

# **Impact of Climate Change in Virginia: Discussion on Economic Growth and Low-Income Population**

**Ashley Logan**  
**Undergraduate Student**

Faculty Advisors:

Dr. Shobha Sriharan and Ms. Darlette Meekins

Virginia State University

[www.agriculture.vsu.edu](http://www.agriculture.vsu.edu)

# Introduction

- The climate in Virginia is considered mild for the United States but can be quite variable because of significant topographic differences across the commonwealth and the influence of the Atlantic Ocean.

- Climate varies significantly across the state because of differences in topography.

- Complex coastlines, mountains ranges, and valleys affect heat and precipitation

- 462-by-201 mile expanse have given it a diverse climate, compared to other states which are dominated by flat land or the ocean

- 12-to-20 mile distance can make the difference between a big snow in Charlottesville or Fairfax county, and rain in nearby Zion Crossroads or Woodbridge

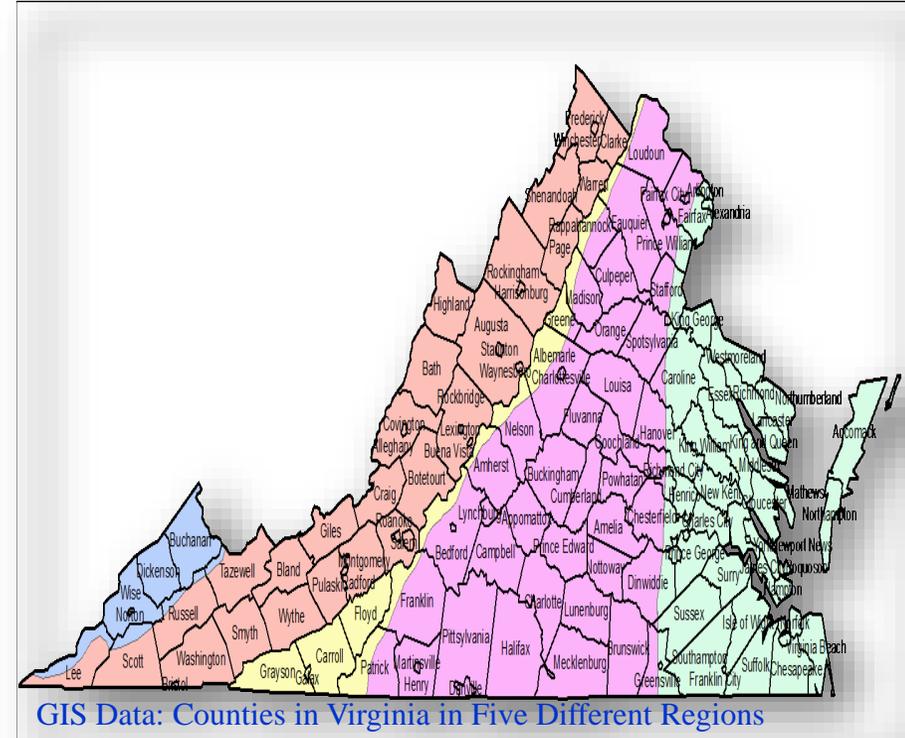


Location of Virginia in Mid-Atlantic Regions of the United States

An increase of Carbon Dioxide emission from human activities effects our weather, wildlife, food production and water.

## Some things to put in perspective continuing this presentation...

- Climate change is cause by human action and will very likely have catastrophic consequence if not tackled urgently.
- 97% of scientists have concluded that human-caused climate change is happening
- Climate is what you expect, weather is what you get.
- Director, Office of Climatology, University of Virginia- Stenger, Phillip J.(Jerry)  
 “That things are changing and continue to change is definitive –that’s certainty the way to bet. It's going to get warmer in Virginia.”



