

Overview of Climate Change in North Carolina

Q&A Notes and Resources

Where are the temperatures being taken (location) to determine temperature, precipitation, etc. in historic trends and calculations?

Most of these observations are being taken at a set of locations that are part of the National Weather Service's Cooperative Observer Network ([link](#)). These are both institutional and volunteer observers who receive training and equipment from the NWS and report their observations on a daily basis. The Cooperative Observer Network has been in existence since about 1890.

It appears methane emissions are increasing (e.g. permafrost thawing). Any thoughts on how much that might make climate change even more extreme?

- It could have a big effect, but there is a lot of uncertainty about how much that could increase in the future.
- Here is a recent article from NASA's Earth Observatory on global methane emissions: <https://earthobservatory.nasa.gov/images/146978/methane-emissions-continue-to-rise>
- August study in Nature (more technical): <https://www.nature.com/articles/s41558-020-0883-0>

How much does shading contribute to the heat island effect?

- Shading can have a big impact on reducing the effect of the heat on people. There have been efforts in big cities (such as Chicago and Phoenix) to increase the amount of vegetation within the urban area to increase evaporation and reduce the magnitude of this effect.
- Asheville Tree Canopy Survey:
 - https://www.ashevillegreenworks.org/uploads/1/1/3/3/11332507/urban_tree_canopy_study.pdf
- The Science Museum of Richmond VA, mapping efforts, legacy of redlining w.r.t. Tree cover, working with planning departments
 - <https://toolkit.climate.gov/case-studies/where-do-we-need-shade-mapping-urban-heat-islands-richmond-virginia>
 - <https://www.smv.org/learn/blog/post/what-urban-heat-island-effect>

If humidity and/or water vapor are already high in NC can significant increases really be expected?

There isn't any fundamental limitation. As the oceans warm, the amount of water vapor near the ocean surface will increase at about 4% per degree F. There will be no barrier to that air being moved over the state by the prevailing wind flow. While we have high water vapor levels, other parts of the US, particularly along the Gulf of Mexico, have higher levels, and that could be our future

Is there research on how much cities have to increase vegetation in order for it to have an impact on the heat island effect?

- The EPA has several resources on the role of vegetation in reducing the urban heat island effect:
 - <https://www.epa.gov/heatislands/using-trees-and-vegetation-reduce-heat-islands>
 - <https://www.epa.gov/green-infrastructure/reduce-urban-heat-island-effect>
- The US Forest Service has also been conducting research to understand the ecological value of urban vegetation (e.g., <https://www.nrs.fs.fed.us/people/dnowak>).

Is it on anyone's radar to increase the resiliency of farms by paying farmers to use cover crops and reduced tillage? The mulch would help with adaptation and the increased sequestered CO₂ would help mitigate climate change.

A number of groups like the Environmental Defense Fund have been conducting research on agricultural management strategies that have potential for mitigating climate change. For example, this blog post from the Environmental Defense Fund describing a recent study on cover crops in Iowa may be of interest:

<http://blogs.edf.org/growingreturns/2020/05/21/cover-crops-reduce-cropping-input-costs-iowa-soybean-association/>.

Do we have resources for folks that work outside? The implication with higher temperature and higher humidity is increased stress for outside workers.

Yes, one particularly useful tool to look at is the Convergence website created by the NC Department of Health and Human Services (NC DHHS), NOAA's Carolinas Integrated Sciences and Assessments (CISA), and the University of North Carolina at Chapel Hill to assist with these types of needs: <https://convergence.unc.edu/>.

How will climate change affect crop insurance and flooding insurance?

- Crop Insurance: While today's speakers weren't as familiar with crop insurance, the US Economic Research Service published a study in 2019 exploring how climate change could affect the cost of the Federal Crop Insurance Program:
<https://www.ers.usda.gov/publications/pub-details/?pubid=93546>.
- Flood insurance:
 - Flood maps are based on past conditions and do not incorporate future changes. This is topic of current research--how best to incorporate changes and uncertainty?
 - Advice: 1) have flood insurance even if you don't think you need it, 2) know what your flood zone is and take actions to reduce your risk/lower flood insurance rates (<https://www.floodsmart.gov/flood-map-zone/find-yours>).
 - Communities have a role to participate in the FEMA Community Rating System ([link](#)) program to achieve a certain number of points/classes to achieve reduction in flood rates for everyone in their jurisdiction.

Has the pandemic had any short-term effects on carbon emissions (potential long-term effects)?

- Yes, there have been some short-term effects on carbon emissions, but there will probably only a be very small effect on long-term emissions assuming the economy returns to usual levels.
- Early analysis from Carbon Brief:
<https://www.carbonbrief.org/analysis-what-impact-will-the-coronavirus-pandemic-have-on-atmospheric-co2>.

Which communities in NC are impacted the most by climate change? How are they impacted, and what steps are being taken to address the impact?

The communities that will be impacted the most are those that have been historically underserved and underrepresented, such as low income communities and communities of color. To develop meaning, practical solutions, these communities should have a voice and be involved in the process.