



Virginia Climate Center, Virginia Climate Assessment, & Virginia State Climate Office



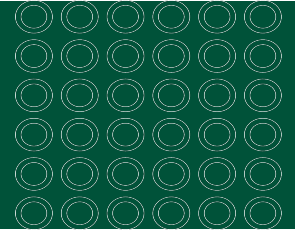
Jim Kinter, Professor, Climate Dynamics
Director, Virginia Climate Center



The Virginia Climate Center



Climate Services and Assessments



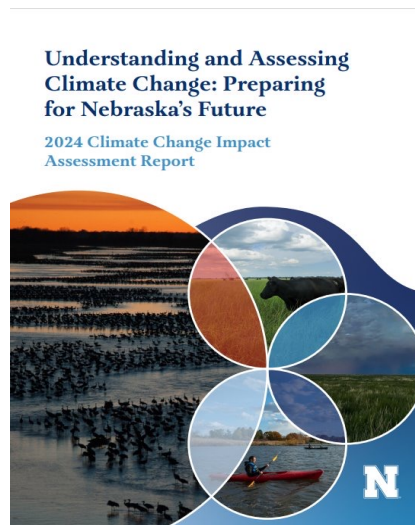
Federal

The National Climate Assessment



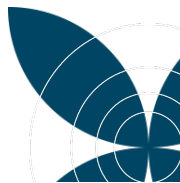
States

State Climate Assessments and State Climate Offices



Virginia (2023)

No statewide Climate Assessments and no active State Climate Office



What Are Climate Services?

- Specialized information, tools, and products that translate climate data and scientific knowledge into actionable insights for decision-makers
 - Climate assessments, predictions, and projections
 - Early warning systems
- Broad range of timescales from weather information to seasonal forecasts to multi-decadal climate projections
 - Historical climate data analysis
 - Current monitoring *at relevant scale*
 - Future scenario planning

How Are Climate Services Provided?

- **Combine** environmental monitoring, R&D, and product generation
- **Use** historical records, ground-based monitoring networks, satellite observations, climate models, and statistical analysis
- **Disseminate** products through web platforms, mobile apps, bulletins, stakeholder engagement, K-12 education, and capacity-building workshops
- **Tailor** to specific sectors (agriculture, water, public health, energy, disaster risk reduction, etc.) and user needs
- **Co-produce**: providers work directly with users to develop relevant and actionable information products

How Does Society Benefit from Climate Services?

- **Protect** vulnerable communities by assessing risks and resilience options
- **Enable** better planning and risk management for climate-sensitive sectors
- **Enhance** food security through improved agricultural planning
- **Reduce** loss of life and economic damage by supporting disaster preparedness and early warning systems for extreme weather events
- **Support** evidence-based climate adaptation strategies
- **Inform** infrastructure and urban planning: long-term climate risks
- **Guide** public health responses to climate-related health risks
- **Help** businesses optimize operations and supply chains based on climate variability and trends



College of Science
VIRGINIA CLIMATE CENTER
George Mason University®

Launch: January 2023

Pilot project supported by Congressionally-directed NOAA community project, under sponsorship of the late Honorable Gerry Connolly, U.S. Representative for Virginia's 11th district

Vision:

A Resilient, Healthy, Sustainable Commonwealth

Mission:

Engage with Virginia's municipal officials, businesses, and community leaders to co-develop information and tools to inform municipal decisions, enhance Virginia's resiliency, and improve economic productivity



VCC Capabilities



Assess

Local climate impacts

Climate planning
concerns



Engage

Gaps in partner needs

Corresponding George
Mason faculty experts



Co-produce

Data products

Research tools

Resiliency solutions



VCC Collaborators and Community Partners



George Mason University
Center for
Ocean-Land-Atmosphere Studies



Institute for a
Sustainable Earth



GEORGE MASON UNIVERSITY
CENTER for CLIMATE CHANGE
COMMUNICATION



FLOOD
Hazards Research Lab



Sample Project:

Supporting Community Efforts for Flood Adaptation

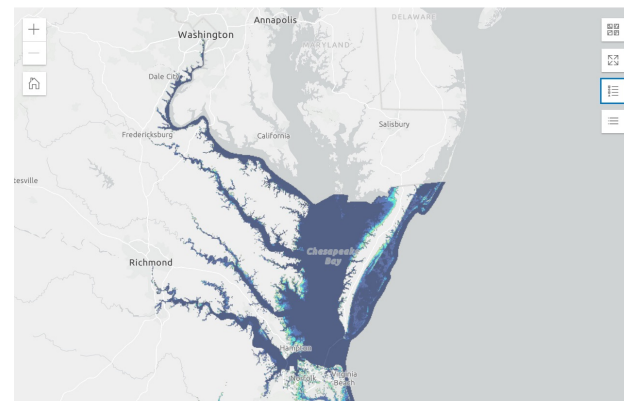
- **Leads:** VCC Co-PI Celso Ferreira (civil engineering) with contributions from postdoctoral researcher P Ruess
- **Stakeholders:** Chickahominy and Pamunkey Tribes, Fairfax City, Northern Virginia Regional Commission

Developing **flood awareness**

Created **flood modeling urban terrain pre-processing tool**

Compiling **locally-relevant flood and climate data**

Modeling **precipitation and flooding in the James River watershed** (endpoint: Richmond) as prototype for all watersheds in Virginia



Virginia DCR Flood Resilience Open Data Portal

Sample Project:

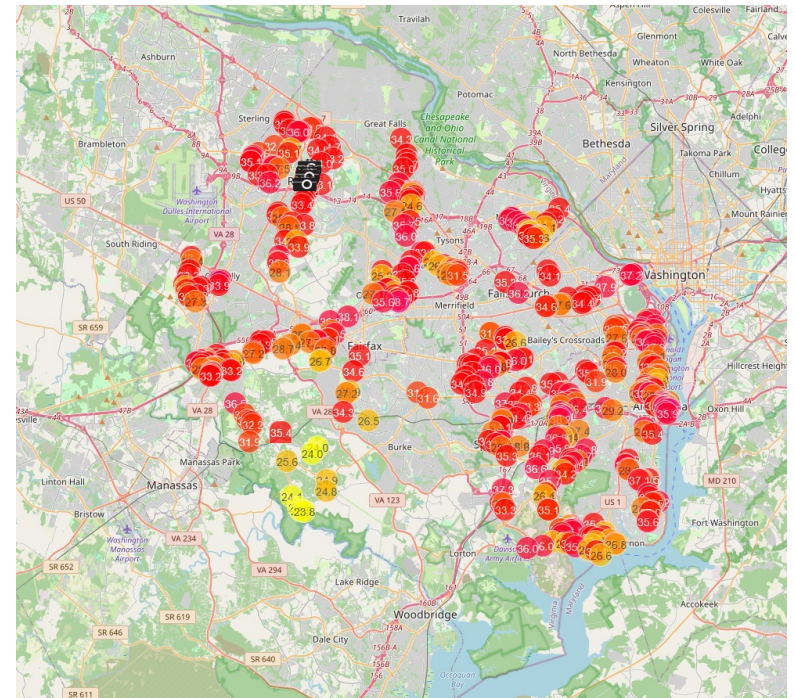
NoVA Urban Heat Island Measurement Campaign

Leads: L. Ortiz, J. Kinter

Students: Alison Lawyer

Stakeholders: Faith Alliance for Climate Solutions (FACS),
American Red Cross (ARC)

- In Summer 2026, VaSCO/VCC teamed with FACS to organize an urban heat island mapping campaign over Northern Virginia
- **Citizen Science:** Over 80 volunteers ran 30 routes in morning, afternoon and evening. Hundreds of thousands of data points collected over a single day.
- **Guidebook:** Working with ARC to develop a guidebook on UHI field campaigns to be used worldwide.

