Sustainability and Climate Change (main/home page)

Elaine Nguyen and Sarah Hill

May 2020

Intro

Climate change is a long-term change in the average weather patterns that define Earth's climate, and starting in the 20th century, has been largely driven by human activities.[1] With the world already feeling the effects of climate change, populations must adapt to these changes. Adaptation is an adjustment in natural or human systems to a new or changing environment, and is key to living sustainably.[2] If we want to work towards keeping our climate at a stable, livable condition, we must incorporate sustainable thinking in much more of our lives and decision making. Sustainability is to have humans and nature exist in productive harmony for present and future generations.[3]

Here in Mansfield, we have actively been working to live sustainably. We had a Climate Task Force to focus specifically on climate issues and we also developed a Mansfield Tomorrow Plan, which acts as a Plan of Conservation and Development and outlines how our town can continue developing while remaining sustainable and environmentally-friendly.

Current State (first subpage)

- The northeast is warming at a rate of 0.5F overall per decade and winters are warming at a rate of 1.3F per decade since 1970 with some observable changes being;
    - More frequent days with temperatures 90F and above
    - Longer growing season
    - Less snow, more rain in winter
    - Earlier spring snow melt
- Since 1895, there's been an increase in annual average temperatures (0.3F per decade) with the greatest increase in the winter (0.4F per decade)
- (image 4) Observed warming trends in CT are higher than on average in the Northeast
    - Annual CT temperature is about 50F (winter 30F) compared to at the beginning of the 20th century when it was 47F (winter 26F)

<u>Local Impacts</u>

- (image 3) There's been an observed increase in heavy rainfall events and in wind intensity during these heavy rainfall events
- Increase in drought
- Weather is not typical of season and there are unpredictable weather patterns, such as warm temperatures in winter months
- Impacts from weather events disrupt quality of life more frequently, such as power outages
- Mansfield contains many critical facilities which special consideration should be given to, including 3 Fire Department Stations

Expected impacts (second subpage)

<u>Impacts on Town Operations</u>

- More frequent and extreme precipitation events will create operation and maintenance challenges

    - Land planning areas will have to deal with increased runoff and drainage needs
- Water planning areas such as Water supply, Wastewater, Stormwater, Coastal Flood Control and Protection, and Dams and Levees will be most affected by increases in, and changed patterns of, precipitation
    - More frequent and intense droughts will decrease the quantity of available water
    - Increased precipitation and extreme precipitation events will increase stormwater and wastewater volumes, decreasing water quality from related pollutant loads
    - Changing precipitation patterns may also increase flooding of local rivers and change 100-year and 500-year floodplains
- Public health will be most impacted through impacts to public health infrastructure, environmental justice communities, air quality and extreme heat ailments and vector-borne diseases
    - Hospitals, health departments, emergency medical services, private practices and shelters will be impacted because of extreme weather events and the increased use of resources to treat and shelter victims
    - Environmental justice communities will be most impacted by lacking access to adequate public health infrastructure, including shelter or evacuation transportation
    - Decreased air quality may increase the incident of, and exacerbate existing, respiratory ailments
    - Increased extreme heat events will increase heat-induced ailments, especially among those who don't have the benefit of air conditioning
    - Ecosystems may be altered in ways that may favor increased vector survival, replication, biting frequency, and geographic range

<u>What this means for Mansfield residents</u>

- (image 2) More frequent days with temperatures above 90
- Heatwaves increase in frequency, duration, and intensity
- Longer growing season
- Less snow, more rain in winter
- Reduced snowpack leads to increased snow density
- Earlier breakup of ice on lakes and rivers
- Earlier spring snowmelt leads to earlier peak river flows
- More ticks and tick-borne diseases
- Poison ivy could become more severe and harmful in its effects

<u>Agriculture</u>

- Warm Weather Crops or crops that mature from late June to early September will be most affected by expected changes in temperature and precipitation
    - This will increase crop disease, pests, and pathogens, and will decrease fruit set
        - For example, peppers don't set above 90degreesF
    - Changes in air quality, especially Carbon dioxide, could increase weed growth, destroying any benefit achieved from slightly increased crop growth
    - Ozone is expected to decrease plant growth and negatively affect pollination
- Dairy cows are threatened because of animal husbandry and feed production which will be highly affected by expected changes in temperature

