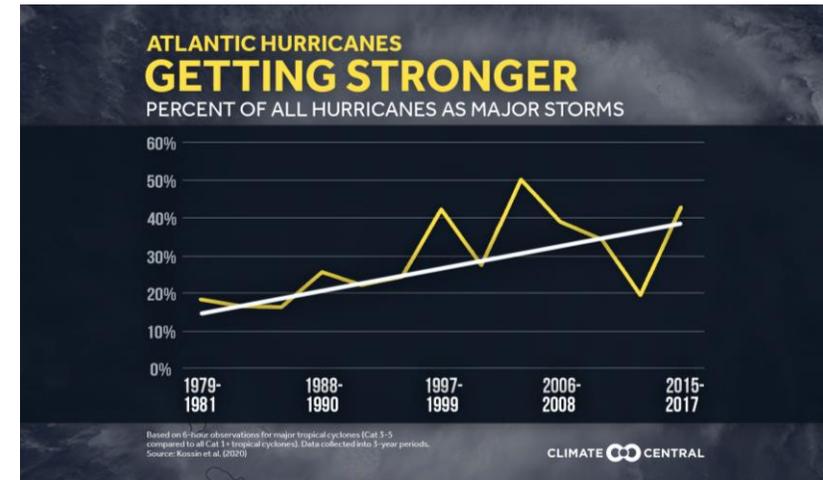
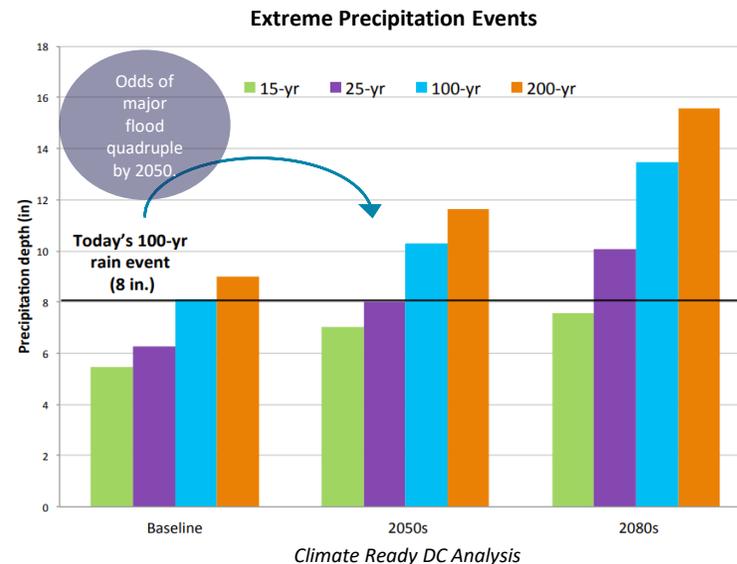
Wetter: Impacts



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

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Structure of today's discussion:

1. Buildings



2. Infrastructure



3. Natural Areas



4. Residents



Buildings: What's vulnerable?

Warmer



- **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.

Wetter



- **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.

Weirder



- **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

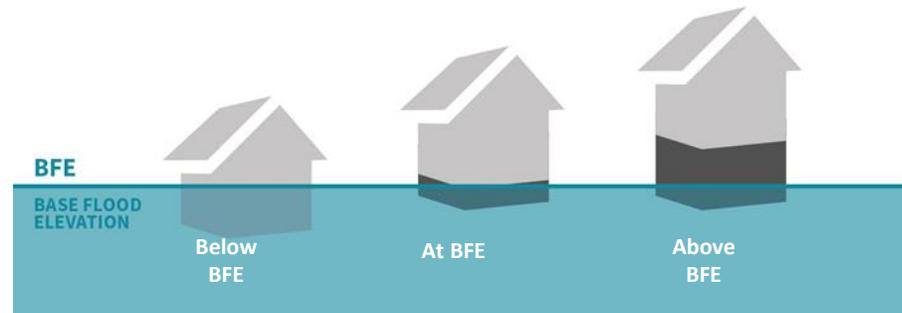
Participation in NFIP/CRS

- ✓ 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.



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.



Rising Tides, Rising Costs, CNYCN

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

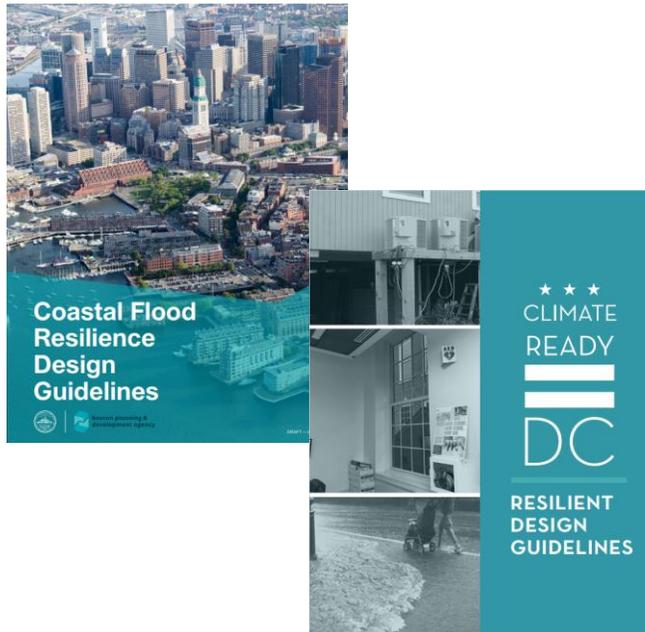


Buildings: What else can we do? What are others doing?