## Climate Variations in Virginia: Five Regions

### “Topography and Climate Work As Team”

- **Precipitation**

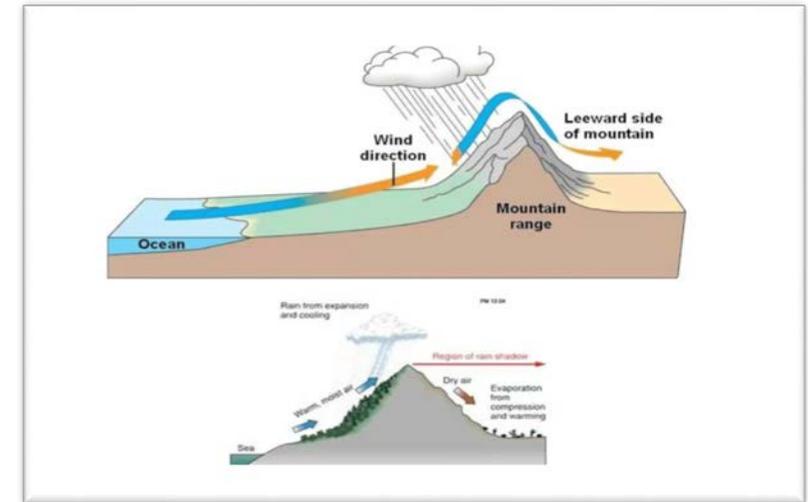
- Shenandoah Valley : Annual Precipitation totals 35-37 inches on average
- Appalachian Plateau : average about 55 inches in the mountains
- Blue Ridge mountain systems also contributes to Virginia’s climate, with it great quantities of rainfall.

- **Winter**

- Blue Ridge : Deep freezes; as comparison to Chicago
- Piedmont: Mild Temperatures
- Costal: Moderate

- **Air currents**

- Virginia topography locks in jet streams
- During a storm onshore warm air will push to the Blue Ridge resulting in floods
- Flowing eastward to valley and ridge will result in drier climate because of rain shadows



Virginia Office of Climatology cautions

“Climate condition typical of one region might in a given year extend outward into another area.”

# Five Regions in Virginia: Popular tourists spots



Shenandoah Park

- 85% of Virginians believe that climate change is happening, and 67% believe that human activity is a factor



