Climate Change Vulnerability Assessment of Georgia Tech

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Class: CP6055 Planning Studio

Link to website with more information on vulnerabilities and references

Purpose

With the threat posed by climate change **imminent**, the goal of this studio was to **assess the vulnerability of Georgia Tech's campus, operations, and surrounding community** to a wide array of hazards expected to get worse as the planet warms, using a combination of literature and research reviews, first-hand interviews with staff and key stakeholders, and geospatial analyses of key campus features.

Scope

The hazards analyzed in this studio were those identified as most salient from the 4th National Climate Assessment:

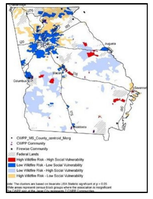
- *Air quality*, impacted by pollutants and wildfires,
- *Extreme heat* and *drought*,
- *Floods*, as might be caused by intense rainfall,
- *High wind events*, such as tornados and hurricanes, and
- *Vector-borne diseases*, both emerging and re-emerging

The impact of the hazards can be wide ranging, and so were evaluated across eight areas covering both the campus and the surrounding community, including utilities, buildings, transportation, health (both physical and mental), safety, food systems, emergency response, and community. Each of these areas was given a score of **low**, **medium**, or **high**, depending on the relative level of vulnerability assessed to the specific hazard.

Equity

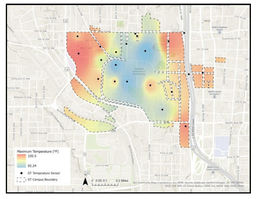
At the core of this vulnerability assessment are the 17 *Sustainable Development Goals* (SDGs), set by the United Nations as part of their 2030 Agenda for Sustainable Development. **The risks identified over the course of this studio directly impact 9 of these 17**, highlighting the importance of preparing for climate hazards as a way of **addressing long-term inequities and injustices for those marginalized communities that still exist** within Georgia Tech's community.

Risks



Air Quality

While Georgia Tech faces no immediate wildfire risks, **the regions surrounding the Atlanta metropolitan area exhibit a significant risk to wildfires**, which can pose air quality concerns for the campus if the smoke is dispersed by wind.
Gaither et al., 2011



Extreme Heat

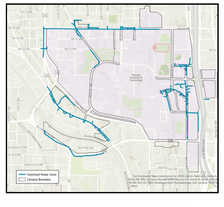
Some areas of campus experience greater urban heat island intensity than others, with **warmer temperatures associated with greater proportion of impervious surfaces** that absorb and retain heat.
Mallen et al., 2020; Georgia Tech Urban Climate Lab, 2017

Drought

Water and soil quality are most at-risk from droughts, which can in turn worsen flooding and wildfires. Tree canopies and vegetation can act as a barrier, helping soil trap and retain moisture.
Giarrusso, 2018

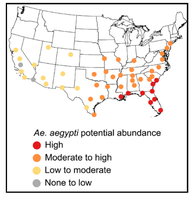
Floods

Stormwater runoff will form **multiple streams cutting through GT campus**, including crossing key roads. This runoff can **degrade infrastructure and contaminate water supplies** if left unaddressed.



High Winds

Overhead power lines, which cross through GT's campus, are at risk for being **downed by winds or debris**. Downed lines can result in **loss of power to campus facilities**, and **can pose a fire hazard**.



Vector-Borne Diseases

Mosquitos are **primary carriers of diseases** like Zika, Dengue, and Chikungunya. **Mosquito habitat is expected to expand northward** due to warming temperatures, eventually encompassing Georgia.
Fourth National Climate Assessment, 2018; Monaghan et al., 2016

Vulnerabilities

Each hazard's **most vulnerable areas** is as follows (for full list, see paper):

Air Quality	Extreme Heat	Drought
Transportation, Health, Community	Utilities, Buildings, Health, Community	Utilities, Buildings, Community
Floods	**High Winds**	**Diseases**
Utilities, Buildings	Utilities, Buildings	Health, Safety

Recommendations

To best prepare for each hazard, we recommend:

- *Air Quality:* investment in air quality sensors and warning system
- *Extreme heat:* installation of heat pumps powered by renewable energy
- *Drought:* increasing tree cover and vegetation throughout campus
- *Floods:* continued investment in green infrastructure, like the EcoCommons
- *High wind events:* performing wind vulnerability assessments on buildings
- *Vector-borne diseases*: reducing incidence of standing water on campus

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