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



Flood Damage Assistance

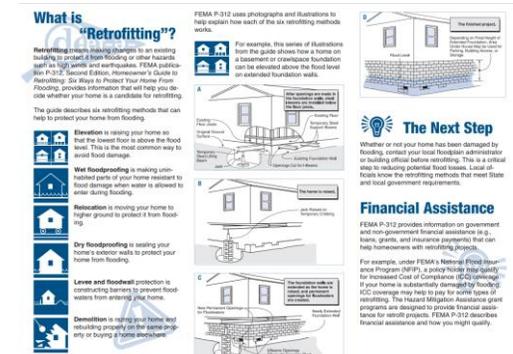
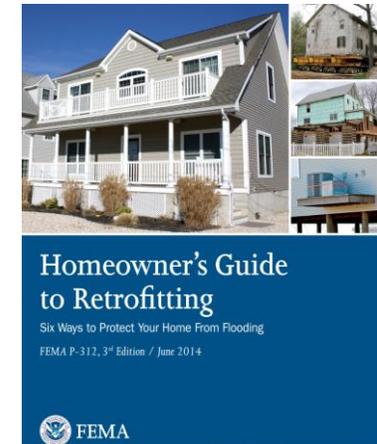
Provided by:



Neighborhood Housing Services of Chicago, Inc.

Guidance to Homeowners

- Guides, landing page for retrofit support



Buildings Discussion



- **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

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Infrastructure: What's vulnerable?

Warmer



- **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

Wetter



- **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

Weirder



- **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

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

Infrastructure Discussion



- **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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Natural Areas: What's vulnerable?

Warmer



- **What's exposed?:** Most water bodies, wetlands, and environmentally sensitive areas in the county are exposed to the Urban Heat Island effect
- **Effects:** Warming can decrease water quality, shift harvesting, affect crop viability, stress trees, and increase survivability of pests and weeds

Wetter



- **What's exposed:** nearly 30% of county parks are located in floodplains
- **Effects:** Flooding in natural areas may cause streambank erosion, contamination runoff (i.e., polluted water supply), habitat disruption (e.g., coastal inundation of coastal environments)

Weirder



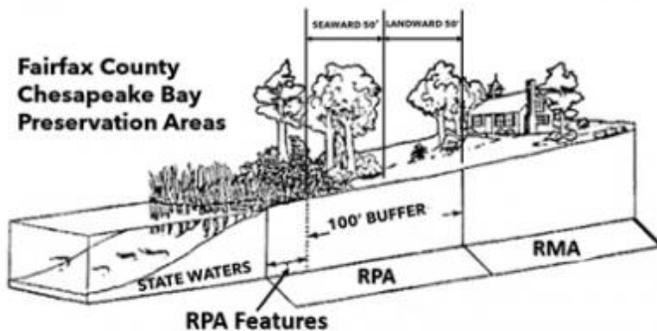
- **What's exposed:** all natural areas are exposed to severe storms
- **Effects:** Stronger storms and severe winds can cause breakage and uprooting of trees, sediment deposition, crop damage, and erosion.

Natural Areas: what are we doing to prepare?