White House, Washington D.C

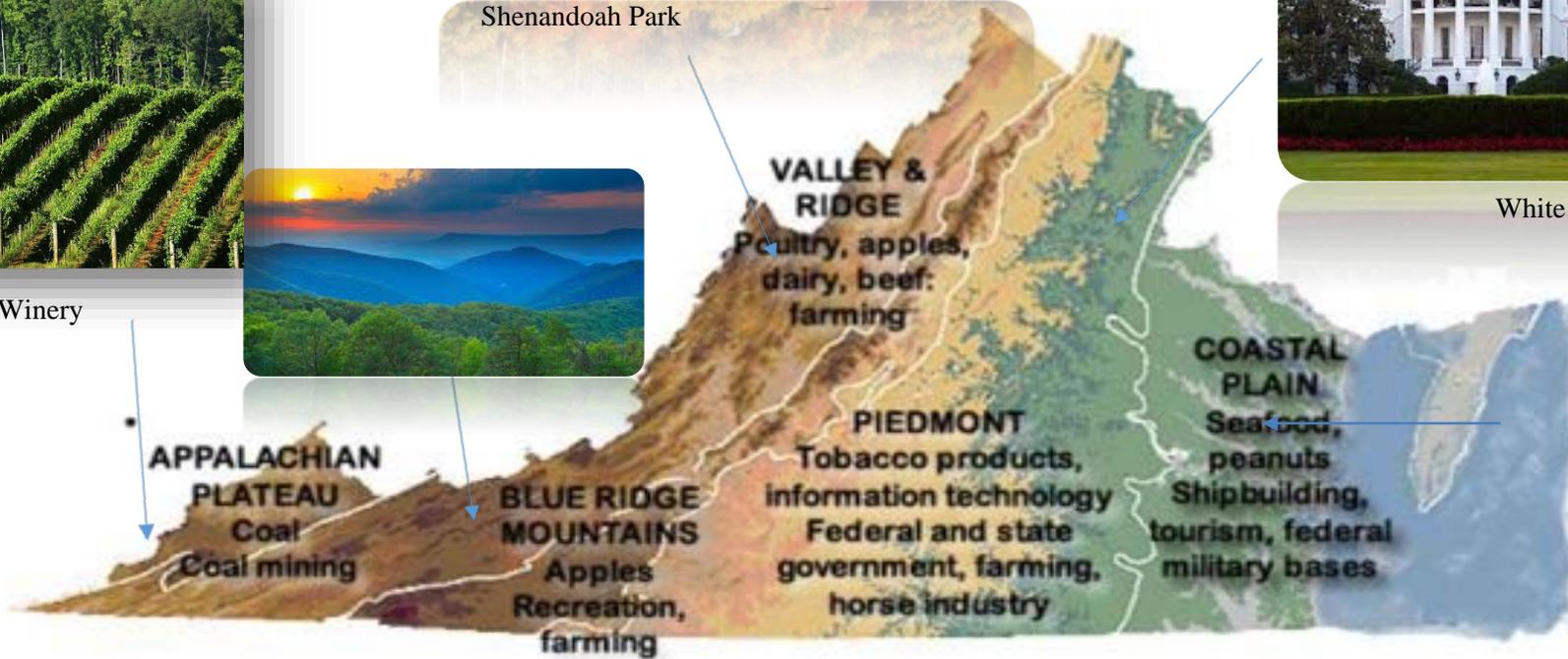
Navy Base, Norfolk



VA beach, Norfolk VA



Deer Creek Winery



## Virginia Five Regions: Food Production

- The mix of crop and livestock production is influenced by climate and water availability
- Major crops in VA: corn, soybeans, hay, and tobacco
- Livestock and dairy are safe, unless summer temperatures rise
- \$2 billion annual production of agriculture
- U.S. production is not at risk but potentially has significant regional changes



### Future action

- Economic Growth
  - Suitability
  - Support natural farmers
  - Use GIS-Geographic Information System
- Engagement of Workers from Minority Background
  - Decrease food deserts
  - Educate healthy diets

[www.agriculture.vsu.edu](http://www.agriculture.vsu.edu)



## Climate Change Affects Virginia: Wildlife

Naturally absorb carbon dioxide from the air

- The changes in weather is making it hard for animal & insects to adapt quickly
- Blooming too early
- Extinction of key species can destroy a habitat
- Deforestation
- Increase in noxious plants and bacteria growing rapidly, which thrive in warm temperatures



NCSTATE Aquarium Greenhouse

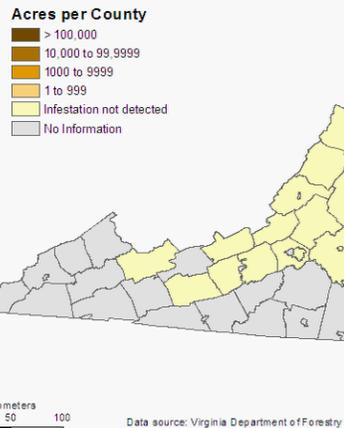
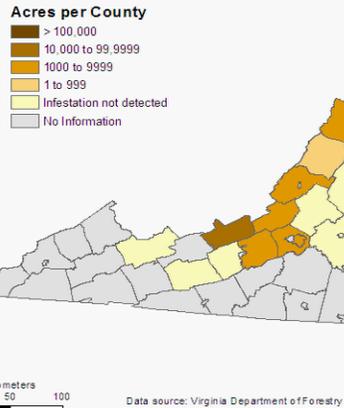


Yellow Floating Hearts-Aquatic Plant



Hydrilla-Aquatic Plant

### Increase in Gypsy Moth Defoliation in Many Counties of Valley and Ridge, and Blue Ridge Mountain Regions in 2008



GIS Data: Gypsy Moth Defoliation in Few Counties in Valley and Ridge Region in 1985

The Intergovernmental Panel on Climate Change says, “1.5 °C average rise may put 20=30% of species at risk of extinction. If the planet warms by more than 3 °C, most ecosystems will struggle.”