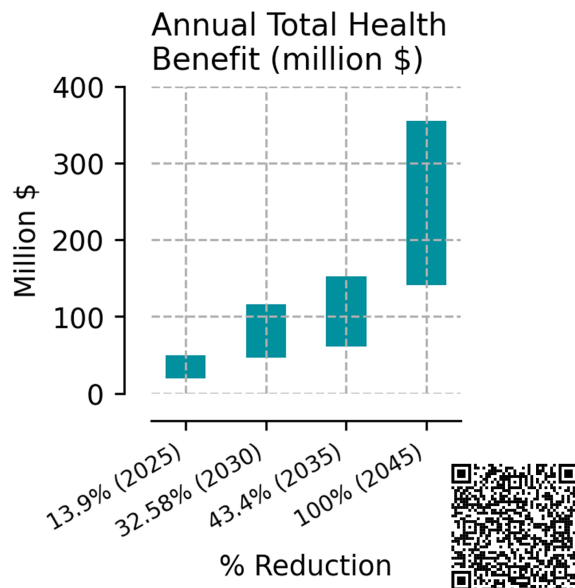


Virginia DCR Flood Resilience Open Data Portal



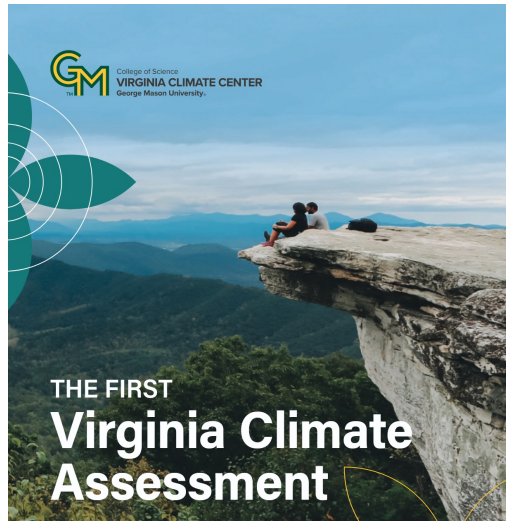
VCC Products

Publications & Reports

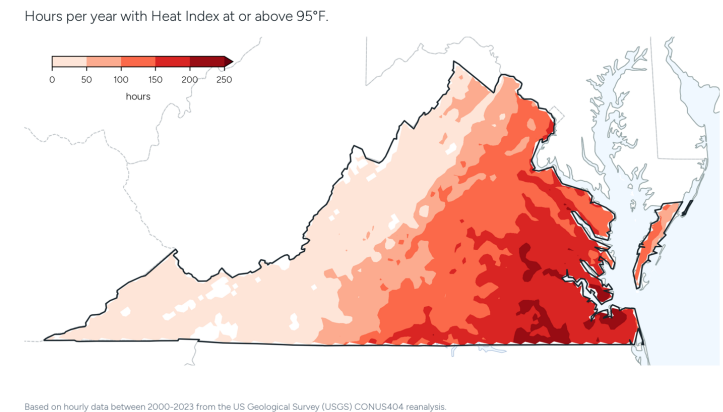


Co-benefits to health and health-care costs related from decarbonization of the power sector, using the Virginia Clean Economy Act (Ortiz et al. 2023)

The First Virginia Climate Assessment



Climate Data





The Virginia Climate Assessment



The Virginia Climate Assessment

The First Virginia Climate Assessment (VCA; Nov 2025) is a **science-based evaluation** of the ways past, current, and anticipated future climate has and will impact Virginia and its people.

The VCA was **prepared (Apr-Oct 2025) and extensively reviewed by experts** across Virginia and beyond.

The VCA is the first report of its kind establishing a baseline of Virginia's weather and climate conditions against which future changes can be measured, and adaptation effectiveness can be evaluated.