Examples of policies and programs already in place in Fairfax County

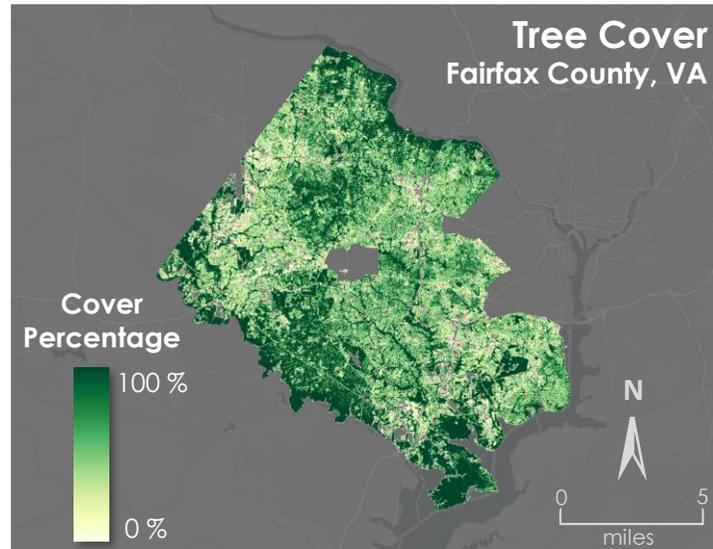
Protection of Water Bodies

- ✓ 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

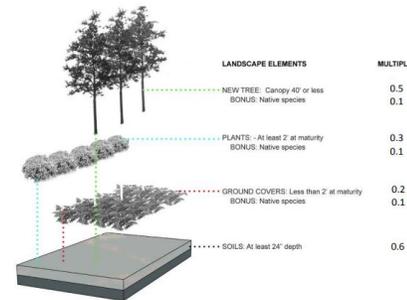
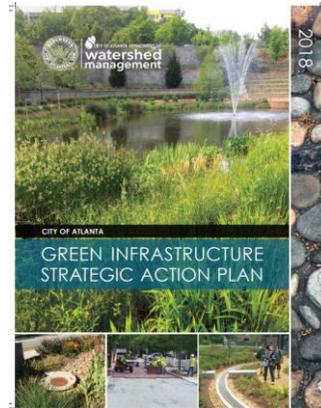
Protect/Conserve

- 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