[www.agriculture.vsu.edu](http://www.agriculture.vsu.edu)

# Climate Change Affects Virginia: Coastal Region

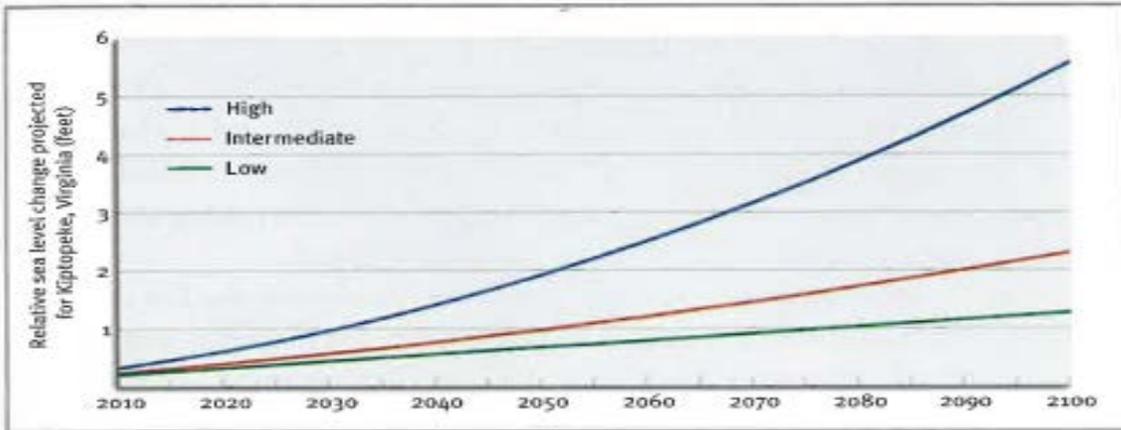
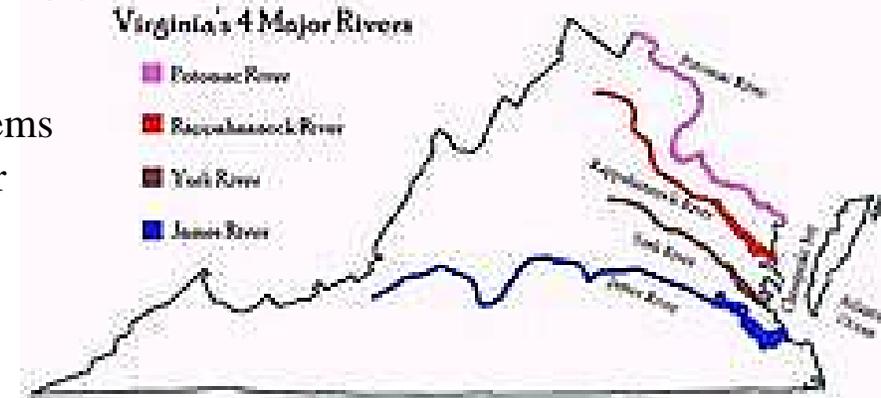


FIG. 16. How fast is sea level projected to rise along Virginia's shorelines?

- Scientists project that Virginia will experience 1.5 feet of sea-level rise during the next 20-50 years, putting the coastal communities increasingly at risk.