90+

pages

9

chapters

26

authors from

8

academic institutions
and non-profits

14

reviewers from

12

academic institutions,
non-profits, and local
governments

To date:

5,700+

web visits

1,020

downloads

327

research products
evaluated





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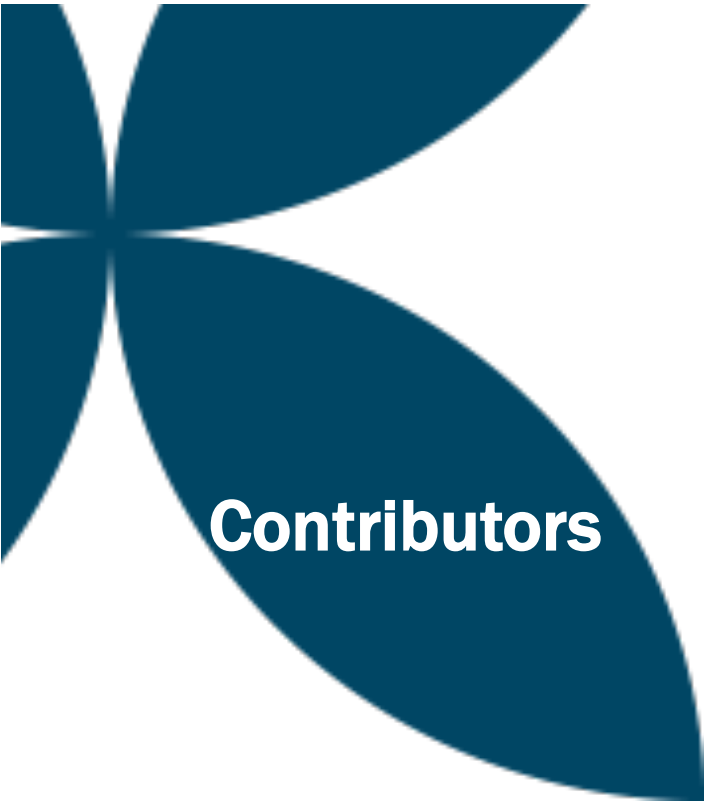
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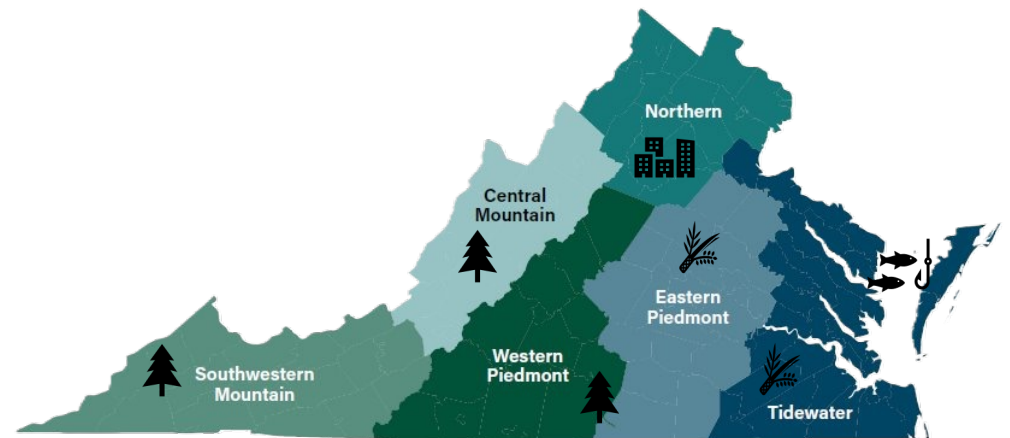
Amanda O'Connor



Focus: Virginia and its climatically homogeneous regions

The report provides regional information organized by 6 Climate Divisions containing:

- 8.7 million people
- Forested areas (60%), agricultural lands, urban development, wetlands, and coastal zones
- Elevations ranging from sea level to over 5,700 ft.
- Crops such as soybeans and corn, all sensitive to climate variability and extremes
- Major economic sectors that include technology, defense, education, and health services



Key Messages of the VCA



Temperature & Heat Risk

- Virginia's temperatures are **increasing**, particularly in cold seasons
- **Heat risk is on the rise in Virginia**, leading to significant health, infrastructure, and ecosystem impacts