Town of Milton Stormwater Credit Policy

Impervious Area Mitigated*	Discount / Credit
10 - 19%	5%
20 - 29%	10%
30 - 39%	15%
40 - 49%	20%
50% or more	25%

Natural Areas Discussion



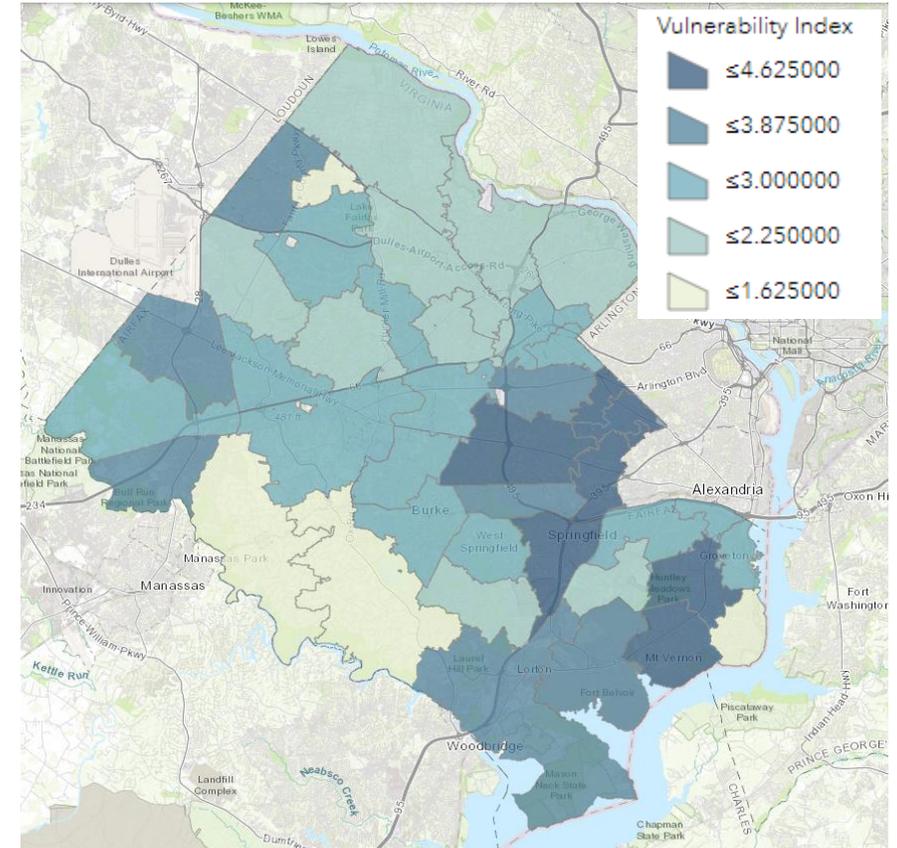
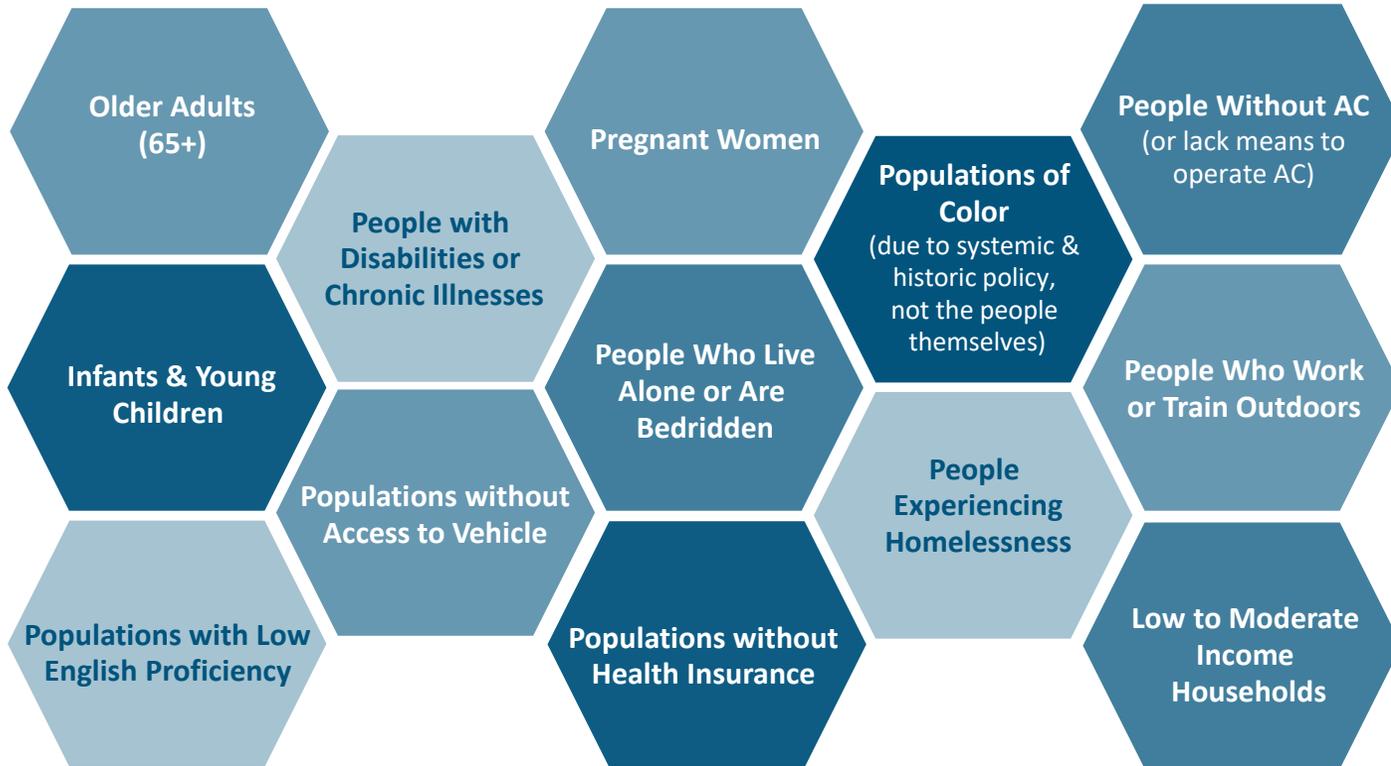
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Residents: Who's vulnerable?