- Virginia's river systems drain the terrain in four geographical directions



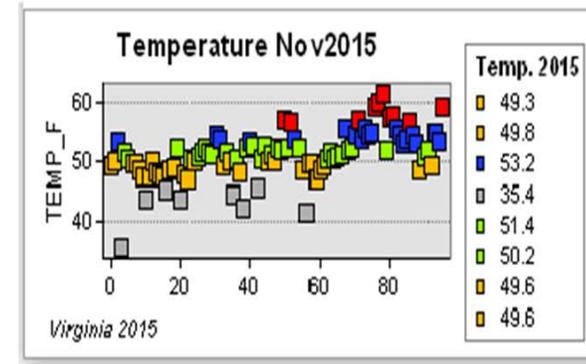
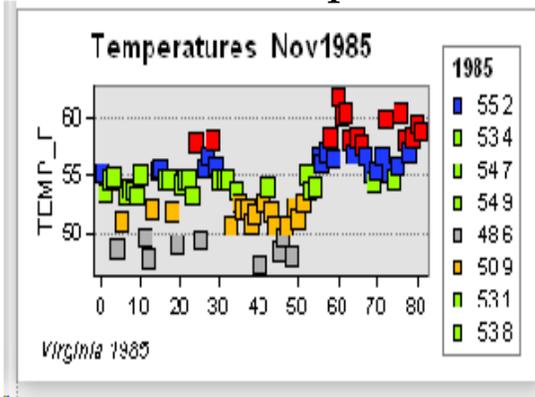
- Home to 1.5 Million people, Hampton Roads is the second-most vulnerable areas to rising seas behind New Orleans

- According to the National Wildlife Foundation (2013)

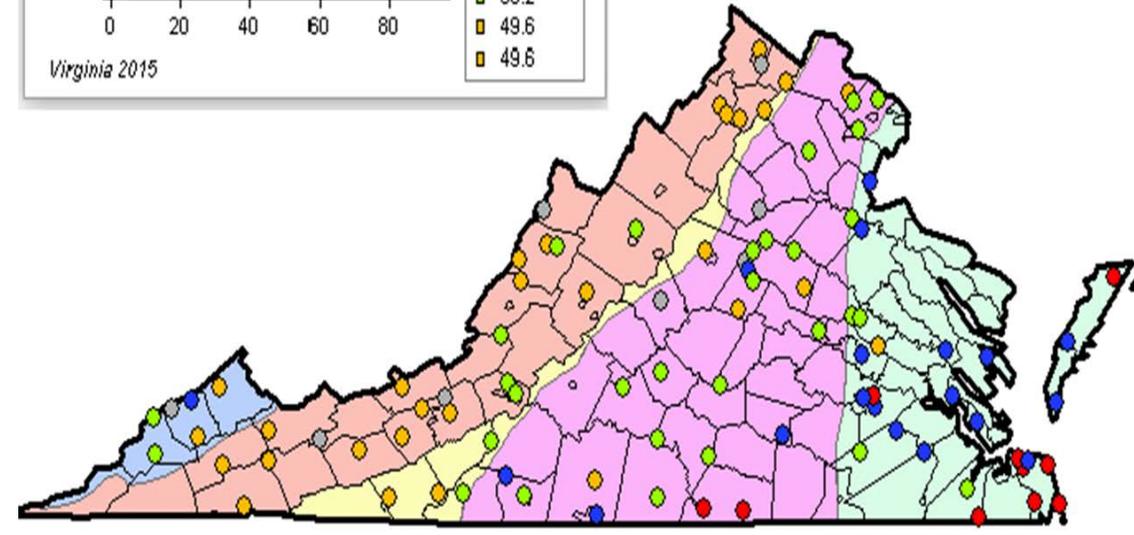
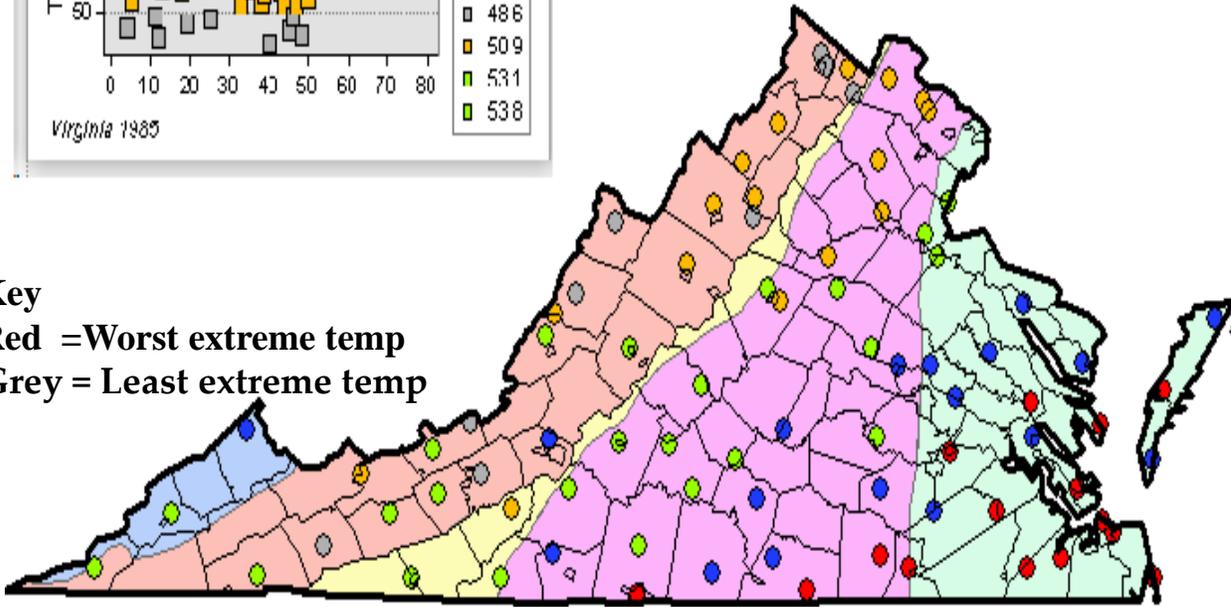
“Virginia is projected to experience a range of impacts from climate change from sea-level rise along the coast to increasing air and water temperatures and changes to precipitation patterns.”