    - More frequent, higher day-time temperatures and absence of nighttime cooling will stress dairy cows more, decreasing their appetite and reducing lactation and calving
    - The stress of increased temperatures, decreased precipitation during the hottest summer months, and water restrictions because of this will lead to long-term, poor animal health, reduced herd size, and lower income potential for farmers
    - There will be increased energy demands from fans and water cooling required to keep dairy cows cool during hotter temperatures
    - Increased precipitation will lead to difficulty managing herds indoors because of the cleaning requirement, and will lead to difficulty with managing herds outdoors due to wet fields, especially In spring and early summer due to more winter precipitation
    - Increased precipitation will also make manure management and water management (runoff) from dairy infrastructure more difficult

What's currently being done (third subpage)

- (Image 5) Establishing green infrastructure standards that maximize infiltration of stormwater and natural drainage is included in the new zoning regulations related to stormwater
    - With changes in weather patterns including an increase in drought, water conservation will become a necessity. With green infrastructure, we will be able to prevent excess water runoff from the increased rainfall events while also increasing vegetation around the town
- Through a residential organic land care workshop series we are encouraging water reclamation and reuse through use of greywater and water harvesting systems (like rain harvesting) for irrigation and explore options for large projects to connect to UConn's reclaimed water facility
    - As stated above water conservation will be a growing necessity and through using greywater (wastewater from households, not including toilets) and other water harvesting systems we can keep freshwater available for utilities that need it
- Developing and implementing strategies to reduce potable water use in municipal facilities by having facilities add low flow aerators to all sink
    - Low flow aerators reduce the amount of water produced from sinks/faucets, once again improving water conservation
- A mansfield community emergency response (CERT) was established in 2014 with efforts coordinated with Willington, Ashford, and Coventry and EHHD (Eastern highlands health district) established a medical reserve corps (MRC)
    - Creating CERT/MRC provides residents with better care/management in case of an emergency, which are expected to increase in the coming years
- Developing and implementing a community education program on preparing for natural disasters through education and community outreach programs, with the first ever town-wide emergency preparedness day in 2019.

    - Educating the public on how to prepare for natural disasters makes the town and its residents less vulnerable to damage

What can be done in the future (fourth subpage)

<u>At the municipal level</u>

- Encourage development practices that ensure water recharge like adopting low impact development best management practices such as impervious pavement, rain gardens, and green roofs
- Include water conservation in the building code through programs such as incentive programs and irrigation BPMs (building management practices)
- Encourage sustainable water capture through LID management practices
- Develop water reuse guidelines for industry and educate on best practices
- Encourage adaptation strategies that will make positive water inundation effects such as by increasing natural habitat conservation
- Conserve ecosystem services for CT agriculture through sustainable production systems and management practices
- Encourage new agriculture technology and infrastructure to minimize greenhouse gas emissions
- Provide education and support for farmers and consumers with stakeholder-specific information
- Minimize water-use in all agricultural sectors with water conservation methods
- Adaptation strategies for public health
    - Evaluate current early extreme weather event warning systems
    - Cevelop/update municipal emergency preparedness plans
    - Develop cooling stations when needed
    - Develop criteria for school closings like during extreme heat events
    - Include Climate Change preparedness strategies in public health education

<u>What residents can do</u>

- Incorporate LID and other water-conservation techniques into homes
- Vote to elect representatives who support adaptation efforts
- Stay educated and up-to-date on current environmental issues and practices
- Connect with neighbors to prepare for storm events
- Volunteer with the town to incorporate sustainable practices
- Write/call representatives to support sustainable initiatives and proposed legislation
- Become a CERT (Community Emergency Response Team) Volunteer
    - To become a volunteer, complete the training offered by a local government agency
    - For more information visit: https://training.fema.gov/is/courseoverview.aspx?code=IS-317

Other resources/recommendations (last subpage)

Image 1

Info on how to conserve water

https://www.americanrivers.org/rivers/discover-your-river/top-10-ways-for-you-to-save-water-at-home/?gclid=Cj0KCQjwyPbzBRDsARIsAFh15Jb6MQvCZWB2RqHvfqkPeAeMKlQvlDK_gQMkmkQJWkBVUW4_9E7DPzcaAn4BEALw_wcB