Residents: How are they vulnerable?

Warmer



- **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

Wetter



- **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

Weirder



- **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 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



Extreme Heat Community Engagement in Philadelphia

- 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?**
- **What other strategies are you interested in seeing the County implement?**
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Agenda VII

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(Draft Version) Climate Viewer -Home

Resilient Fairfax

Open in Map Viewer Classic



Allison Homer
allison.homer@fairfaxco...

- +
- Layers
- Tables
- Basemap
- Charts
- Legend
- Bookmarks
- Save and open
- Map properties
- Share map
- Create app
- Print

Legend

Heat

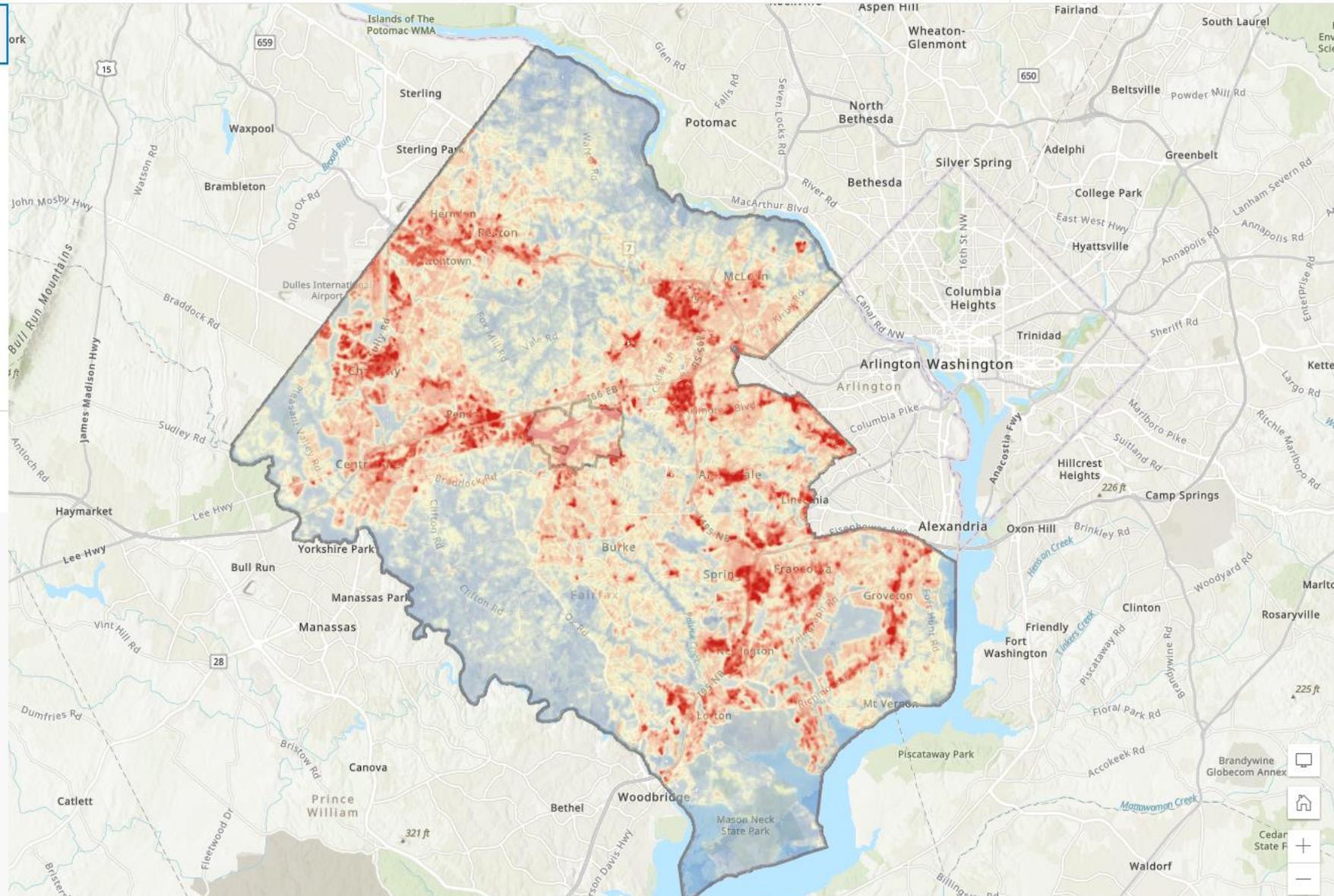
Daytime Average Summer Temperatures °F



Areas Above 100 °F



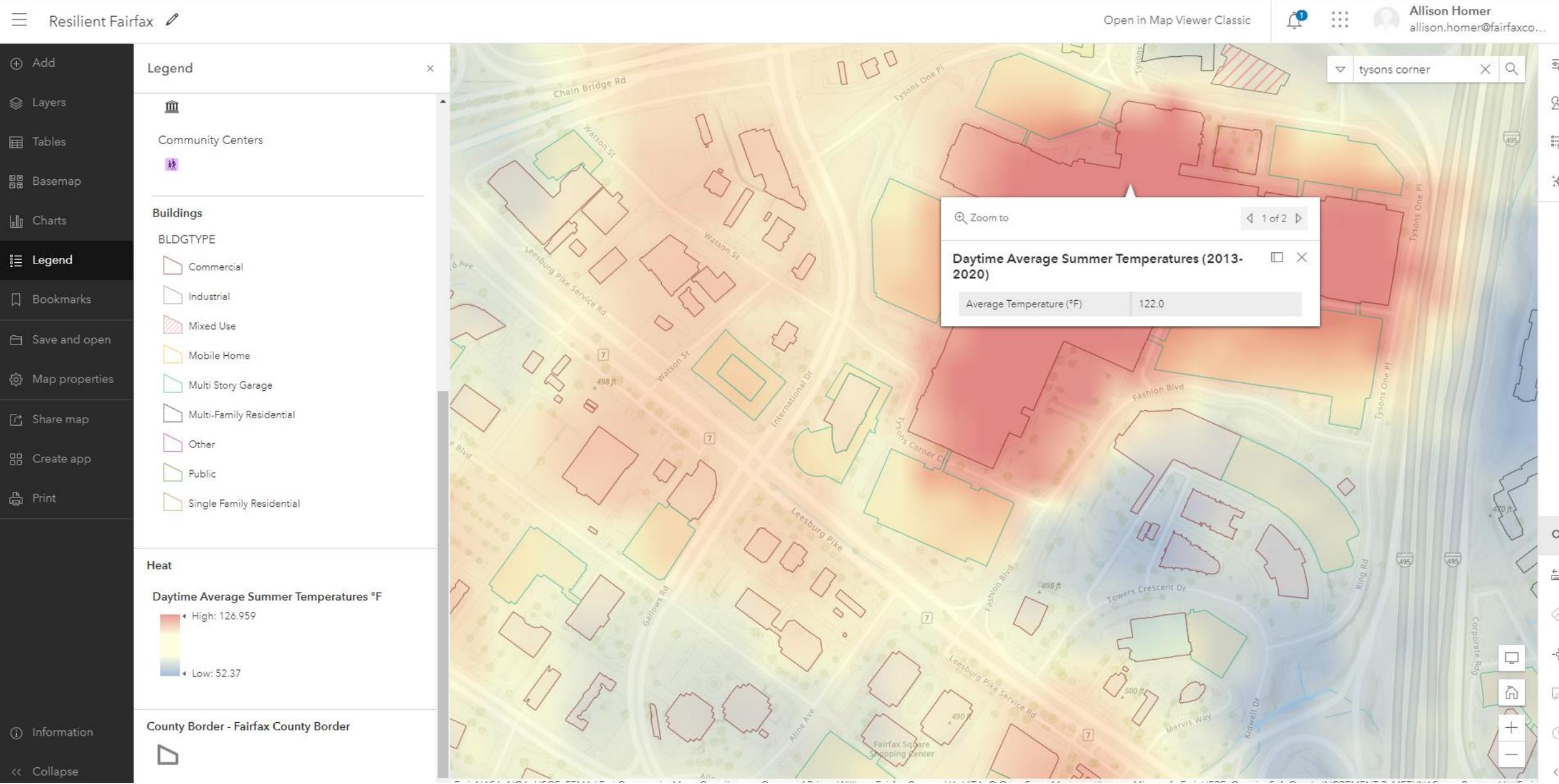
County Border - Fairfax County Border



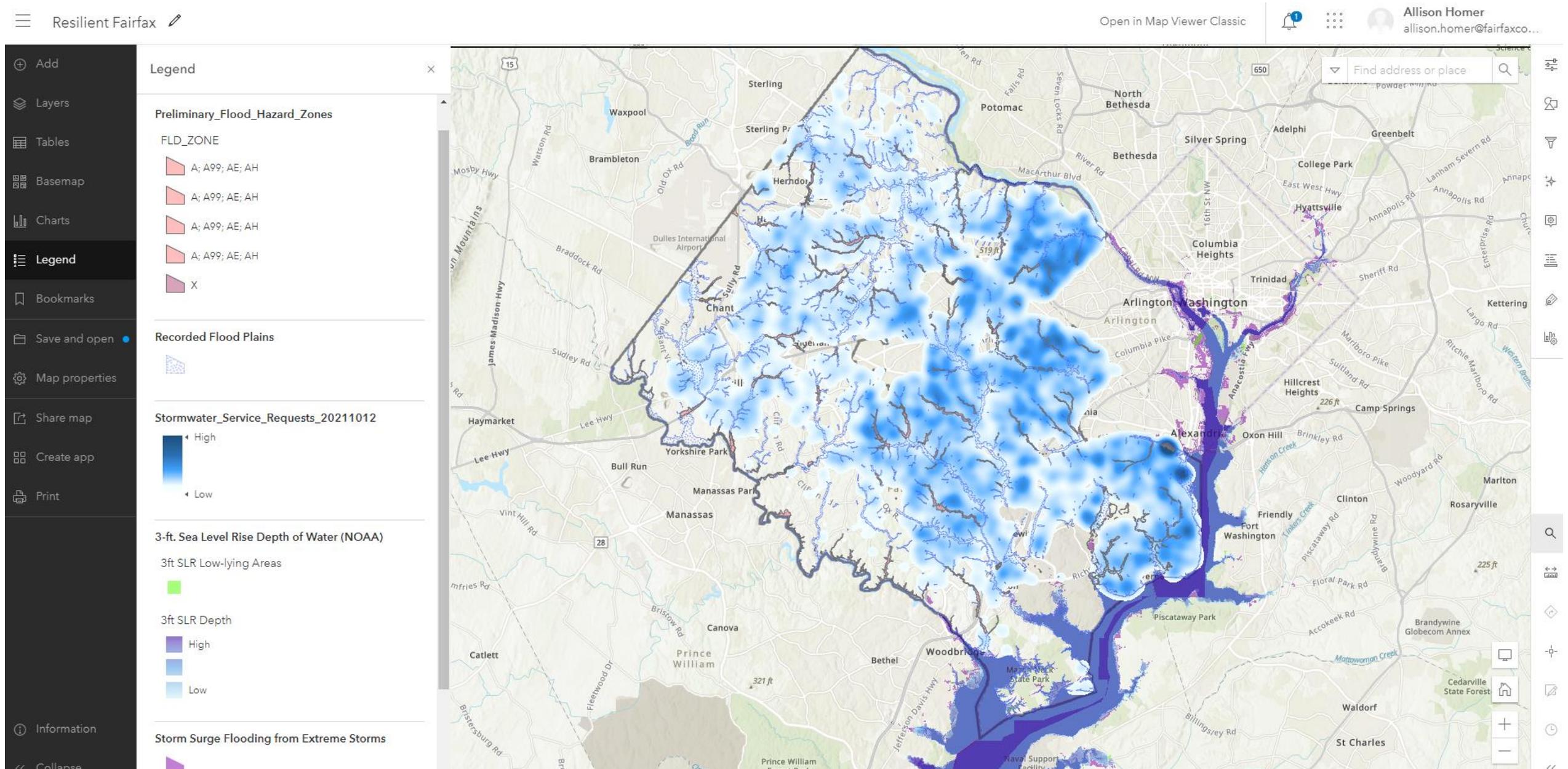
Information

Collapse

(Draft Version) Climate Viewer - Daytime Average Summer Temperatures



(Draft Version) Climate Viewer - Stormwater Requests



(Draft Version) Climate Viewer-Belle View Elementary School

Resilient Fairfax

Open in Map Viewer Classic



- Add
- Layers
- Tables
- Basemap
- Charts
- Legend**
- Bookmarks
- Save and open
- Map properties
- Share map
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- Print
- Information
- Collapse

Legend

- Commercial
- Industrial
- Mixed Use
- Mobile Home
- Multi Story Garage
- Multi-Family Residential
- Other
- Public
- Single Family Residential

Flooding

3-ft. Sea Level Rise Depth of Water (NOAA)