# GIS Data: Temperature changes in different counties in Virginia over time

- Temperature Rise is more evident in Coastal Region of Virginia



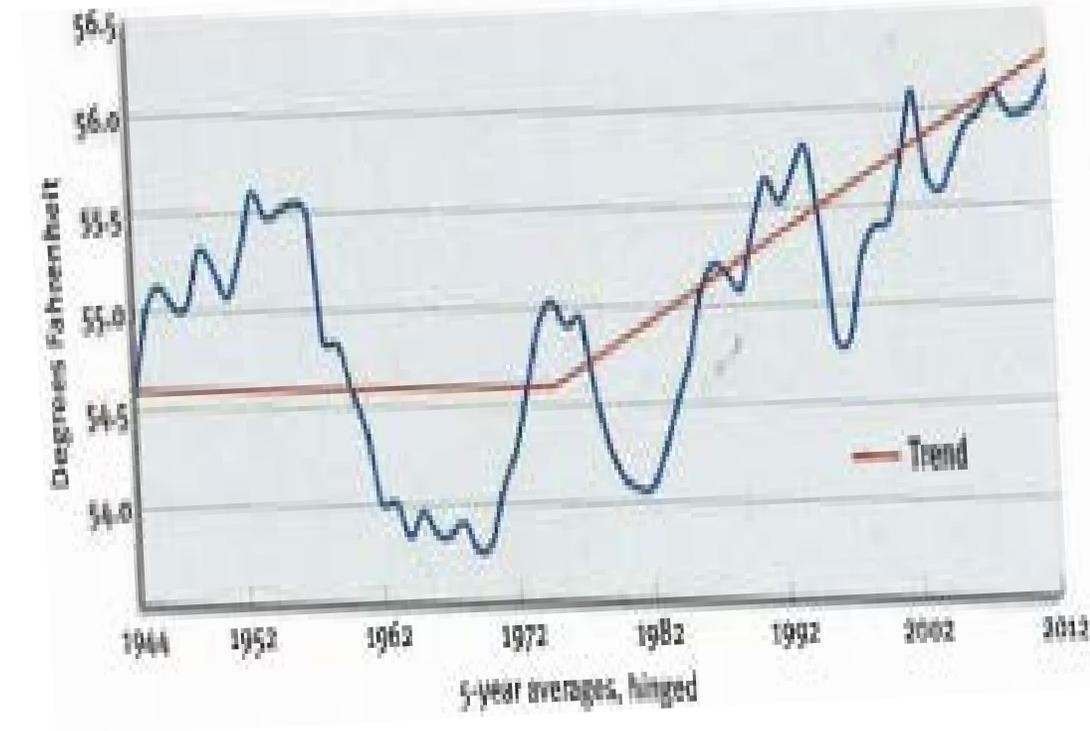
**Key**  
 Red = Worst extreme temp  
 Grey = Least extreme temp