Mansfield recycling rules

http://www.mansfieldct.gov/441/Trash-Recycling-Homepage)

Mansfield info on/during an emergency event

http://www.mansfieldct.gov/268/Emergency-Management

References

[1]:Overview: Weather, Global Warming and Climate Change. Retrieved from https://climate.nasa.gov/resources/global-warming-vs-climate-change/

[2]:Climate Change Adaptation: Background & Next Steps for the Northwest Hills. (2016, September 29). Retrieved from http://northwesthillscog.org/wp-content/uploads/2016/11/JWB-5th-Thursday-Climate-Change-Adaptation-Presentation.pdf

[3]:Learn About Sustainability. (2016, October 18). Retrieved from https://www.epa.gov/sustainability/learn-about-sustainability#what

4: Rawitscher, George et al. Ad Hoc Climate Action Task Force. (2018, August 31).

5: The Impacts of Climate Change on Connecticut Agriculture, Infrastructure, Natural Resources and Public Health. (2010, April).

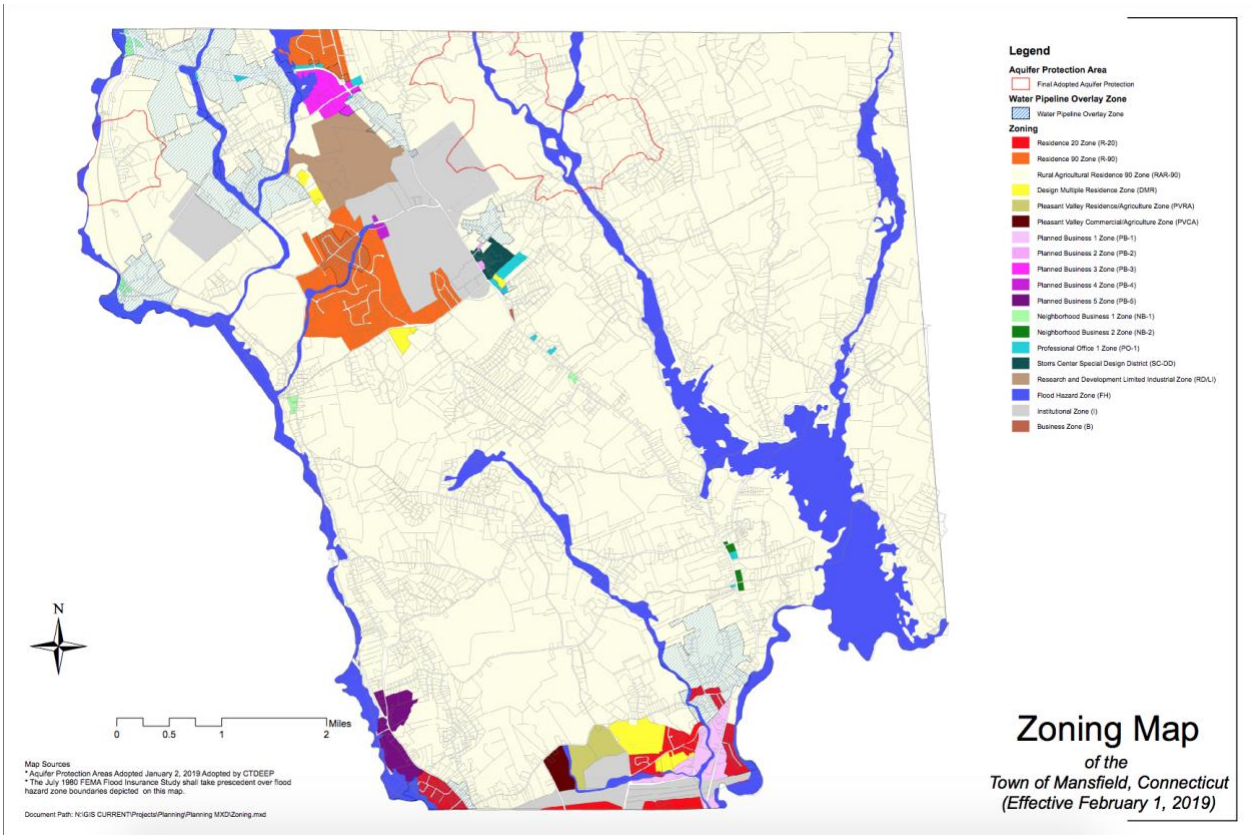
6: Connecticut Climate Change Preparedness Plan. (2011).