3ft SLR Low-lying Areas

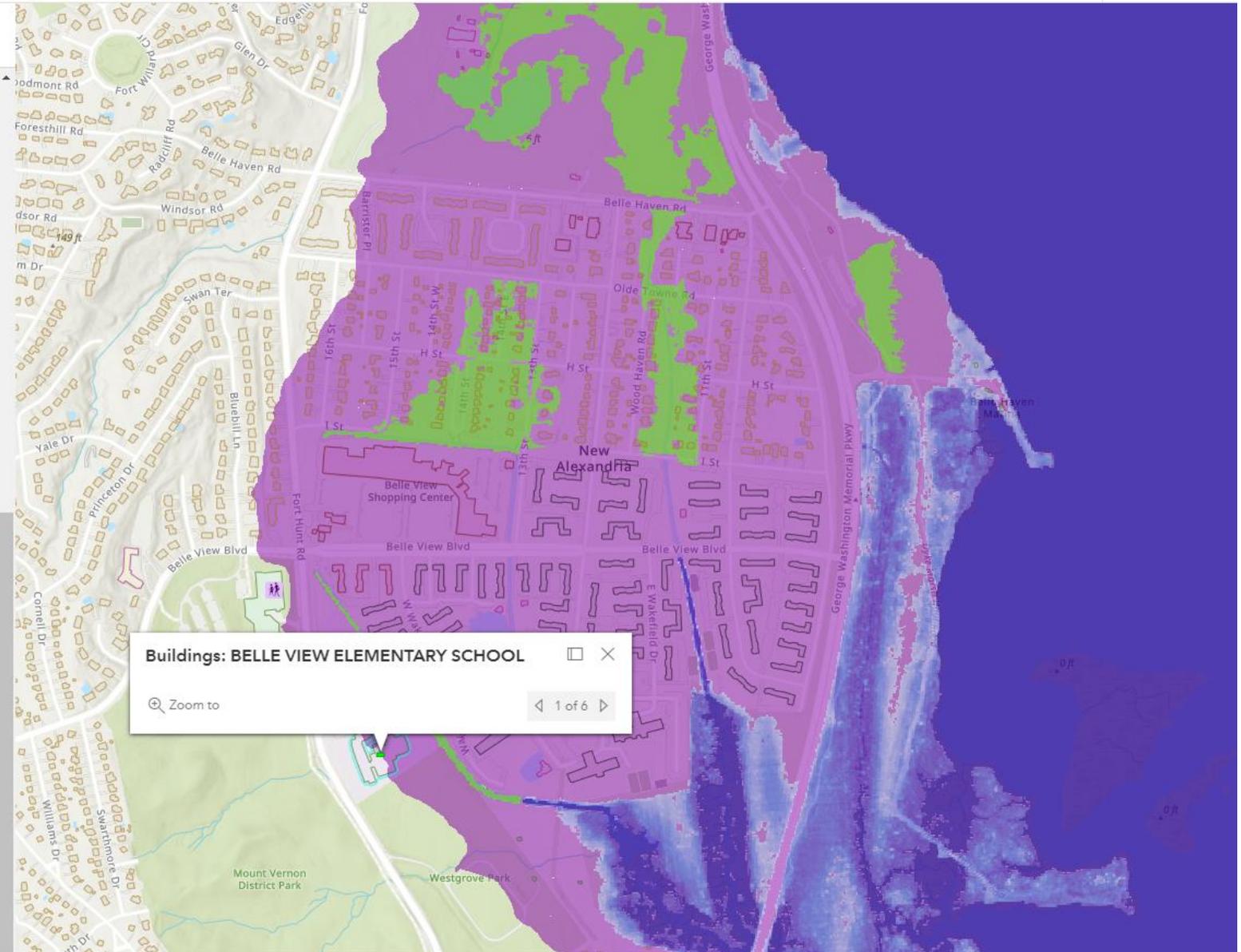
- 3ft SLR Depth
 - High
 - Low

Storm Surge Flooding from Extreme Storms

-

County Border - Fairfax County Border

-

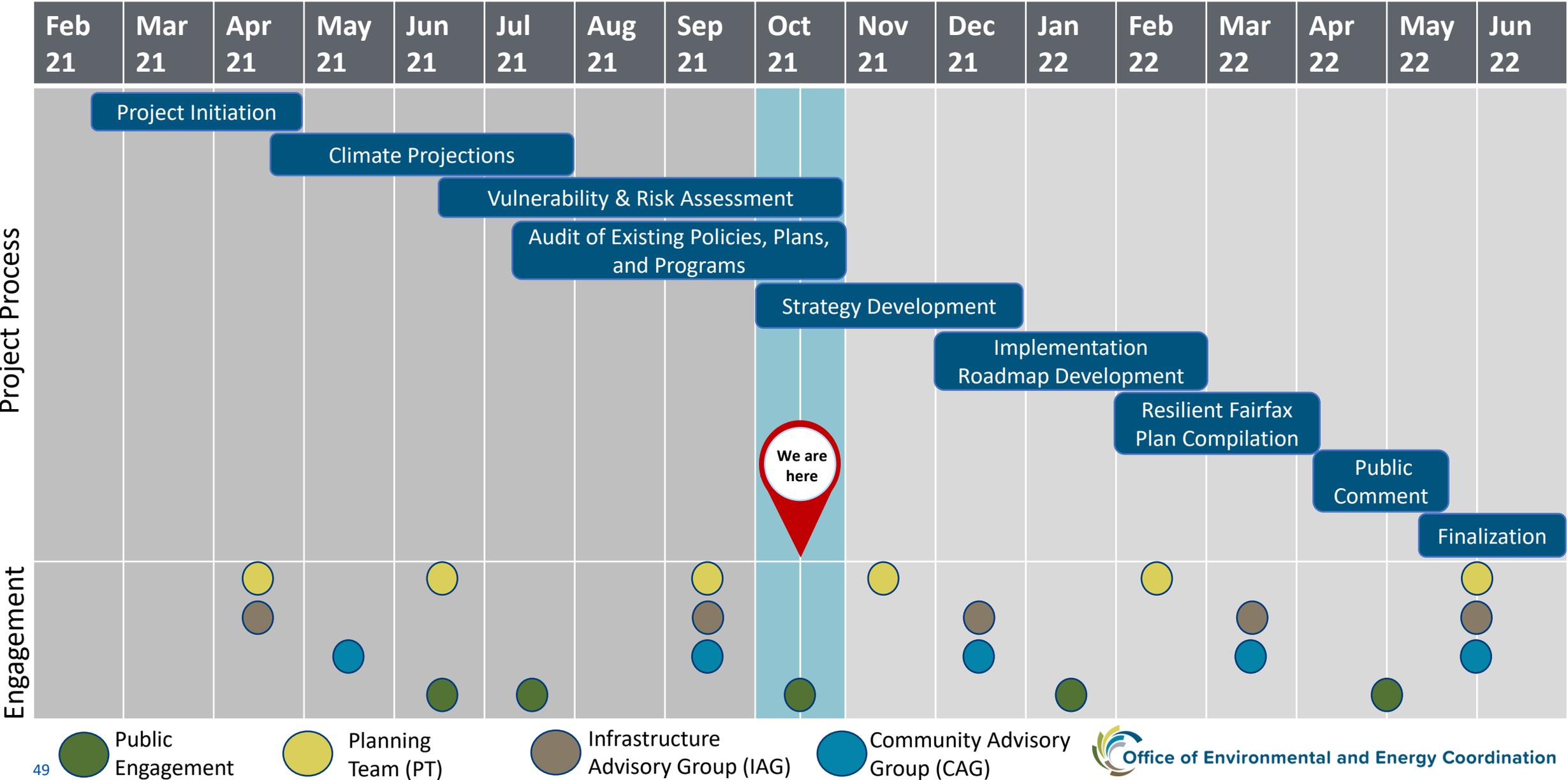




Agenda VIII

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Project Timeline



Stay Engaged!

Share the Meeting Recording once posted:

- [Public Engagement with Resilient Fairfax | Office of Environmental and Energy Coordination \(fairfaxcounty.gov\)](#)

Keep up with our progress!

- Website: <https://www.fairfaxcounty.gov/environment-energy-coordination/resilient-fairfax>
- Facebook: www.facebook.com/fairfaxcountyclimate
- Twitter: @ffxgreen

Send us an email anytime

- 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!



CADMUS



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