Precipitation & Flood Risk

- Virginia is **getting wetter**, with more frequent and extreme precipitation
- **Inland flooding is causing widespread damage** due to intense and frequent rainfall, land use changes, and aging stormwater infrastructure



Drought Risk

- **Drought is an increasing concern** due to rapid development and limited predictability
- **Drought heavily impacts** agriculture, forestry, water resources, and the data center industry, with the Western and Northern parts of the Commonwealth being most affected

Key Messages of the VCA



Sea Level Rise & Coastal Flooding

- Sea level has been rising in **Virginia** and is expected to accelerate
- **Coastal flooding is worsening** due to storm surges, sea level rise, and land subsidence



Compounding Risks

- Compound climate and weather **extremes are increasingly cascading** into power outages in Virginia and threaten to overwhelm infrastructure and emergency systems
- Heat is compounding with pollution sources to **degrade Virginia's air quality**



Exposure

- All of Virginia's economic sectors and natural systems are **sensitive to climate change** and face increased exposure
- One of the most important effects of climate change on Virginia's economic sectors is its **impact on critical infrastructure** which underpins a functioning economy

What's Next?



VCA 2.0

The Virginia Climate Center has collected feedback from peers and community members that will be integrated into the next Assessment. Improvements will include finer-scale geographic detail and expanded coverage of impacts on sectors like agriculture and public health.

Virginia State Climate Office

The VCA highlights the need for a central, state-wide source for climate services and data in Virginia.





The Virginia State Climate Office



What is a State Climate Office? What do they provide?



Collect, analyze, and disseminate weather and climate resources and data



Conduct periodic climate assessments to summarize the science, impacts, and recommendations for responding to climate change



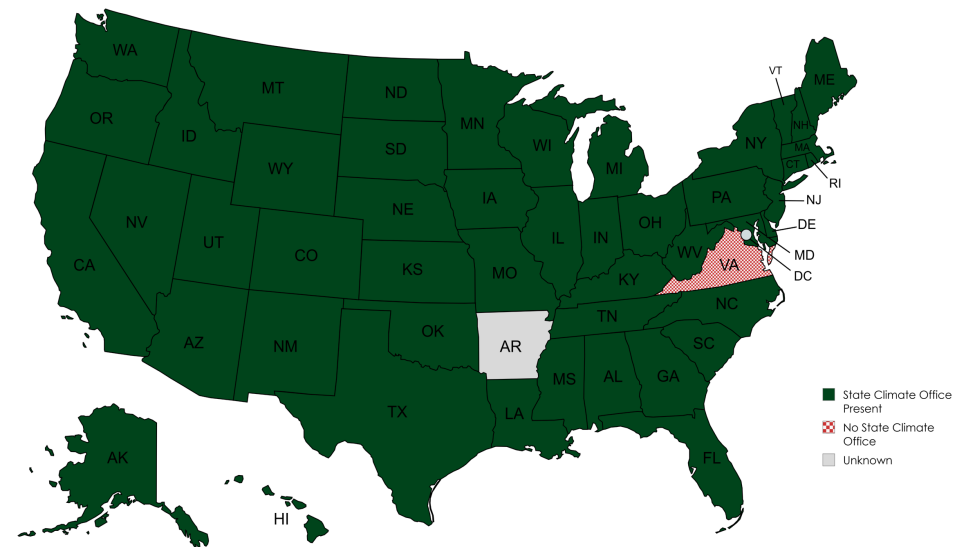
Maintain and monitor a Mesonet of observations



Develop training and education support tools



Ensure low-and-no cost access to high-quality resources regardless of location, size, or budget



Prior to 1 July 2026, Virginia was 1 of only 2 states without a State Climate Office



Why Does Virginia Need a State Climate Office?

Gaps in Climate Data and Services

Without a State Climate Office, Virginia represents a hole in the network of climate service providers in the Southeast.