7: Seth, Anji et al. Connecticut Physical Climate Science Assessment Report. (2019, August).

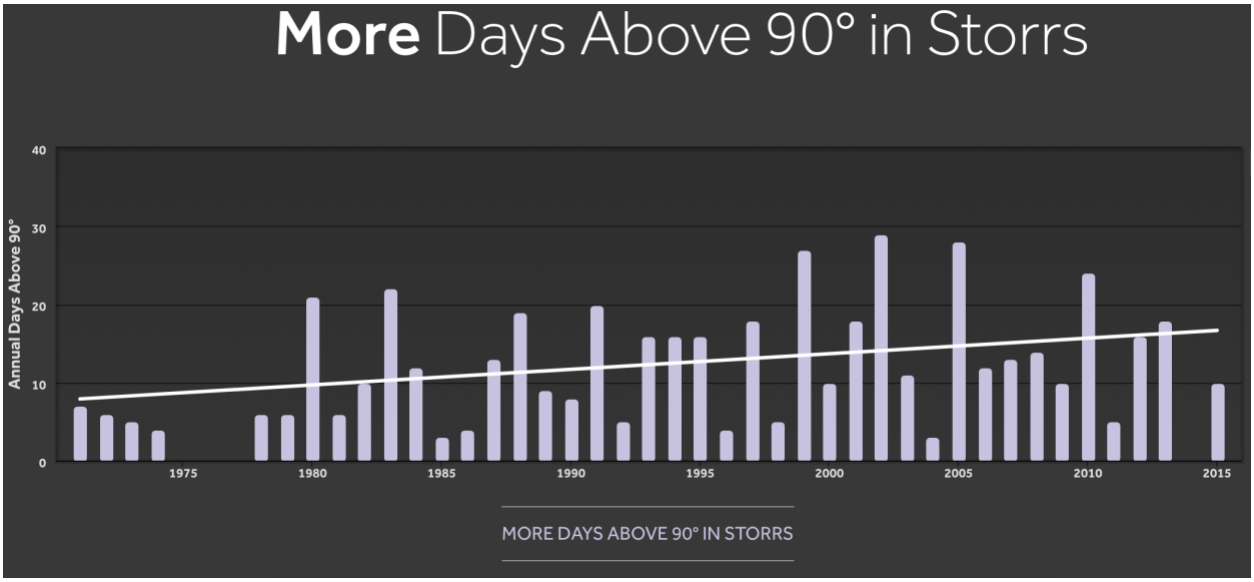
8: Mansfield Tomorrow: Plan of Conservation and Development. (2015, October 8).

9: Wozniak-Brown, Joanna. Building Municipal Resilience and Climate Adaptation through Low Impact Development. (2017, December 7).