## Climate Change Affects Virginia: Temperatures

Climate change is expected to increase the number and intensity of drought and extreme heat events

- Scientist Projected at The Nature Conservancy
  - VA will be as hot as South Carolina by 2050
  - Hot as northern Florida by 2100
- “40 percent of the increase in atmospheric CO<sub>2</sub> over its pre-industrial-era level has been put there just in the time that has passed since the congressional hearings that warned about climate change in 1988.”
- Hotter temperatures that contribute to the poor air quality threaten exacerbate such health concerns
  - For example Asthma
    - Asthma affects 163,000 children 554,000 adults in Virginia



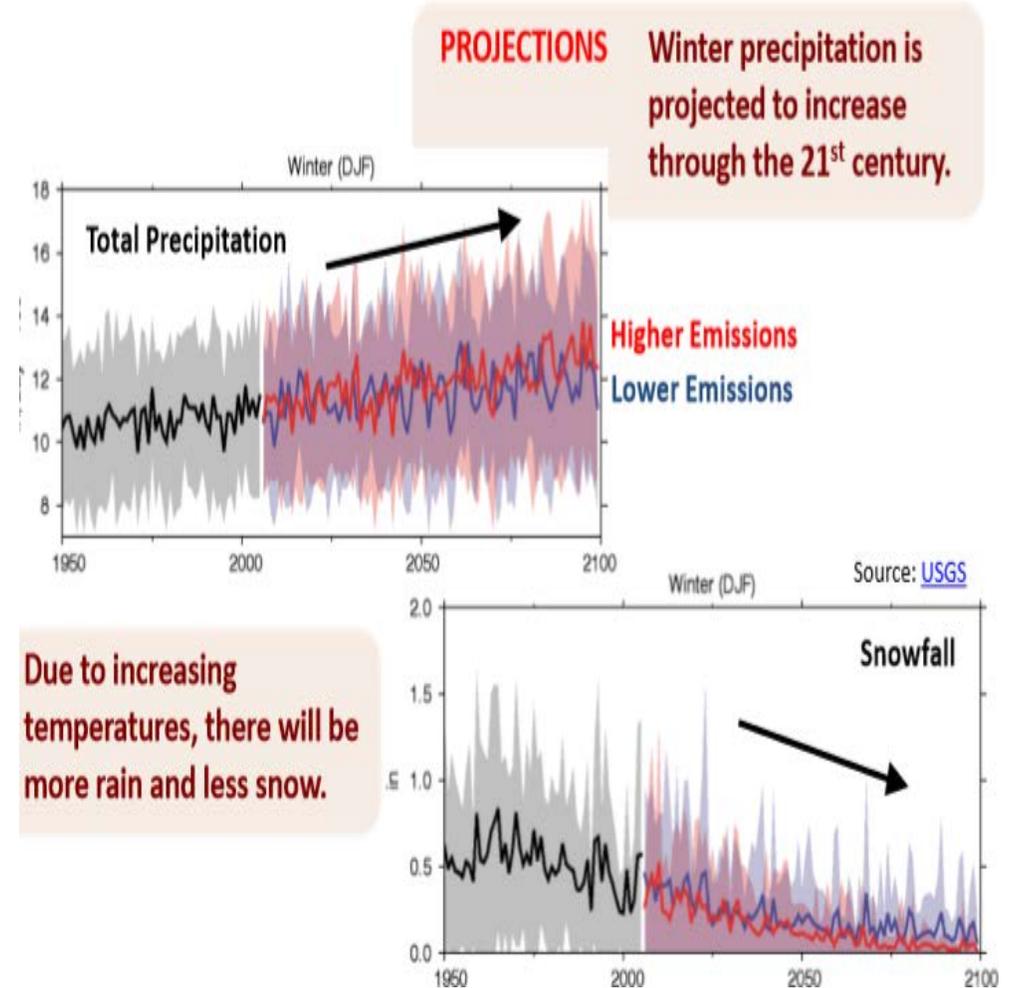
Increasing Temperatures in Virginia- Data: The National Climate Data Center (NCDC)