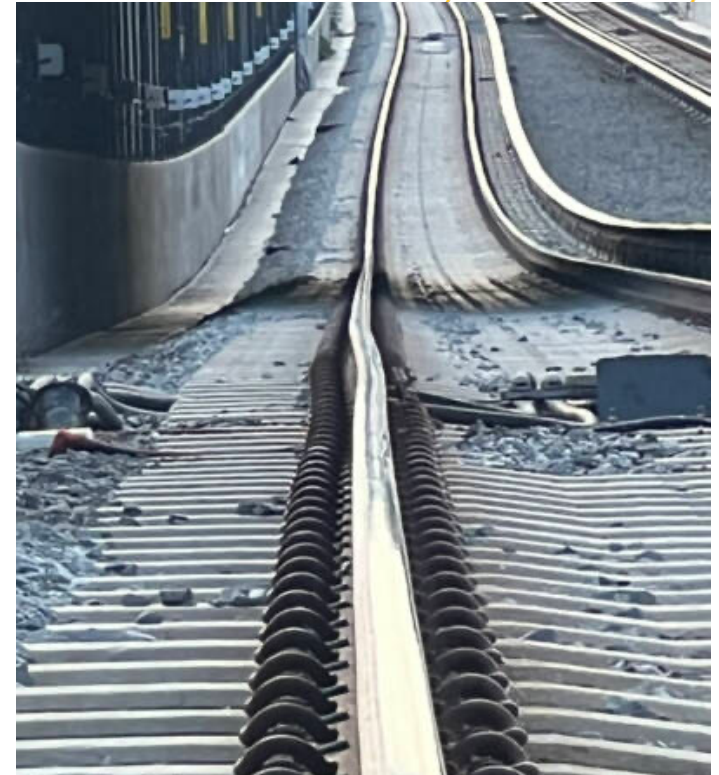
Different agencies and universities monitor weather and climate with little coordination, so large swaths of the state lack coverage.

Representation and Accessibility of Critical Data

All Virginians deserve access to high-quality, accurate, and timely weather and climate data, services, and technical support to make informed decisions.

Solutions are Needed

Virginia must develop both statewide and community-scale solutions that account for local climate and climate change conditions, exposure to risk, community values, and adaptive capacity.



DC metrorail tracks kink due to extreme heat in Crystal City, Virginia.



Why Does Virginia Need a State Climate Office?



- **Virginia is a large, diverse Commonwealth**
 - 133 counties, cities and towns
 - Wide variety of climate zones, populations, businesses, and cultures
- **Virginia is not immune to the impacts of a warming planet**
 - *Sea level rise*: Virginia's coast and tidal rivers
 - *Extreme heat, precipitation, and severe weather*: Urban centers
 - *Excessive precipitation events and prolonged drought*: Rural Virginia
- **Comprehensive analysis of risks** to economic stability and growth, public health, security, and community well-being is **needed at the municipal scale.**
- **Virginia must develop both statewide solutions and community-scale remedies** that account for local climate and climate change conditions, economic resources and vulnerabilities, community values, and adaptive capacity.



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OPINION

Virginia has a new climate office. It's at George Mason University. Here's what it does.

The researchers running the office plan to partner with Virginia Tech and other state universities, and to work with state agencies and business groups, partly those in agriculture.

Launch: July 2026

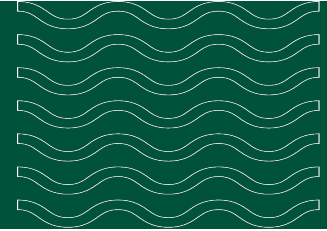
GMU receives authorization to host SCO.

Mission:

Develop and deliver authoritative data, analyses, assessments, and technical expertise regarding Virginia's weather and climate, and the impacts, risks, and risk-management options arising from them, to state and local government agencies, businesses, and communities of place or practice throughout the Commonwealth.



You're Invited to Get Involved!



Read the First Virginia
Climate Assessment



Check out the Virginia State
Climate Office



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Climate Center email
updates