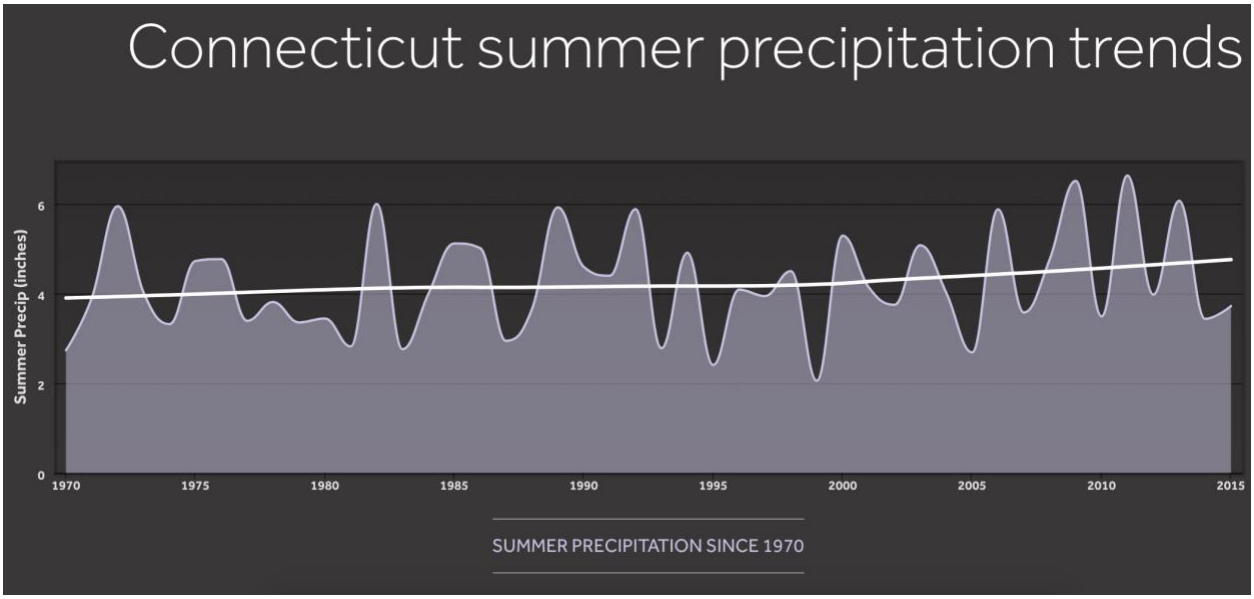
Images to use:



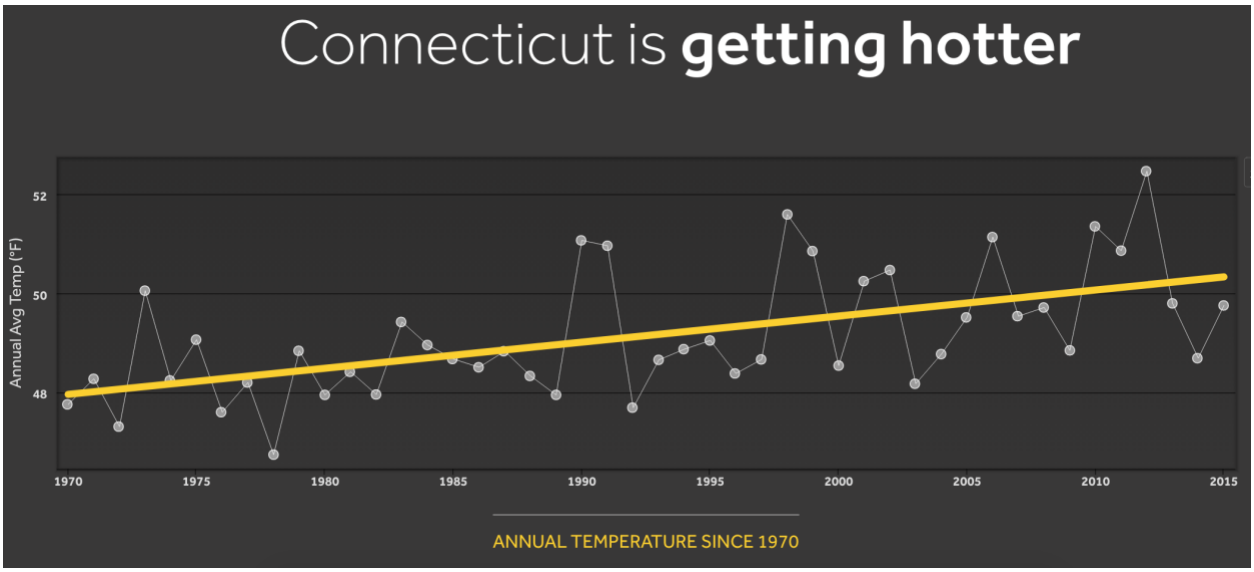
1 (zoning map from http://mansfieldct.gov/DocumentCenter/View/3213/Official-Zoning-Map-Feb-2019)



2 (screenshot from wxshift.com, searching for local climate in 06268 - average temperature trends)



3 (screenshot from wxshift, searching for local climate in CT - average precipitation trends)



4 (screenshot from wxshift, searching for local climate in CT - average temperature trends)

5 (green roof on Storrs Hall at the University of Connecticut, taken by Chester Arnold)