## Climate Change Affects Virginia: Precipitation & Snowfall

- Less snowfall more inland flooding
- Increase rainfall winter
- Decrease rainfall in summer
- Snowfall moves toward the spring season
- Looking into future more intense rainfall ,droughts, storms and flooding



Changes in precipitation and temperature regimes have the potential to disrupt agriculture and forestry.



# Results and Conclusions

- Human-induced climate change is expected to have many effects on Virginia's weather, wildlife, food production and water supplies.
- The data collection showed that there exists substantial evidence to confirm the evidence of climate changes in Virginia.
- Potential serious damage to forests, the cities, the Chesapeake, the Atlantic, and ourselves, comes next
- Ask yourself what can you do to help sustain our agriculture in U.S? Take the step today to reduce amount of climate change we're causing in everyday activists. Don't think short term , think long term .
- For Virginians, hope this was useful to make changes now because, we live here, this is our home! Participate in mitigation and adaptation

# Acknowledgements

The student author, Ms. Ashley Logan from Virginia State University extends her thanks to the funding agency, Environmental Protection Agency for travel award and her faculty advisors, Dr. Shobha Sriharan and Ms. Darlette Meekins for receiving guidance in research.

Ms. Logan also acknowledges the financial support from the NIFA Grant at Virginia State University.

[www.agriculture.vsu.edu](http://www.agriculture.vsu.edu)

Learn more degrees in agriculture  
from the College of Agriculture at  
[www.agriculture.vsu.edu](http://www.agriculture.vsu.edu)  
or call (804) 524-5672.



Jewel Hairston, Ph.D.,  
Dean / 1890 Administrator

DEPARTMENT OF AGRICULTURE

Interim Chairperson:

Dr. Christopher Catanzaro

Faculty:

Dr. Pamela Thomas-Buchanan

Dr. Marcus Comer

Dr. Glenn Chappell

Dr. Ngowari Jaja

Dr. Richard Omotoye

Dr. Brian Nerrie

Dr. Shobha Sriharan

Antonio McLaren, *USDA Program Liaison*  
(804) 524-5252 • [amclaren@vsu.edu](mailto:amclaren@vsu.edu)

Jacqueline Eldridge, *Admin/Office Specialist*

VIRGINIA STATE UNIVERSITY  
COLLEGE OF AGRICULTURE  
One Hayden Drive • P.O. Box 9416  
Virginia State University, VA 23806  
[www.agriculture.vsu.edu](http://www.agriculture.vsu.edu)  
(804) 524-5961